









TRANSACTIONS
OF THE
ILLINOIS STATE HORTICULTURAL SOCIETY

FOR 1879,

BEING THE PROCEEDINGS OF THE TWENTY-FOURTH ANNUAL MEETING,

HELD AT

NORMAL, McLEAN Co., DECEMBER 9, 10 AND 11;

TOGETHER WITH THE PROCEEDINGS OF THE

HORTICULTURAL SOCIETY OF NORTHERN ILLINOIS;

ALSO, OF THE

Warsaw, Galesburg and Kankakee Horticultural Societies,

FOR THE YEAR 1879.

Embracing Reports, Essays and Discussions in all Departments of Tree and Fruit Culture and Floriculture, with Lists of Fruits, Trees and Plants adapted to the several Fruit Districts of the State; also Papers, by Special Scientists, upon those Sciences which are related to Horticulture.

NEW SERIES—VOL. XIII.

EDITED BY THE SECRETARY,

O. B. GALUSHA, MORRIS, ILL.



CHICAGO:

PUBLISHED BY THE SOCIETY.

C. E. SOUTHARD, PRINTER, 175 MONROE ST.

1880.

REPORT TO THE GOVERNOR.

TO HIS EXCELLENCY SHELBY M. CULLOM, GOVERNOR OF ILLINOIS :

In accordance with the requirements of the Act of the General Assembly re-organizing the Illinois State Horticultural Society, I have the honor to present you with a copy of the Thirteenth Volume of the new series of its Transactions, containing the proceedings of the Society for the year 1879, together with a statement of its receipts and expenditures for that year.

Your obedient servant,

O. B. GALUSHA,

Secretary Illinois State Horticultural Society.

Morris, Ill., February 21, 1880.

FRUIT, OR HORTICULTURAL DISTRICTS.

I. NORTHERN ILLINOIS.

1. *Fox River District*—Boone, Cook, DeKalb, Du Page, Grundy, Kane, Kankakee, Kendall, Lake, LaSalle, McHenry, Will.—12.

2. *Rock River District*—Bureau, Carroll, Henry, Jo Daviess, 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.

5. *Centralia, or Wabash District*—Clark, Clay, Crawford, Cumberland, Edwards, Effingham, Fayette, Franklin, Hamilton, Jasper, Jefferson, Lawrence, Marion, Richland, Wabash, Wayne, White.—17.

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.

OFFICERS FOR 1880.

PRESIDENT.

PARKER EARLE, Cobden.

Vice-President—J. T. JOHNSON, Warsaw.*Secretary*—O. B. GALUSHA, Morris.*Treasurer*—S. G. MINKLER, Oswego.*EXECUTIVE BOARD.*

PARKER EARLE.....President, State Society.
 O. B. GALUSHA.....Secretary, State Society.
 W. A. PRATT....President, Horticultural Society of Northern Illinois.
 JONATHAN PERIAM,Vice-Pres't, Horticultural Society of Northern Illinois.
 A. C. HAMMOND....President, Horticultural Society of Central Illinois.
 J. W. ROBISON,Vice-President, Horticultural Society of Central Illinois.
 J. M. PEARSON....President, Horticultural Society of Southern Illinois.
 E. HOLLISTER, JR.,Vice-Pres't, Horticultural Society of Southern Illinois.

COMMITTEE ON GENERAL HORTICULTURE.

This committee is expected to report, each for his respective district, on the *status* of Horticulture therein, modes of culture and results, the weather and its effects upon trees and plants and the development of fruits, adaptation of different species and varieties to different soils, prevalence of insects and remedies for noxious species; in short, to report all *facts* which he may be able to collect which will be of benefit to the fruit-growers and tree-planters.

1st District.....W. T. NELSON, Wilmington.
 2d "ARTHUR BRYANT, JR., Princeton.
 3d "C. N. DENNIS, Hamilton.
 4th "H. K. VICKROY, Normal.
 5th "B. PULLEN, Centralia.
 6th "J. M. PEARSON, Godfrey.
 7th "T. A. E. HOLCOMB, Cobden.

STANDING COMMITTEES FOR 1880.

Gentlemen named on these committees are requested to investigate and report independently in their several departments.

ORCHARD CULTURE.

S. G. Minkler, Oswego; J. W. Robison, Tremont; E. A. Reihl, Alton.

BERRY CULTURE—STRAWBERRIES.

C. N. Dennis, Hamilton; E. C. Hatheway, Ottawa; G. W. Endicott, Villa Ridge; J. H. Stewart, Quincy.

BERRY CULTURE—RASPBERRIES AND BLACKBERRIES.

J. H. Sanborn, Anna; Henry M. Dunlap, Champaign; O. B. Galusha, Morris.

GRAPES AND GRAPE CULTURE.

Fred. Hayden, Alton; James Crow, Crystal Lake; T. J. Hale, Galesburg.

PEACHES AND PLUMS.

E. J. Ayres, Villa Ridge; B. Pullen, Centralia; J. T. Johnson, Warsaw.

VEGETABLE GARDENING.

E. Hollister, Sr., Alton; H. K. Vickroy, Normal.

FARMERS' HORTICULTURE.

N. J. Colman, St. Louis; A. C. Hammond, Warsaw.

NEW FRUITS, TREES AND PLANTS.

Samuel Edwards, Mendota; Parker Earle, Cobden; J. S. Johnson, Warsaw.

FLORICULTURE.

Prof. J. V. N. Standish, Galesburg; Mrs. A. M. Mitchell, Warsaw; Mrs. G. A. Tryon, Galesburg.

FORESTRY AND ORNAMENTAL TREE-PLANTING.

Robert Douglas, Waukegan; J. W. Fell, Normal; Dr. J. A. Warder, Ohio.

LANDSCAPE GARDENING.

Dr. A. G. Humphrey, Galesburg; Jonathan Periam, Chicago.

ENTOMOLOGY.

Prof. Cyrus Thomas, Carbondale; Miss Emily A. Smith, Peoria; D. B. Wier, Lacon.

ORNITHOLOGY.

Prof. S. A. Forbes, Normal; Charles K. Worthen, Warsaw.

BOTANY AND VEGETABLE PHYSIOLOGY.

Prof. T. J. Burrill, Champaign; Prof. G. H. French, Carbondale; Dr. C. W. Spaulding, St. Louis.

METEOROLOGY.

Prof. J. H. Tice, St. Louis; Dr. N. E. Ballou, Sandwich; T. McWhorter, Aledo.

LIST OF MEMBERS

FOR 1880.

NAME.	ADDRESS.	BUSINESS.
Augustine Henry.....	Normal.....	Nurseryman; Snyder Blackberry a specialty.
Augustine John.....	Pontiac.....	
Avery Henry.....	Burlington, Iowa.....	E. R. Cherries and Hardy Small-fruits specialties
Baldwin Jackson.....	Jacksonville.....	Nurseryman.
Baller F. A.....	Bloomington.....	Florist.
Bancroft L. R.....	Pontiac.....	Fruit Grower.
Bigham J. R.....	Chatsworth.....	
Blodget Daniel.....	Brighton.....	
Boardman Dr. E. R.....	Elmira, Stark Co.....	
Bouton H. C.....	Anna.....	Pub. and Prop. <i>Farmer and Fruit Grower.</i>
Brown K. M.....	Normal.....	Fruit Grower.
Bryant Arthur, Sr.....	Princeton.....	Orchardist and Farmer.
Burnham John.....	Batavia.....	Amateur Fruit Grower.
Burrill T. J.....	Champaign.....	Prof. Horticulture I. I. University.
Cart J. J.....	Morris'ville, Christ'n Co.....	Hedge Plants and Apple Seedlings.
Clapp Henry.....	Morris.....	Fruits and Vegetables; Hard Maples.
Cochran J. W.....	Blue Island.....	Amateur Fruit Grower.
Colwell William.....	Sparta, Randolph Co.....	
Cowing G.....	Muncie, Ind.....	Strawberry, Rasperry and Blackberry Plants
Daniels L. E.....	Mazon, Grundy Co.....	Farmer and Fruit Grower.
David Dr. E. B.....	Aledo.....	
De Garmo R.....	Assumption.....	Fruit Grower.
Dennis C. N.....	Hamilton.....	Fruit Grower.
Dennis Mrs. C. N.....	Hamilton.....	
Dewey D. M.....	Rochester, N. Y.....	Original Colored Fruit-plate manufacturer.
Douglas Robert.....	Waukegan.....	Grower of Evergreen and Deciduous Tree Seedlings.
Dunlap Henry.....	Champaign.....	Fruit Grower.
Earle Parker.....	Cobden.....	Fruit Grower.
Eaton O. H.....	Tremont, Tazewell Co.....	
Edwards Samuel.....	M'dota, formerly Lamoille.....	Nursery and Small-fruits.
Edwards Mrs. Samuel.....	Mendota.....	
Emerson F. M.....	Bloomington.....	
Farnsworth, W. W.....	Waterville, O.....	Nurseryman and Grower of Large and Small-fruits.
Fell C. E.....	Bloomington.....	Nurseryman.
Fell J. W.....	Normal.....	
Fisher S. D.....	Springfield.....	Sec. State Board Agriculture.
Frazier Dr. J. V.....	Viola, Mercer Co.....	Practicing Physician.
French Prof. G. H.....	Carbondale.....	Prof. in Normal University.
Galusha O. B.....	Morris.....	Grower of Choice Plants, Str'b's, Rasp'b's and Bl'kb's
Galusha Mrs. M. J.....	Morris.....	
Gaston A. H.....	Lacon.....	Nurseryman; New Pears a specialty.
Gaston J. R.....	Normal.....	Fruit and Vegetable Grower; Prop. of Creamery.
Gaston Mrs. J. R.....	Normal.....	
Garrett G. W.....	Roscoe.....	Fruit Grower.
Gatchell A.....	Quincy.....	Grower of Small-fruits and Vegetables.
Graves E. W.....	Sandwich.....	
Graves H. C.....	Sandwich.....	Nurseryman; Apple Stocks and Root Grafts specialties.
Haines James.....	Pekin.....	Insurance.
Hammond A. C.....	Warsaw.....	Orchardist; Apples, Cider and Cider Vinegar.
Hatheway E. C.....	Ottawa.....	Grower of Small-fruits and Vegetables.
Holdridge W. H. H.....	Tonica.....	Farmer and Fruit Grower.
Hollister Capt. F.....	Alton.....	Grower and dealer in Small-fruits and Vegetables
Humphrey Dr. A. G.....	Galesburg.....	Physician and Fruit Grower.
Jackson William.....	Godfrey.....	Grower of Fruits and Vegetables
Johnson J. S.....	Elderville.....	Farmer and Fruit Grower.
Johnson J. T.....	Warsaw.....	Fruit Grower.
King S. M.....	Bloomington.....	
Kinney D. F.....	Rock Island.....	Nurseryman and Fruit Grower.
Knodle Brothers.....	Irving.....	Nurserymen.
Laughlin E. L.....	Normal.....	
Mann W. H.....	Gilman.....	Nurseryman. Hedge Seeds and Plants.

NAME.	ADDRESS.	BUSINESS.
McKinstry B.....	Grant Park, Kank. Co.....	Nurseryman and Breeder Short-horn Cattle.
McWhorter T.....	Aledo.....	Nurseryman and Orchardist.
Metcalf B.....	Normal.....	
Miller & Hunt.....	Chicago.....	Roses and all kinds Plants by mail. Send for list.
Minkler S. G.....	Oswego.....	Orchardist and Farmer.
Minkler Mrs. S. G.....	Oswego.....	
Minier G. W.....	Minier.....	Farmer and Orchardist.
Muir Henry.....	Galesburg.....	
Nelson W. T.....	Wilmington.....	Nurseryman, Farmer and Orchardist.
Ridings J. W.....	Morris.....	Farmer and Orchardist.
Robison J. W.....	Tremont.....	Orchardist and Farmer.
Roots Prof. B. G.....	Tamara.....	Teacher.
Sanford E.....	Morris.....	Solicitor; Money loaned to Farmers.
Schroeder Dr. H.....	Bloomington.....	Grape Grower.
Spalding Frank E.....	Springfield.....	
Spalding J. B.....	Springfield.....	Nurseryman, Wholesale and Retail.
Spicer R. H.....	Viola, Mercer Co.....	
Stewart J. T.....	Peoria.....	Physician, Surgeon and Botanist.
Stichter H.....	Washington, Iowa.....	Grower of Small-fruits and Plants.
Storrs, Harrison & Co.....	Painesville, Ohio.....	Nurserymen and Florists.
Teas E. Y.....	Dunreith, Ind.....	New Chinese and Japanese Pears; Small-fruits.
Terry J. W.....	Viola, Mercer Co.....	Nurseryman; Apples a specialty.
Thomas Prof. C.....	Carbondale.....	State Entomologist.
Turner Prof. J. B.....	Jacksonville.....	Farmer and Fruit Grower.
Van Emmon W. W.....	Yorkville.....	
Vestal Prof. Geo.....	Lafayette, Ind.....	Prof. in Purdue University.
Vickroy H. K.....	Normal.....	Grower of Small-fruits and Vegetables.
Vickroy Mrs. H. K.....	Normal.....	
Waller Edward C.....	94 Wash'gt'n st., Chicago.....	Real Estate.
Washburn Andrew.....	Bloomington.....	
Watson Mrs. N. J.....	Normal.....	
Watson W. A.....	Normal.....	Nurseryman; Snyder Blackberry a specialty.
Webster Jabez.....	Centralia.....	Fruit Grower.
Wells A. W. & Co.....	St. Joseph, Mich.....	Best Fruit Packages at Lowest Living Rates.
Whitney A. R.....	Franklin.....	Orchardist; Cider Vinegar.
Wilson Silas.....	Atlantic, Iowa.....	Centennial Grape and Seedling Nursery.

HONORARY MEMBERS.

Dr. J. A. Warder, North Bend, Ohio; Dr. J. M. Gregory, Champaign, Ill.; Prof. Cyrus Thomas, Carbondale; Prof. J. H. Tice, St. Louis; Prof. J. B. Turner, Jacksonville; Prof. B. A. Mathews, Knoxville, Ia.; Dr. Allan Furnas, Danville, Ind.; Prof. S. A. Forbes, Normal, Ill.; Miss Emily A. Smith, Peoria; Mrs. H. V. Austin, W. A. Ragan and Mrs. W. A. Ragan, Clayton, Ind.; Mrs. Sally Soper, Danville, Ind.; Mrs. F. A. Jones, Ind; Mrs. Mary J. Harland, Ind.; Chas. W. Murtfeldt, Kirkwood, Mo.



PROCEEDINGS

OF THE

TWENTY-FOURTH ANNUAL MEETING

OF THE

ILLINOIS STATE HORTICULTURAL SOCIETY.

HELD AT

NORMAL; DECEMBER 9, 10, 11, 1879.

The Illinois State Horticultural Society met, pursuant to adjournment, to hold its twenty-fourth annual meeting, in the Philadelphian Hall of the State Normal University, at Normal, McLean county, December 9, 1879, at ten o'clock A. M.

The President of the Society, Prof. T. J. BURRILL, of Champaign, presided.

The meeting was opened with prayer by the Rev. A. ETHRIDGE, of the Congregational church of Normal.

ADDRESS OF WELCOME.

E. C. HEWITT, LL. D., President of the State Normal University, in behalf of the citizens of Normal, welcomed the Society in the following words:

Mr. President and Gentlemen of the State Horticultural Society:

It is a fortunate thing for us when duty and inclination point in the same direction. I am in that happy condition this morning. I am

directed by the citizens of Normal to welcome you to our town on this occasion. This we gladly do, for we have known you well in times past; many of your prominent members have lived in this community; some are with us yet; some have moved away from us, and some have gone from us on that journey from which there is no return. We have known these men as intelligent, upright, public-spirited citizens; and for this reason we are glad to welcome the body of which they were or are members.

I can well remember when only rank grass and prairie flowers covered the surface now occupied by our pleasant village. The change in its appearance we recognize as due largely to the work of some of your members, and to the influence of your Society. For this reason, also, we welcome you to our town and to our homes.

In the name of the State Board of Education I welcome you to this building. We desire you should feel perfectly at home here; that you should use its halls for your purposes; that you should freely visit its recitation rooms and its laboratories at any and all times when you may choose.

We feel that your work and ours are not very far apart. We are striving to elevate the people of this great commonwealth, intellectually and morally; you are striving to benefit them by increasing their physical comfort and by ministering to their love of the beautiful. In all my acquaintance with the affairs of this institution I have never known a member of this Society who was an enemy of the Normal University. There may have been such a case; but, if so, it has not come to my knowledge.

I desire to add my personal welcome. I remember attending one of the meetings of your Society when I first came into this community. If I mistake not, it was twenty-one years ago this month; the meeting was held in the old "College Hall," in Bloomington. I was then much pleased with your work, and interested in it, and some of the members I there met for the first time I was afterward privileged to call my friends.

It is not necessary for me to prolong these remarks. Your time is precious, and I have claimed quite enough of it. In conclusion, I desire again, in the name of the people of Normal, of the Board of Education, and for myself, for I would not be excluded, to welcome you heartily to this place and this people.

RESPONSE BY THE PRESIDENT.

To this eloquent and cordial greeting President BURRILL responded :

In the name of and for the members of this Society I return to you, sir, very many thanks for the cordial and encouraging words with which you have greeted us. And you will allow me to say that your remarks are indeed encouraging, and will be treasured as fresh incentives for renewed and redoubled activity on the part of these my colleagues in their laudable efforts to contribute something of good in their day and generation to the fair land in which we live.

Your own arduous labors are in other fields, and your tribute of praise is therefore of greater worth and your appreciation of our art and efforts the more highly valued. Daily contact with a certain class of phenomena and ceaseless stud in a given line may unduly influence the judgment and mislead the devo. in the true estimate of his calling ; but when commendation comes from those free from such bias the spoken word carries with it a meaning and value worthy of remembering and cherishing. Again I thank you for the pleasantly chosen words with which you have expressed your good will and appreciation for yourself and the citizens of this community.

But your own interest in our art has been, to my knowledge, quickened in the past by a participation in its labor. Memory carries me back, how many years I can hardly tell, and presents now in mental vision what my eyes at that other time beheld. It was a warm, bright day in spring-time, and with coat off and spade in hand you were toiling upon the home lot still occupied as your home residence ; and I can say that in this as in other undertakings you won success. *President Hewitt*, the trees grew. I can testify to that. They were not like those planted by our late honored Secretary of State, Wm. H. Seward. His time had been taken by employments other than those of horticulture, and in the acquirement of knowledge, great as was his store, the facts and processes concerning tree-planting had not found a place. But having a home place to improve, he zealously undertook the work at his own time and in his own way. While thus heroically at work, a neighbor, better informed than himself in this particular, came along, and after watching the interested activity of his more famous friend exclaimed : " Well, it is fun to plant trees, even if they will not grow."

Now permit me to say that it seems to me eminently appropriate that you, sir, should address us. You are accustomed to talking to students. These whom you now see before you belong to that class. They have the

great book of Nature open before them, and all feel that there is very much to be learned from its glowing pages. Some truths have been mastered, some problems have been solved; but there are many mysteries unexplained, and depths of meaning not yet fathomed. It is the business, as well as pleasure, of this body to investigate and study, and I can assure you these students need not the schoolmaster's rod to stir them to their duty. There is interest in it. Pleasure and profit combine to stimulate diligent and persevering effort.

Again. Your students expect to become teachers; they are preparing themselves for that purpose. So these students, the members of this Society, are, and are to be, teachers. Whether they choose to do so or not they must teach by precept and example. You will bear me witness that I do not flatter when I say that this teaching has been in the past and will be in the future eminently successful. They are good teachers, because live teachers, because they work with keen personal interest and heart-felt enthusiasm.

I will not prolong these remarks, though I feel there is much that might be said by one well acquainted with the flowers of rhetoric. I hope our meeting may prove interesting to you and the members of your great and noble institution. I am heartily glad that it may be said with truth that the members of the State Horticultural Society are warm friends of the State Normal University. Our studies are different, but they do not conflict; our labors take different directions, but they tend to the same end—the upbuilding of the State, and the intellectual, social and moral welfare of the people which compose it.

REPORT OF SECRETARY.

Mr. President and Fellow Members :

In presenting my special report for the fiscal year of December 9, 1878, to December 8, 1879, allow me to congratulate you upon the continued and increasing interest in the work of our Society, which is manifested in the demand for copies of its transactions. Officers of sister societies, of public libraries, of colleges and institutions of learning, and superintendents of public instruction, not only of our own State but of surrounding States, have solicited copies, and upon their receipt expressed appreciation of their value. In accordance with instructions of the Executive Board I have distributed among the county superintendents of the State, upon their request, about four hundred and fifty copies, consisting of volumes 10, 11, 12, for the use of district-school libraries in their respective counties.

The reports from the various committees will better place before you the status of horticulture in our State than your Secretary can do.

Although the year has not been as favorable for horticultural work and success as we could wish, yet upon the whole we have cause for encouragement rather than despondency, as there is an evident general advancement in modes of culture and improvement in varieties of fruits and trees.

The great need of our Society at present seems to be the enlistment of intelligent, energetic young men to swell our ranks and be prepared to take the places of those who are older and whose work will soon be completed. If we constitute ourselves recruiting officers for this purpose it will soon be accomplished.

FINANCIAL REPORT.

The following is a list of the orders drawn upon the Treasurer of the Society since the last report :

Date.	No.	In whose favor.	For what purpose.	Amount.
1878.				
Dec. 11,	19,	E. Hollister, expenses at meeting of Board, Jan., '77,	\$	5 95
"	20,	Dr. A. G. Humphrey, expenses at meeting of Board, Jan., '77.....		11 50
"	21,	O. B. Galusha, balance on settlement (as Sec.).....		36 36
"	22,	S. G. Minkler, percentage as Treasurer.....		15 39
"	23,	Prof. J. H. Tice, expenses as lecturer, meeting 1878,		7 96
1879.				
Jan. 16,	24,	H. K. Vickroy, half amt. for services reporting....		10 00
"	25,	L. K. Scofield, expenses of meeting of Ex. Board..		21 20
Feb. 6,	26,	A. C. Hammond, " " " ..		12 10
"	"	27, T. J. Burrill, " " " ..		7 50
"	14,	28, S. M. Slade, " " " ..		20 00
Mch. 18,	29,	C. E. Southard, publishing Transactions 1878.....		766 50
"	"	30, O. B. Galusha, expenses of meeting Ex. Board....		16 50
Nov. 7,	31,	O. B. Galusha, salary as Secretary for 1879.....		300 00
"	25,	32, H. K. Vickroy, balance for services as reporter....		10 00

CREDITS AND EXPENDITURES.

Salary for 1879.....	\$300 00
Office rent, fuel and lights.....	30 00
Traveling expenses (while publishing).....	22 30
Freights and expressage.....	7 50
Postage on correspondence.....	18 03
Postage on books and circulars.....	9 83
Telegrams.....	1 75
Stationery.....	4 02
Printing bills.....	13 00
Boxes and cordage for books.....	1 65
Total.....	\$408 08

RECEIPTS.

Order No. 31, for salary 1879.....	\$300 00
Thirty-one Memberships for 1879.....	31 00
Five Memberships for 1880, and 30c. postage.....	5 30
Total receipts.....	\$336 30
Balance due on all accounts.....	\$71 78

Respectfully submitted,

O. B. GALUSHA, *Secretary.*

Mr. S. G. MINKLER, Treasurer of the Society, presented his report :

TREASURER'S REPORT.

DEBITS.

Amount in Treasury at last report.....	\$ 433 76
Received from State Treasurer (March).....	500 00
“ “ “ (Nov. 8).....	800 00
“ for Memberships.....	52 00
“ from Huggins's estate.....	9 85
Total.....	\$1,795 61

CREDITS.

Paid out Warrants, Nos. 19 to 32 inclusive.....	\$1,240 96
“ Emily A. Smith, on verbal order (for expenses as lecturer).....	8 40
“ Expressage.....	2 30
“ Postage.....	50
“ Exchange.....	1 30
Total.....	\$1,253 46
Balance in Treasury Dec. 8, 1879.....	\$542.15

Respectfully submitted,

S. G. MINKLER, *Treasurer.*

On motion of Dr. HUMPHREY, the reports of the Secretary and Treasurer were received, to be handed to the Auditing Committee for examination when such committee is appointed.

Mr. MINKLER stated that there was a balance of fifty-four dollars due from the Huggins's estate, but that since both sons of our late Treasurer had died, and the family was left without the means or health to enable them to discharge the obligation, he moved that the Secretary be instructed to cancel the debt by returning the note to Miss Sarah Huggins, who is administratrix of the estate.

After remarks by Messrs. EARLE, GALUSHA, MURTFELDT and others, expressive of sympathy with the family, the Treasurer was substituted for the Secretary, and the motion was put to vote, and prevailed unanimously.

AUDITING COMMITTEE.

The President appointed Messrs. Hammond, Graves and Mann as committee to examine the reports of the Secretary and Treasurer.

REPORT ON GENERAL HORTICULTURE—FIRST DISTRICT.

The President called for the report of the First Horticultural District by H. C. GRAVES, Committee. By request of Mr. GRAVES, it was read by the Secretary, as follows:

Mr. President and Members of the State Horticultural Society:

Out of the thirteen correspondents appointed by your Secretary seven have responded, and, although quite a number of counties remain unheard from, enough is received to show quite clearly the *status* of horticulture in this district.

There is very little left to say without repeating what some one or more of the correspondents have already said. I will only make a few general remarks, and a brief local report of the fruits, etc., at this point.

The season, the past year, in this district, has had its variations of wet and dry, heat and cold, but has not been marked by extraordinary extremes and excesses. The spring opened in medium season with a fair amount of rain in April, but running rather dry in May and early June. During midsummer there was plenty of rain-fall and heat, which pushed the fruits and cereals rapidly forward, giving strong vine and wood growths. The last of August, with September and October, were dry, with more than ordinary heat in the latter months, causing trees and vines of all kinds to mature an excellent growth, so that I think little danger from cold the coming winter is apprehended.

Plum and Cherry trees commenced to bloom at this point May 2d, coming out very slowly, as cold northeasterly winds prevailed, with frost and freezing every night for seven days; then, turning warmer, the Apples and Strawberries commenced to bloom, and warm, dry, windy weather followed. We were a little surprised that the repeated freezing did not affect the Plums and Cherries seriously—the former making a fair and the latter nearly a full setting of fruit. This is testimony in favor of the idea advanced by your committee last year, and our esteemed friend, E. C. Hatheway, viz.: that greater destruction of our fruits emanates from long rains at time of inflorescence than from frosts.

Apple-trees here bloomed quite generally, but most kinds rather sparingly, very few trees, comparatively, in this district, giving more than half a crop, and from that down to none at all. There was a moderate supply of summer and fall apples of home growth in our markets for a

short time. The late fall varieties ripened early in the fall and soon rotted. Of winter varieties there were very few, and owing to the warm, dry fall weather they ripened too early and fully, consequently the very few we have are keeping poorly, so, as usual, we are dependent on Michigan and other States to the east for this staple fruit. Our old orchards are going to decay; the middle-aged ones are neither healthy nor fruitful and already show unmistakable signs of short life. Of young orchards, while some look well, the majority are spotted, some trees have died out, some half dead, others not vigorous nor healthy, etc.

There is, Mr. President, a cause or causes for the short, unhealthy life and unfruitfulness of our apple orchards in Northern Illinois, and it is now time for our Society to make (since it has become able to do so) able and diligent search for these causes, and if found publish them to the people, with the remedies, if there are any.

There are many theories concerning the failure of our orchards which I will not take time to enumerate, but there is likely to be found something real in many of them; and while I am willing to concede that proper drainage and protection, careful selection of location, judicious cultivation and pruning, etc., have much to do in the matter, I hold that our prairie soil and its climate are peculiar and different from those of Michigan and States farther east that produce the apples in abundance that we like to eat; and that, after all we may do artificially on these points, we will fail in a great measure to grow healthy, long-lived, fruitful trees that will give us first-class, long-keeping fruit, especially so long as we plant varieties originating in and adapted to soils and climates quite different from ours, which is the case with nearly all the varieties in the orchards of to-day.

I lean to the theory that when we get an apple that is every way a success in our soil and climate it will have to be originated here, inheriting its peculiarities from the soil and surroundings, or in some other soil and climate exactly like this. The want of a first-class, long-keeping apple is keenly felt in our district; in fact, we may include the entire Northwest on this point. This fact has been accepted by this Society, and it is conceded by many that such variety or varieties will have to originate here with us. But, gentlemen, what are we doing to produce them? Nurserymen, as a rule, sell nothing but grafted trees; in fact, the rule with them is to consign every seedling that appears to the brush pile. Nothing, so far as I can learn, is being done by any society or persons at all commensurate with the task. With this state of affairs, and with the taste and desire everywhere amongst us to reach abroad to different and distant soils and climes for what we want, when will we produce the varieties in question? The time, under the present circumstances, surely appears distant. With the hope that this Society at this meeting will discuss this important subject and take such action as will result in a thorough and able examination of all the theories connected with the subject, and give us back facts and something practical in place of theories, I will leave the subject with two suggestions which appear to me practicable:

(1) If the nurseryman, when digging his trees, would save the smoothest and most promising seedlings that appear and plant them in an experimental orchard, or, if not situated to do that, give them out to customers (of course after first selling them all the grafted trees he can), something good might result from it.

(2) Then some of us might save seeds from the best long-keeping varieties of home origin and add a few seeds from old standard long keepers, and after growing them two years or more select the most promising in appearance and plant in orchard. Such an orchard would be, to some extent, of value, and stand a chance to give the kind wanted. The experiment would be interesting and cost almost nothing but a little time and attention, and any of us that will can do it. Other and more scientific methods might be adopted, and I trust will be. We suggest these because they come within the reach of all.*

Pears.—The few trees we have bore moderately. From our observations of the failures of others we would recommend keeping the pear orchard, after well established, in blue-grass sod.

Plums gave a fair setting, but no harvest.

Cherries.—Early Richmond, the only variety grown to any extent, was nearly a full crop here.

More attention is being paid to small-fruits in this district than in former years. With the new and improved varieties they can be grown with much certainty, and the people are beginning to find it out.

Currants and *Gooseberries* were a medium crop. These fruits, although indispensable, command less attention since the introduction of the finer varieties of strawberries, raspberries and blackberries.

Grapes.—Concord, the only variety grown much, was injured by frost when in bloom, and from one-half a crop to less was the result.

Blackberries.—The Snyder is being planted quite generally and promises well, although the canes were injured by the winter and gave, on our grounds, but half a crop.

Raspberries.—Black-caps were injured by the winter; not much fruit. Turner was a little hurt, but made a fair crop of excellent fruit.

Strawberries, in this vicinity, were injured some by drouth, producing one-half to two-thirds of a full crop.

Having written much more than I intended at commencement, I will now present the reports received; all of which is respectfully submitted.

H. C. GRAVES.

* While, as Mr. Graves remarks, the effort to introduce better long-keeping apples is not "commensurate" with the good to be attained, yet there is very much doing in different parts of the State in the way of planting seeds of our best apples and fruiting those which seem promising. The display of seedlings and the award of a ten-dollar premium for them at this meeting is evidence that the Society apprehends the importance of the work and is desirous of encouraging effort in this direction.—EDITOR.

REPORT OF LASALLE COUNTY, NORTH—By SAM'L EDWARDS.

H. C. GRAVES, Sandwich, Ill.—*Dear Sir*,—The past season, like all others, has given some peculiar experiences to horticulturists. The mercury went 30°—last winter. Peaches and blackberries were generally killed; the only exceptions known to me are a choice seedling freestone peach grown by W. E. Chapin, at LaSalle, which has not failed to bear for several years, and the Snyder blackberry. Wallace and Taylor blackberries, which have been sent out as hardy, were so much affected as to fail in fruit, though they are harder than Kittatinny and Lawton.

In some instances the hardy raspberries were somewhat injured by winter, but in sheltered locations escaped. Apple-trees generally, in nursery and orchard, were not damaged, but from some cause the crop of fruit was light. In a few instances the yield was good. Maiden's Blush, Duchess of Oldenburg, Lowell, Warfield, Perry Russet and Stark bore well with me, while Willow Twig and Ben Davis, noted as profuse bearers, gave only a few specimens. The remark is often made that apple-trees do not bear as well as formerly. Is it owing to drier seasons and to seeding down orchards, thus robbing them of moisture? This theory has been raised in my mind, and the remedy would seem to be frequent cultivation of the surface soil and mulching through the hot season. Codling-moth was not as plenty as usual. Bark-lice are disappearing. Washing trees in June with diluted carbolic acid and soap did not prevent deposit of eggs for the borer; it may need frequent repetitions in a rainy season; I intend to give it further trial. As first apple orchards are failing and few trees planted now, our markets must soon be supplied from other localities.

Pears gave a better crop than apples; no blight observed.

Miner Plums, as usual, blossomed full, but set no fruit. Younger trees of Wild Goose bore well.

Early Richmond and English Morello *Cherries* gave good crops.

Strawberries were injured materially by May frosts. Downer's, Downing and Green Prolific were most abundant in our market and give good returns; Sharpless is very promising, vines vigorous, bore well, of good quality, large size, with a small part of the crop coxcomb-shape, larger than any other berry ever grown in this vicinity; Crescent is very robust and healthy in foliage, bears well and fruit is of good quality; Forest-Rose foliage browns badly; Miner's Great Prolific is rather promising—of fine quality; Col. Cheney and Capt. Jack are good; Wilson does not succeed well with me and I have excused it; Prouty does not bear well with ordinary field-culture.

Turner *Raspberry* is the best red raspberry tested for this locality; Pride-of-the-Hudson is an unmitigated humbug; Florence is hardy and productive; Gregg is hardy, good, and from the large size of the fruit it must take the lead as a market berry.

Snyder *Blackberry* is still considered the most valuable fruit of its species for the family or market. Liberal mulching for the hot weather is advised for all small-fruits.

Currants bore a moderate crop.

Gooseberries were a failure.

Concord *Grapes* were plenty, and are being planted for family use by our farmers more generally than any other small-fruit, except Snyder blackberries and cherries.

Vegetable gardens among farmers are slowly improving, with no serious pest except the green cabbage-worm, for which salt and hand-picking have proved effective remedies, but in most cases the crop has been abandoned and lost.

Planting of *Evergreens* for screens is yearly increasing; very few planting for timber; barbed wire has nearly given a quietus to hedge-planting.

All fruits ripened earlier than usual. Bellflower and Domine apples, generally used in January and February, are now (Nov. 27) in fine eating order. Of late-keepers the Salome, from E. C. Hatheway, of Ottawa, is decidedly the best apple, succeeding here, known to me. It was in perfect condition in June.

REPORT OF LASALLE COUNTY—By E. C. HATHEWAY.

MR. H. C. GRAVES.—*Dear Sir*,—In compliance with your request to send you facts respecting the *status* of horticulture in this county, I will say that the season generally in this immediate locality has been favorable, in the main, for growth of tree and vine; in fact, I never saw such an abundant growth of cane as the grape-vine has made this year, which no doubt is due not only to the favorable season for growth, but as well to the spring frosts cutting off the bloom, which occasioned a crop of less than half the usual quantity.

Very warm weather early in April started buds and pushed them into growth. May came in cold and dry, with frost every night, destroying strawberry bloom, except where mulch was allowed to remain *very late*, so that not more than forty or fifty per cent. of this crop was realized.

Dry weather with high winds continued until the 13th of May, injuring bloom and also setting fruit on orchard trees; very heavy rains about the middle of May destroyed young plants just breaking through the soil in vegetable gardens.

Our whole season has been peculiarly favorable for all vegetable and plant growth, as it has been steadily hot, with frequent showers.

Cherries were a very short crop and brought two to three dollars per bushel.

Early Richmond was the only variety that produced much fruit, and then *only where worked on the Mahaleb*.

What few English Morellos ripened *were worthless, being wormy*.

Currants were scarce in general. Most plantations have been allowed to take care of themselves, and consequently have become infested with lice (*aphides*), and also stalk-borers, to such an extent that they are of little consequence for producing a crop.

Gooseberries are neglected, and few other than the hardy Houghton and American Seedling are found in our markets.

Plums are cultivated so little here that they are hardly worth mentioning, unless it may be the wonderful "Wild Goose," which, though the trees are plentiful enough in this locality, is like its namesake, *so shy* that if Mr. Curculio had to depend upon this one variety of fruit for his commissariat, *and eat the whole, starvation gaunt* would beset him in his early existence.

Grapes were a short crop, caused by frosts during inflorescence. For ability to stand grief I place Concord at the head all the time. Prices for this fruit ranged a little better than last year.

Pears were not quite up to the usual amount in this locality, as the severe storm of seventh of July whipped off the most of them. I think that the time is not far distant when pears can be grown as plentifully as apples; at least I have not lost faith in them, being fully satisfied as to what is the occasion of the *blight*; and I believe we know the remedies, but fail in the proper application of them.

Apples were quite plentiful in fall varieties, and brought low prices; but winter fruit was very scarce, and what little there was rotted badly.

Apple-trees made fine growth this year, and branches are thickly studded with fruit-buds for next season.

Some twig-blight on English Golden Russet, Maiden's Blush and Willow Twig, but no leaf-blight on any variety.

Baldwins nearly all killed with cold, last winter.

Blackberries are but little grown here, but Mr. Samuel Edwards writes me from the northwest part of the county that he had a large crop of splendid Snyders. I was fortunate enough to be the recipient of a crate of them from him, which he termed "culls, or the last run of the pickings." *They were splendid*, and if these were "poor" Snyders, I propose to go, if necessary, a long way to see some good ones next season.

Strawberries, as stated before, were a short crop in this locality. Wilson, except in few instances, was a total failure. Crescent, with me, did wonderfully the past season, seven-eighths, or less, of an acre producing more than 8,000 quarts, which sold at two to two-and-one-half cents per quart here more than the best Wilsons would bring. I sold fine Wilsons in Chicago for ninety cents per half-bushel crate, and on same day,

and from same shipment, Crescents brought one dollar and seventy cents per half-bushel crate. I grow strawberries to sell fruit, not plants, and shall still plant Crescents. One peculiarity about this variety is that it blooms five to eight days later and ripens its fruit four to seven days earlier than Wilson. Crescent is almost thoroughly pistillate; and I think it has been condemned by many because they did not plant perfect varieties near it. I like the appearance of Capt. Jack, but fear the petiole of leaf is too short to protect the immense trusses of fruit which this variety produces. I would advise any one desiring to learn regarding the honest merits of berries of various kinds, both old and new, to get the recently published catalogue of small-fruits sent out by our respected Secretary, O. B. Galusha, as, in the main, my experience and observation coincide with the results given therein.

Vegetables were a fair crop of good quality, except potatoes, which in the central and southern part of the county were quite a failure, but in the northern part of the county they were very fine. Cabbage was badly infested with the larvæ of the imported cabbage-butterfly (*Pieris rapæ*).

REPORT OF DEKALB COUNTY—By C. BAILEY.

Owing to my limited travel through the county I can only report for my immediate vicinity. The cold weather of last winter probably killed some of the fruit-buds. The light crop of apples is partly due to this cause and partly to the large crop of the previous year, and to scorching sun and severe winds and storms during the critical time of flowering.

There has been more pear-blight here than usual this year, but the *cause* is not known.

The extreme warm weather just as apples were ripening caused fall apples to rot and caused winter apples to prematurely ripen, so that at this date (Nov. 27) they are soft. Apples were a light crop; pear-trees bore well but blighted considerably; cherries and all small-fruits were in profusion; we have but few plum and peach-trees which gave very little fruit.

Cultivation.—It is now the general opinion that the kind of treatment of trees which will give a moderate growth of new wood each year is best for the health and productiveness of the trees; and each one must judge for himself as to the condition and needs of his trees. Too much wood-growth is not favorable to the formation of fruit-buds, and also renders trees more liable to be damaged by the cold; and a stunted growth produces inferior fruit. Yet no rigid rule can be adopted in orchard culture, for some kinds will thrive and do well in a sod, while others, like the Wagoner, would die in such a situation.

Pear-trees I would cultivate while small, and then let blue-grass take possession of the ground, as I think the blight is akin to rust and blight in small grain, caused by extreme heat and wet combined, which forces an unusual flow of sap, more than can properly be elaborated into leaves, fruit and wood, and so it culminates in blight.

Gathering and Keeping Fruit.—It is now well understood that all fruit to keep well fresh *must not be bruised* in picking and handling. Apples should be carefully hand-picked and put at once into barrels or boxes. Farmers here sell by the barrel or bushel in the little towns around us. Winter apples should be kept as near the freezing point as possible, for if allowed to get much warmer for any length of time they will get ripe and become insipid in taste.

Soils and Exposure.—The soil for an orchard should be dry, of course; our prairie soils develop too much wood-growth, hence those orchards on the edges of groves give most fruit. Orchards upon the prairies should be protected by belts of timber, else your fruit will be blown off in some high wind before it gets ripe.

The raising of small-fruits for market is attempted by but few, for as soon as our fruits are ripe we are confronted in Chicago by the Michigan growers—and their name is Legion—whose lighter soils are adapted to fruit-growing. They have cheap transportation, while ours is quite the reverse, so that they can undersell us in the market.

Late-keeping apples are the only fruit which can be profitably raised here for shipment.

Varieties.—Of Apples the following are most esteemed: Red Astrachan, Duchess of Oldenburg, Snow, Tolman Sweet, Wagoner (not hardy), Domine (has not done as well latterly as formerly, rotted badly this year), Minkler, Rawles' Janet, Ben Davis and Willow Twig. This has kept sound in the barrels until they were wanted for filling the next year. It is not a choice eating apple, but is a good cooker.

Flemish Beauty Pear does as well here as any. Bartlett is good while it lasts. Winter Nelis is the best late pear. I have several trees about as large as a broom-handle, which bore from ten to sixty pears each.

Early Richmond Cherries are so plenty as to supply the birds first and the people afterward. The old-fashioned Eastern cherry, known under different names, is grown here; it is larger and not as sour as the Early Richmond (Early May), and is different from the Morello.

The Lombard Plum is as good as any.

The Concord is *the* Grape for us.

There is no good excuse for any land-owner to be without currants, strawberries and raspberries, as they are so easily grown.

We farmers do not go much into floriculture or gardening. The former is left to the ladies, and the latter is sadly neglected. The best way for a farmer to grow vegetables is to put every sort into long rows, three feet apart, and cultivate between the rows with a horse, cleaning out in the rows by hand. Let him try this and he will be surprised to see how quickly he can clean out his garden.

Insects.—Potato-beetles have not been as plenty as in previous years. The only cures for them are to pick off the old ones early, then sprinkle the vines with Paris green and leave the lady-bugs to do the rest. The striped cucumber-beetle was plenty upon the melon and cucumber vines, also a worm at the roots; the new cabbage-worm destroyed nearly all our cabbages.

To keep the apple orchard free from codling-moths the best way is to fence it for the pigs, and as soon as the wormy apples begin to drop turn in the pigs every day, just long enough for them to eat up the fallen fruit. Although we are not favorably located for raising fruits for market, yet there is no good reason why every farmer should not produce enough for a full supply throughout the year; and no fact is better established than this, that the consumption of plenty of ripe fruits the year round is conducive to health and happiness. Besides, there is a peculiar pleasure in watching the growth of the trees, from year to year, seeing the fruit develop, and gathering it when ripe. One who has moved out on an open prairie, with nothing but the green grass around him, and has seen his live fences, wind-breaks, fruit-trees and shrubbery grow up, has something to attract him to his home and keep him away from saloons and other places of idleness.

REPORT OF KENDALL COUNTY—BY J. S. SEELEY.

As I have been requested to report as to fruit crops, etc., for the present year, I will attempt to give some of my experience and observations as to some of the suggestions made in the card of inquiry.

The cold of last winter was very severe on *Grapes* unprotected and shortened the crop very materially. Kittatiny *Blackberries* killed to the ground, and Doolittle and Philadelphia *Raspberries* were badly hurt and did not produce half a crop; the Turner was uninjured and bore a good crop.

Not having noted the time of blooming of various fruits, am unable to give particulars, but the whole list was from seven to ten days later than usual.

Strawberries and Turner *Raspberries* gave a fair crop; Richmond *Cherries* about one-half crop; *Apples* a very light crop and very little bloom. The few that did grow were mostly injured by the codling-moth.

The present state of horticulture is not very promising in this vicinity. Our proximity to Michigan is against us; for an enormous quantity of small-fruit ripening there at the same time as ours is shipped here and sold at ruinously low prices—strawberries from five to six cents per quart and other fruits in proportion—so that, if we are so fortunate as to raise a surplus, we have to sell it at very low prices.

The principal injury by insects, the past season, has been from cabbage-worm (which has made a clean sweep of the raw material for *kraut*) and codling-moth and curculio. The absence of plums has caused the "little Turk" to depredate on the cherry to a considerable extent. The Colorado beetle made something of a show early in the spring, but soon disappeared with but little damage.

COMMUNICATION FROM HON. LEWIS ELLSWORTH.

The following was read in connection with Mr. GRAVES's report :

NAPERVILLE, ILL., Dec. 4, 1879.

H. C. GRAVES, ESQ.—*My Dear Sir*,—I have received from Secretary Galusha a request for a report on some subject for our annual meeting at Normal, on the 9th inst.

I regret that my time has been and is so controlled that I cannot fully comply, nor shall I be able to attend the meeting, which I deeply regret.

I would suggest, for consideration and discussion, the cause or causes of the premature old age and decay of our apple-orchard trees. Is it alone attributable to climate, our severe winters and bright, warm sun? our late, growing autumns? or want of thorough drainage? or want of protection by timber-belts? or to the system of propagating by root-grafting, weakening the constitution of the tree, *as claimed by some?*

My impression is that the first and perhaps the greatest cause of injury to our fruit-trees is the want of thorough drainage of the orchard grounds. There is an opinion with many that our flat lands, only, require drainage; others think that all, the rolling as well as the flat lands, are greatly benefited by drainage.

My own observation convinces me that all our lands with a clay or clayey-loam subsoil should be thoroughly tile-drained for the highest development of any crop, especially fruit. Shelter-belts for the orchard is another subject upon which there is a diversity of opinion; the general practical experience on that subject has not been sufficient to demonstrate positively the advantage or non-advantage, hence the diversity of opinion. I incline to the protection side of the question. As to the kind of tree for protective belts, I consider the evergreen far superior to the deciduous trees. They afford protection at the time of year when protection is most needed, whilst the deciduous trees have dropped their leaves, leaving only partial protection. One other consideration in favor of the evergreen is, they occupy much less ground than the deciduous trees—one row of the former is sufficient for a shelter-belt, while of the latter two or more rows are required to afford only a slight protection. The location of an orchard is a matter worthy of consideration; a northern is preferable to a southern declivity, or an eastern to a western slope.

Protection for our fruit-trees in some manner is a necessity, for without it on the prairies fruit-growing for market purposes must be a failure. Whether that protection be in a well-drained soil, or protection by timber-belts, or a change in the manner of propagation, or the location of the orchard, or all combined, are questions worthy of consideration. The loss is not owing so much to the short life of our fruit-trees as to their unhealthy condition, for an unhealthy tree produces defective, unsalable fruit.

Go through our fruit markets—Chicago, for instance, one of the largest on the continent. What do you find? If inquiry be made it will be found that the fairest, best fruits come from Michigan, Ohio, New York or some State outside of Illinois. Is there no remedy for this?

It is the duty of horticultural societies, especially the Illinois State Horticultural Society, which by liberal appropriations by our State Legislature is kept alive financially, to inaugurate a system, through appropriate committees, or otherwise, of practical investigations that will furnish reliable information on a subject of so much importance as fruit-growing for market purposes, which is one of the great productive interests of the State. Failing to do this, we are not worthy to receive financial aid from the State, nor can we consistently ask it of the Legislature.

If we cannot grow fruit successfully for market, the sooner we know it the better, that our lands covered with orchard trees may be cleared and appropriated to the growth of other and more successful crops.

REPORT OF GRUNDY COUNTY—By J. W. RIDINGS.

H. C. GRAVES, Committee on General Horticulture for First District.—*Dear Sir*,—"Little Grundy" county does not boast a high position in the noble art of horticulture, yet the number of those who appreciate the value of fruits, and are extending their cultivation, is, I think, increasing from year to year. It is quite noticeable, also, that there is a growing discrimination in respect to varieties; people are not satisfied with fruit simply because it is fruit of any particular variety or species, but are learning that there is a wide difference in the value of varieties in each species, and are inquiring for and planting such varieties as are known to have the requisite hardiness and productiveness of tree or plant combined with good qualities in the fruit.

The one great obstacle to success and progress in this direction is the swarm of *conscienceless leeches*, in the name of "agents" for nurseries, which yearly spread themselves over the county, duping farmers and owners of village lots, by selling them, at exorbitant rates, trees and plants with new and high-sounding names, not one in twenty of which has ever proved worth the planting. It is true that the purchasers of "iron-clad Russian" apple-trees, "hardy sweet cherries," "curculio-proof" plums, "blight-proof" pears, "grape-vine" raspberries, "Japan" persimmons, tree-roses, etc., etc., are almost universally those who do not take agricultural journals, all of which, every year, warn the people against these marauding parasites. If every farmer would take, read and heed some good agricultural journal the "occupation" of these oily-tongued gentry would soon be gone. Much has been written and said of the scourge of *tramps* which for several years has infested all parts of the country, yet I venture to affirm that the actual loss to the country at large has been *ten-fold greater through tree-peddlers than tramps*.

Is it not high time for a law to be enacted to suppress them, even though it necessarily exterminate all classes of agents who take orders for goods?

The weather is usually the first topic for discussion when anything is to be said or written, however remote the subject on hand or in mind may be from any meteoric influence; but horticulture is so directly dependent upon suitable warmth and moisture that these necessarily demand the first place in a horticultural report. Yet I feel so keenly in regard to the scourge of tree-peddlers that my mind is never free to discuss any other subject relating to horticulture until I have worked that off. Now I feel better, and will go on with my say about the weather.

Perhaps in not one year in twenty have the extremes of temperature, drouth and rain-fall come so near meeting as during the past spring, summer and autumn, in this county. Last winter found the soil drier than usual, and this circumstance in connection with the intense cold of 26° below zero damaged many trees and plants usually hardy. Snyder blackberry, never before known to be damaged by cold in this latitude, was considerably hurt, yet not so much but the canes put out full-sized leaves in spring.

Spring opened with timely rains, and with extreme heat in March and April, which was followed by extreme cold and drouth in May, so that the blossoming of all trees and plants was from one to two weeks later than usual. To these extremes, following each other in a reversed order, is probably due, to a great degree, the blasting of blossoms of our apple and cherry-trees, and the dropping, when quite small, of more than half of all the fruit which set. There were many exceptions to this general failure in the apple and cherry crop, however, some apple orchards bearing quite fully in close proximity to others which were almost barren; and I have not been able to account satisfactorily to myself for the fact. In short, the behavior of apple-orchards has been unreasonable, and in many instances quite trying to the temper of the owners.

Here, orchards cultivated or "set in clover," according to the most approved modes, were barren of fruit, while just over there a neglected orchard bore a good crop; yonder, orchards rewarded the owners for good culture by returning a bountiful crop of fine fruit, while near by neglected orchards seemed to chide their owners for such neglect by refusing to mature sufficient fruit for their families' use. Generally, however, good cultivation, with *moderate* use of the knife and saw, has paid in the quality if not in the quantity of fruit, even in this freakish year. A severe freeze

occurring while the earliest blossoms were open destroyed a large portion of them, and in consequence such early-blooming sorts as Domine generally failed; and it was also true that the latest blooming sorts, such as Rawles' Janet and Northern Spy, were almost destitute of fruit.

In my own orchard Maiden's Blush, Roman Stem, Benoni, Golden Russet and Triumph bore good crops; Domine, Snow, Keswick Codlin, Sweet June, Carolina Red June and Rawles' Janet, moderate crops, while nearly all other sorts, comprising those recommended by your Society for cultivation in Northern Illinois, were almost entirely barren.

I saw in Mr. Galusha's young orchard whole rows of Ben Davis, Willow Twig and Jonathan which were loaded with fruit of the best quality, many of the trees having their branches propped up to prevent breaking. This orchard is on a sandy loam and had been moderately manured and cultivated. The Duchess of Oldenburg, Roman Stem, Ramsdell's Sweet and some other varieties also were bearing good crops; but trees in his orchards generally seemed as capricious as elsewhere, most of them holding but little fruit.

The crops of berries and grapes have been fully up to the average in quantity, though the size of all species as well as that of apples was diminished by the severe drouth. The earliest and medium-ripening strawberries were seriously damaged by the great drouth which extended over the last half of May and the first half of June; the later strawberries, also raspberries, were much benefited by timely, though insufficient rains.

From the eleventh of June till the first of October there were occasional rains, though at no time sufficient to produce an average growth of tree and fruit; but with October came intense heat—the thermometer for six consecutive days marking from 90° to 94° in the shade. This in connection with severe drouth caused premature ripening of late-keeping winter apples and a quite general dropping of the fruit.

To the drouth of May, quite as much as to the severity of the weather in winter, is no doubt due the killing of Snyder blackberry canes, which reduced the crop nearly one-half in this county, as the foliage withered and dropped, and the canes died after they were in leaf and many while in full bloom.

Kittatiny blackberry canes were dead and dry in the spring.

All the older varieties of raspberries were somewhat injured, and Philadelphia nearly all killed.

The extreme heat of October caused very many buds of raspberries to break, and great damage to canes must ensue if the present winter proves severe.

Recent rains have revived the strawberry plants so that they may produce a fair crop next year.

Fruit trees appear in good condition and promise well for 1880.

The timber in the groves of this county is decreasing and tree-planting scarcely keeps pace with the destruction; so that, on the whole, I think the leaf-surface is diminishing from year to year. There seems to be, however, an increasing disposition to plant trees, especially evergreens for ornament and shelter.

After reading the report the SECRETARY remarked:

Mr. President, the gentleman reporting from Grundy county is not, and never was, a nurseryman.

THE PRESIDENT.—Nor a tree-peddler. (Laughter.)

MR. GALUSHA.—We would infer as much from the tone of the paper. His fruit took the first premium at the late State fair, over strong competition. He is a successful orchardist.

PRESIDENT'S ADDRESS DEFERRED.

The Secretary moved that the address of the President, which is the next in order on the programme, be deferred and made the special order for to-morrow afternoon, immediately after the discussion of topics from query-box, stating as reasons for the motion that the time was short, that the address was somewhat lengthy, that it was of a character to interest all, being upon the "Mission of Horticulture," and he hoped there would be a fuller attendance then than now.

Mr. PEARSON asked what was the wish of the President.

THE PRESIDENT.—I would prefer that it be deferred, especially as I understand that the Committee on Soils and Fertilizers, whose reports are due at that time, will not be ready to report.

The motion was put to vote and carried.

DISCUSSION UPON THE REPORT.

DR. HUMPHREY.—In one of the papers read the writer says the great State of Illinois gets its apples from Michigan, Ohio and New York. Why is it that we can't raise our own apples? I say our black prairie soil is too fat; I have seen orchards on these rich soils die out in six or eight years, while orchards thirty feet higher, planted on "the barrens"—land where white-oak had grown—were thirty years old and in good condition. I think the main fault is in the soil.

Mr. PEARSON.—I don't think the fault is all in the soil.

DR. HUMPHREY.—On these rich soils they die before they are old enough to bear fruit—die from over-feeding, and this is the reason they are so short-lived. On the barren bluffs they live thirty or forty years.

Mr. MCWHORTER.—I fear we will be led into error by Dr. Humphrey's statement. It does not damage trees to have the surface of the orchard covered with water, provided it does not remain long; the trees must not stand a long time with wet feet.

I would probably not agree with Mr. Ellsworth as to the cause of the early decay of our orchards, for I think it is mainly owing to climatic influences; severe cold of winter, succeeding seasons of less than the usual amount of rain-fall, is very damaging to trees. Orchards on dry prairie soils in Mercer county have done best, because these soils endure dry seasons better than the stiffer timber soil. My old Pomeroy orchard was planted on dry prairie soil nearly thirty years ago, and is now in better condition than the one where I now live, which was planted on timber soil or "barrens" from which I grubbed out scrub-oaks and hazel brush.

We have greater irregularity of climate here than in the States east of the lakes, and to this fact is mainly due their advantage over us in growing orchard-fruits.

MR. MINKLER.—Is it not true that a large portion of fruit sold as “California fruit” does not come from California? Ben Davis apples grown in Illinois are sold as California apples. The fact is that the largest and most showy apples, no matter where grown, are very often sold as “California apples.”

As to the cause of decay in our apple-trees, I agree with Mr. McWhorter that it is climate rather than soil. Our hogs do not get the cholera from over-feeding, neither do our trees get sick because the soil is too rich. When the climate is right we get good crops on either prairie or timber lands; but when our trees go into winter with the ground very dry, and the winter proves severe, our trees are damaged. If it was the nature of the soil or the mode of treatment which causes the early decline complained of we could in a measure remedy it, but it is not easy to manufacture a climate to suit us.

MR. HOLDRIDGE.—I have no experience in under-draining orchard lands, but have in tile-draining lands for farm crops, and know that such lands withstand the extremes of both wet and dry weather far better than undrained lands; they never are muddy or mushy in wet weather or lumpy in times of drouth. I could tell land that has been tile-drained by walking over it blindfolded. I believe tile-draining will greatly benefit orchards, for the reason that has been stated here that trees freezing very hard in a dry, lumpy soil are liable to damage; draining prevents the extreme dryness of soil.

MR. GALUSHA.—*Mr. President*, this is one of the most important subjects in practical horticulture. I believe in draining all tenaceous soils and in giving good cultivation; but before we condemn our prairie soils as not adapted to orchard culture we should use our brains in ascertaining what elements are needed to make these soils good fruit soils, and our muscles in applying the remedies. This is an old story, one which came up in the early history of this Society. It was then claimed, as it is now, that our virgin prairie soil is surcharged with ulmic acid, which, when in excess, is detrimental to healthy growth of fruit-trees; but this is only true of comparatively new soils. After they have been turned up to the light and the warmth of the sun, for a few years, they become sweetened and better suited to orchard growths. The trouble is not that new soils are too rich, but that they contain too much of this humic (or ulmic) acid. I have several times called the attention of this Society to

orchards upon the prairie which had been a long time in grass and were literally starving to death, being rejuvenated and rendered productive by plowing and manuring. Barn-yard manure contains all the elements needed; and if judiciously applied to unhealthy, unfruitful trees, good cultivation given, and the land, where it is needed, either under-drained or surface-drained by throwing into ridges before trees are planted, we would hear but little about the *soils* of Illinois being too rich or too sour for orchard sites.

As has been well said, the climate is somewhat inimical to the orchardist, and we must therefore keep on trying to secure varieties which have the greatest amount of vitality to withstand our extremes of weather.

A. H. GASTON.—Let Illinois raise her own seedlings if we are to have healthy iron-clad trees. Ben Davis, one of our hardiest, is a native of Kentucky; Rawles' Janet is failing, and so is Willow Twig. I am glad the fruit-growers of Illinois are turning their attention to the production of new varieties. The Wythe is a new apple. Mr. Hatheway has brought out the Salome, which so far has withstood all changes and borne every year. There are samples of good seedling apples on the tables in the other room, exhibited by Mr. Hammond; I have three seedlings in the fruit-hall which I wish you would examine.

I believe we can raise healthy pear-trees here as well as apple-trees. When we find smooth, nice-looking seedlings we should save them.

MR. BURNHAM.—Need we wait till the seedlings grow up to test them? Can they not be grafted into orchard-trees and so learn in two or three years whether the fruit is valuable?

MR. GASTON.—Yes, and this is the best way to prove whether they are worth any farther care; we will then only lose a very little labor for two or three years at any rate, and if one in fifty proves good we will get paid.

INTRODUCTIONS.

THE PRESIDENT.—Now is a good time to call on and make the acquaintance of the Treasurer, and present him with your card and a dollar for membership.

MR. MINKLER.—Yes, I like to make the acquaintance of all the members, and especially in the manner spoken of by the President.

THE PRESIDENT.—We have here from Indiana, as delegates, Mr. and Mrs. W. A. Ragan. Dr. Humphrey will please to introduce them.

Mr. and Mrs. Ragan rose and were introduced.

W. A. RAGAN (of Indiana).—*Mr. President, Ladies and Gentlemen,* it is a pleasure for me to be with you to-day, and although not personally acquainted with but few of you, I feel as though I knew you well through correspondence. I am no speech-maker, but a practical fruit-grower. I desire to say that there are other delegates from Indiana, *ladies*, who will be with you this afternoon.

Upon motion, the Society adjourned till 1.30 P. M.

FIRST DAY—AFTERNOON.

The Society assembled at the appointed time, with the President in the chair.

TOPICS FROM QUERY-BOX.

The regular order of business was taken up, the Secretary opening the Query-box and reading the contents.

After the reading, on motion, the Society voted to take up the questions *seriatim* for discussion.

The Secretary then read the first query:

Query No. 1.—Will some one name the contents of the little box inclosed in this paper and tell what we are to expect from their work?

The Secretary stated that the little box referred to contained the pupæ of insects.

On motion, the question, with the accompanying chrysalids, was referred to the Committee on Entomology, with request to report at this session.

Question No. 2.—Is winter a better season for grafting the grape-vine than spring or summer?

MR. McWHORTER.—I think it is better to graft vines in winter than in spring, as the vines will not bleed—the atmospheric influence upon the vine itself is less at that season than in spring or summer. In reply to a question, Mr. McWhorter said the vines would not bleed before the frost leaves the ground.

MR. MINKLER.—Does the bleeding damage the vine materially?

DR. SCHROEDER.—No; the bleeding in pruning vines does not hurt them much, but when they are cut off and grafted while bleeding the flowing of the water prevents the cion and stock from uniting sometimes. You will have the best success in grafting *early* in spring, before

the sap starts. I have grafted in January, but those grafts did not do very well.

MR. BALLER.—Buds or cions will grow, even if the mother vine does bleed; yet it is better to graft at some time before bleeding commences. I have succeeded in grafting the vine by keeping the cions in a cool place, where they would not dry, and grafting when the parent vine was nearly in full leaf.

A Voice.—Do you graft above or below the surface?

MR. BALLER.—I have noticed no difference in the success, whether the grafting was done above or below the surface.

A Voice.—In grafting above ground do you cleft-graft or ring-graft?

MR. BALLER.—I would ring-graft.

DR. SCHRÖEDER.—When I have an old vine to graft I graft it above the ground, for the vine may throw out suckers, and if the graft is set in the ground you could hardly tell the grafted part from the suckers.

But I don't think this talk about grafting grape-vines amounts to much. We don't want to graft grapes, we can grow them so much easier from cuttings or layers. Once in awhile we will want to bring a new kind into bearing right away, and then we can graft it.

THE SECRETARY.—I practiced root-grafting grapes over twenty years ago. The grafting was done in winter, the same as root-grafting the apple, except that I took pains to use roots which had branches or fibers—packing them away in earth after grafting, and in spring, when planted, they would generally be well cicatrized, and perhaps two-thirds of them made vines; but, as Dr. Schröder says, it don't pay to graft grapes, except in some cases to increase the quantity of wood of a new sort or bring it sooner into bearing.

A. H. GASTON.—I would graft them in winter, using wild vines for stocks, as they are free from phylloxera, and will give feeble growers a vigorous growth. I have grafted as late as the tenth of June on strong roots, and the grafts made a good growth.

J. R. GASTON.—Would we not get stronger vines of some of the more feeble-growing sorts by grafting them on the Concord?

A. H. GASTON.—Yes, they will grow much stronger.

Question No. 3.—Will the Brighton grape have more value for the vineyard or for family use than the Concord, its parent?

DR. SCHRÖEDER.—I have seen the Brighton grape in bearing and think I know something about it, but will not say anything in its praise. I have said for many years that the Concord is the grape for the people, and, as the people's friend, I say *stick to the Concord*.

MR. BALLER.—I saw the fruit of the Brighton in Rochester, where it originated, and was not impressed very much in its favor. It is said to be a cross between Diana and Black Hamburg, and if so its parentage is not much in its favor for this latitude. I think it not as reliable as the Concord.

A. H. GASTON.—I am a progressive man, yet I will stick to the Concord unless I get something better.

The Brighton was exhibited at the Wenona fair last fall and was the object of much attraction; the fruit is better than Concord; and a friend of mine who raises them says the vine is more vigorous than Concord.

Question No. 4.—Will the Salome apple have more value for the commercial orchard or for family use than the Ben Davis?

Signed, A. H. GASTON.

MR. ROBISON.—Will not Mr. Hatheway's seedling, the Salome, be brought out and introduced?

THE SECRETARY.—A description of this fruit and history of the tree may be found in volume twelve, page 133, of our Reports, and, as I speak of it also in my report upon New Fruits to be read at this meeting, I prefer to defer discussion upon it. Mr. Hatheway states in that history that the tree has borne so heavily that it has been difficult to procure cions. I will say, however, that he has said to me that he is very sensitive to the cry of "humbug," and does *not* intend to offer trees of it until and unless the fact of its superlative value is established beyond a peradventure, after having fruited in different localities and on divers soils. I have watched the tree and fruit, using the fruit in the summer after other apples were gone, and can assure the members of this Society that it keeps fresh and crisp, retaining its aroma. From December to July it is a good dessert apple and a superior cooking apple. Mr. Hatheway has put cions into the hands of many leading fruit-growers in the country, who have promised to give the variety fair tests and report the results.

MR. BANCROFT.—Is the apple keeping well *this* year?

THE SECRETARY.—Yes. It has been kept in a tight barrel and opened one year from the gathering, and not a half dozen decayed apples found.

J. S. JOHNSON.—The Committee on New Fruits is to report on Thursday, and I move this subject be referred to this committee.

It was referred.

Question No. 5.—Is the Duchess of Oldenburg more valuable for the commercial orchard or for family use than the Red Astrachan?

MR. GALUSHA.—With me—yes, for both.

A Voice.—Red Astrachan ripens early and sells well; it does not drop from the tree as much as Duchess.

MR. GALUSHA.—The Duchess succeeds over a larger area than Red Astrachan. Duchess does drop from the tree, and the fallen fruit is valuable; but when the gathering time comes the trees still hold a good crop of beautiful, salable apples. Mine brought fifty to eighty cents per bushel in our home market this year.

MR. MURTFELDT.—This Society formerly published lists of fruits which it voted to recommend for cultivation, and I think it would be well to take up the apple lists and discuss and vote upon the merits of the different varieties—to review the Society's list.

MR. WIER.—The old apple lists we know are not reliable, and neither can we make one now which will be reliable over the State for two years. Some apples which were placed at the head of our lists we would now consign to the foot.

If I were to plant a new orchard and was confined to the two sorts named in this query I would plant one thousand Duchess to one Red Astrachan; for the Astrachan don't bear well with me nor on any soil in my vicinity, and we have almost all sorts of soils. I can get ten bushels of Duchess to one of Red Astrachan.

MR. MURTFELDT.—Trees of the Red Astrachan will bear when they get older.

MR. HAMMOND.—We should profit by the remark of Mr. Murtfeldt. In Hancock county Astrachan trees will bear from two to three times as much as Duchess trees. They are much larger and have more bearing surface of head.

I would like to have the apple list discussed; these varied experiences are of value, for there are reasons for these results.

MR. WEBSTER.—At Centralia the Duchess never gets ripe; it falls from the tree. Red Astrachan tree bears well, but the fruit rots.

Williams' Favorite and Benoni are both better than either of those under discussion.

J. T. JOHNSON.—In the region of Chicago, and to the north and west, the Duchess is good, but not as valuable in the extreme western or southern parts of the State.

MR. MINIER.—Is not the Duchess of Oldenburg a *Russian* apple? If so, it is of course a northern apple.

THE SECRETARY.—Yes, and Red Astrachan came from Sweden, in about the same latitude. Both are hardy trees.

MR. BANCROFT.—I had, in Livingston county, twenty bushels of Astrachans on a tree, and sold them at seventy-five cents per bushel. This fruit always sells well.

MR. NELSON.—There is no Astrachan fruit, of any amount, in Will county. I have one Astrachan tree fifteen years old, but have had not a peck of fruit. I have Duchess trees, and get plenty of *fruit* from them *too*—my young trees bore full this year.

MR. WIER.—Trees of many varieties vary greatly in productiveness in different localities, nearly all trees have a local reputation. As Mr. Hammond says, Red Astrachan trees have more bearing surface than Duchess, but with me they bear leaves—“only leaves.” Duchess trees may be planted ten by twelve feet apart and will bear well for many years; but when they close in each alternate tree may be cut out.

MR. HOLDRIDGE.—My land is clayey loam, and three years in four my Astrachan trees are well loaded. The orchard was planted twenty-one years ago. Sweet Vandevere I prize, it holds on the tree well. Duchess trees planted a few years ago are bearing well, but Red Astrachan was a long time coming into bearing.

INTRODUCTIONS.

DR. HUMPHREY.—*Mr. President*, I have the honor to introduce to you and the members of this Society Mrs. Harlan and Mrs. Jones, delegates from the Indiana State Horticultural Society; also Mrs. Lewis, of Bloomington.

THE PRESIDENT.—*Ladies*, we are pleased to welcome you.

On motion of Dr. Humphrey the delegates from Indiana were made honorary members of the Society.

PRESENTATION OF FLOWERS.

THE SECRETARY.—*Mr. President and Brother Members*, I take pleasure in presenting to you, in behalf of the donors, these baskets of most beautiful flowers, arranged with such skill and taste as few ever acquire or possess. One was donated by Messrs. Baird and Tuttle, of Bloomington, arranged and handed in by Mr. Samuel Phenix; this large one was the work and the gift of Mr. F. A. Baller, of Bloomington. There are also other baskets and bouquets upon the tables in the other hall which I trust

the committee will notice. I feel assured you will take pleasure in viewing their lovely tints and beautiful forms, and in their artistic arrangement.

THE PRESIDENT.—There is only one failing in these beautiful mementoes of God's goodness, with which, with lavish hand, he decks the bosom of Mother Earth, one only fault—they are not immortal. (Sensation.)

REPORT UPON ORCHARD CULTURE.

Reports from the Committee on Orchard Culture—Messrs. Hammond, Robison and Pearson—came next in order, and were called for by the President.

A. C. HAMMOND, of Warsaw, read the following report :

To advise wisely and intelligently, on a subject of so much importance as orcharding, especially when our field is the State, extending over almost seven degrees of latitude, fanned on its southern borders by the soft breezes of the Gulf, on the north swept by the fierce, blasting winds of the arctic circle, with a soil as varied as the climate, from the rich drift-deposits of the river-bottom and the Loess formation of the bluff, to the rich, black soil of the great prairies, is an undertaking of great magnitude, and one from which I would gladly escape; but to neglect duty is unmanly; to shrink from it is cowardly. I will therefore perform my allotted task to the best of my ability.

The year just passed has not been a profitable one to the orchardist. The terrible cold of January injured nearly all the peach, pear and cherry-trees, as well as cut off the entire crop of fruit, and probably killed twenty per cent. of the apple-trees in Northern and Central Illinois. Then we had a late frost, that cut off at least two-thirds of the apple-crop. What apples we had, however, were of good size, and unusually well colored, but ripened two or three weeks earlier than usual.

About gathering time (the twentieth of September) the weather turned excessively hot, the mercury ranging from 80° to 92° in the shade for nearly a month. The effect of this August weather was to ripen and rot apples that were gathered, and to cause those on the trees to drop, causing great loss to growers and dealers. The year may therefore be set down as an unsatisfactory one, although in some sections the crop was fair, and some orchardists have made money; yet the measure of success has not been large enough to tempt, to any great extent, those seeking investments to plant commercial orchards. Yet we now and then find a man who has the courage to brave torrid heat and arctic cold, floods, drouths, tornadoes and ten thousand insect enemies, and in the face of an over-stocked market and low prices to plant a commercial orchard. The first and most difficult question for these men to decide is that of varieties, and on this point hinges the success or failure of the enterprise. For a number of years past planters have gone wild on Ben Davis, and a very large proportion of the orchards planted have been—perhaps universally—of this variety.

But what shall we plant, if not Ben Davis? asks the anxious inquirer after light—a question more easily asked than answered. Twenty-five years ago the Janet was the popular apple, and more largely planted than any other; but we have learned that as the tree grows old the fruit becomes small, and is not wanted in market at any price.

Later the Winesap was all the rage, and was planted by everybody. It was then a regular bearer, the fruit large and handsome, and brought the highest price in market, and the hopeful orchardist, in the simplicity of his soul, cried, *Eureka! Eureka!!* A few passing years, and “lo, a change came o’er the spirit of his dreams!” The spur-blight attacked the tree, and the scab destroyed the fruit; and now hundreds of thousands of trees are but cumberers of the ground. Later still the Willow was supposed to be the *ne plus ultra*, and was planted in large quantities; but a large portion of these trees has either been grubbed up or they stand blighted and dead monuments of the credulity of the unsophisticated orchardist. Except in a few favored locations it is not now planted.

Then the Rome Beauty, Minkler, Stark, Smith’s Cider and Grimes’ Golden were each supposed to be the coming apple, but they have all “been weighed in the balance and found wanting.”

This brings us to the Ben Davis era. No tree has ever been planted in the West in such quantities as this, and it is probable that not more than one-fourth of them have yet come into bearing. When they all come to full bearing, and their product is crowded upon the market, already overstocked with better fruit, we may safely predict that the price will fall below the cost of production. True, it possesses many of the requisites of a popular apple: The tree is healthy, vigorous and a good bearer, the fruit large and handsome, and, notwithstanding its lack of quality, has heretofore sold for fancy prices. Extensive planting has thus been encouraged, and many a young orchardist hopes and believes he has discovered a sure and rapid road to wealth; but we fear that many of these hopes will prove like apples of Sodom, fair to the eye, but dust and ashes in the grasp, as the observing orchardist, even now, sees signs of deterioration, and in all probability it will hold the same relation to the next generation that the Newtown Pippin, White Bellflower and Rawles’ Janet do to us.

“But,” says one, “you have not yet told us what to plant.” Very true, nor do I feel competent for the task. My own last planting has been: *Summer*—Red Astrachan, Duchess of Oldenburg and Sops of Wine. *Fall*—Maiden’s Blush. *Winter*—Ben Davis, Jonathan, Red Canada, Wythe; and I do not know that I could do better now.

That we need a new apple, combining the good qualities of our best apples, with the size, color, hardiness and productiveness of the Ben Davis is a foregone conclusion; but how to obtain it is the question. There is no doubt that by a careful system of hybridization, crossing some of our delicate and best varieties with the coarser and more hardy ones, good results might be obtained; but, in my opinion, the true plan is to grow trees from seeds, from some of our hardy and desirable sorts, like Ben Davis, Bellflower, Red Canada, or Pryor’s Red. It is well

known that, as a rule, trees flourish best in their native soil, and that their removal a few degrees of latitude or longitude often changes the quality and time of ripening of the fruit and all the conditions of the tree.

The Baldwin, so satisfactory in both tree and fruit in the East, is almost worthless here, the fruit being inferior in quality and ripening in October, and the tree tender and short-lived. The same may be said of Newtown Pippin, so long regarded one of the most profitable apples in New York. The Rome Beauty is a native of Southern Ohio, and there ranks high as a commercial apple, but on the prairies of Illinois the tree is tender and altogether unsatisfactory; and the fruit scabs so badly, four years out of five, as to render it unfit for market.

The popular apples of Michigan are but cumberers of the ground with us, and the Wealthy, so highly lauded in Wisconsin and Minnesota for its hardiness and keeping qualities, is an October apple in Illinois.

In my own county some attention has been given to this subject. Seeds of the Bellflower, Janet, Rambo, Romanite and Ben Davis have been carefully planted by different individuals, and in nearly every case the result has been gratifying. The Wythe is a seedling of the Janet, bears and blooms at the same time, and resembles it very closely in leaf, bark and the general appearance of the tree; but the fruit is much larger and of better quality. We have an apple that possesses several of the unmistakable characteristics of the Bellflower, and evidently a seedling from it, that ought to be disseminated, as it is equal to the parent in quality and appearance, and apparently more productive. I have also had my attention called to two seedlings of the Rambo, one of which very closely resembles it in every respect except color, which is white; the other is a better keeper and more juicy, and will probably prove to be an acquisition. I have also seen a seedling of the Ben Davis that resembles it closely in appearance, and is claimed by the originator to be much better in quality, and is certainly worth looking after.

I do not wish to be understood as saying that all seedlings are hardy, or that one in a hundred will be of any value. Out of a thousand, grown from seeds—say of the Bellflower—the practiced eye will, before they are three months old, discover that at least nine hundred and fifty are worthless, while from the remaining fifty one or two of value may be obtained. These experiments require considerable time and money, and will not therefore be engaged in by any great number, but if a dozen members of this Society would consider themselves a committee to grow and test new varieties great good would result.

It is becoming more and more apparent that commercial orcharding must fall almost entirely into the hands of the specialist, as in these days of insect enemies and diseases the ordinary farmer cannot or will not give his orchard the attention that is necessary to produce satisfactory results. Then, again, the man who has two, three or five thousand barrels of apples can make better sales than the man who only has as many hundred, and if the waste of the orchard is utilized by drying it must be done on a large scale. The same may be said of the making of cider.

To be a success it must be made in large quantities, by the man of experience, who knows how to make and handle it, and can afford to look up a market.

I have in this paper spoken of orcharding only from a commercial standpoint, not because I consider the family orchard of less importance, but space will not permit of any discussion of this point.

MR. ROBISON.—*Mr. President*, I have prepared no paper upon orchard culture, for I presumed the other members of the committee, experienced orchardists, would exhaust the subject.

MR. PEARSON.—*Mr. President*, Mr. Robison has made my speech (laughter); but as he has no report, nor I either, perhaps it is best that I should say a few words upon the subject.

I wish to urge upon the members of the Society, that they do not allow themselves to go into the cultivation of too many varieties. If I had planted but three or four kinds they would have paid four times as much profit as corn. I think our list as already published wholly sufficient; and I wish further to say, that I agree with Mr. Hammond that the growing of apples for commercial purposes must largely pass into the hands of commercial orchardists.

I don't know that the apple "boom" has struck us in Madison county very bad, but am satisfied that apples pay better than any other crop in our locality.

In my orchard, planted about fifteen years ago, Smith's Cider, Ben Davis and Benoni have paid for the land on which they stand three or four times over, and the trees are good for fifteen years yet. We think if we can get a dollar a barrel we are getting a good price and are doing a profitable business. There is no orchardist in our section but has made money in raising apples, and any man that can't make money at it had better quit and go to speculating (laughter). Fall fruit don't pay—we have no market. In my orchard I seed to clover, and as the clover in time kills out or is run out by the blue-grass I plow or harrow and sow to clover again.

On the first of November the fruit-buds looked splendidly and a finer prospect never existed for a big crop of fruit of all kinds on the trees; but now they are swollen badly, except Rawles' Janet, and I fear for them, especially for the peaches, the buds of which on many of the trees show the red; and if we should have a winter which is at all severe we shall lose most of our fruit.

MR. MINIER.—You have what is termed the Loess soil, I believe.

MR. PEARSON.—Mine is a white-oak and hickory soil.

J. T. JOHNSON.—Do you think there is any decrease in orcharding in your locality?

MR. PEARSON.—I don't know but there may be, possibly.

With us peaches pay wonderfully when they bear.

THE SECRETARY.—How often is the curculio-catcher used in your peach orchards?

MR. PEARSON.—We don't run the curculio-catcher at all. The curculio will take Amsden and the *first* early, then work on the medium early to a certain extent, but the late ones will be all right.

A Voice.—How about the plums?

MR. PEARSON.—We grub up the plum-trees to keep the Curculio in check.

MR. ROBISON.—I felt satisfied the subject would be exhausted by others, but since Mr. Pearson has given his experience I will say a few words in reference to my locality.

In planting apples it is advisable to learn *what* varieties to plant in order to meet with the best success, and in planting select those best suited to the market, and which observation or experience has taught us would succeed. With us, where judicious selections have been made, the apple crop has paid far more than the wheat crop. I think that on an average it has paid one hundred dollars to the acre. It must be understood, however—and I wish to emphasize this point—that some varieties may do well on some soils, while others may do as well on some other kinds of soil; yet reverse the order of setting, that is, change the trees but not the soils, and they might both prove worthless as to producing fruit. Jonathan, Ben Davis and Rawles' Janet will do nothing on wet or very moist land, yet on such land the Willow Twig succeeds wonderfully. Now, some varieties that otherwise might do well are disposed to drop their fruit or have it blown off by heavy winds; one of these varieties is the Winesap. On the day of the great Chicago fire we all know that it blew rather lively. Well, that day, from three acres of Winesaps which were very heavily loaded, every apple blew off—three thousand bushels lying on the ground the next morning.

Yellow Bellflower on the prairie grows big trees, but not any fruit, while on clay land it is profitable; Smith's Cider is another apple that does well with me. I have been somewhat amused at the idea of growing new seedlings to take the place of our standard sorts, for the reason that *they are running out*. Apples *don't* deteriorate if you have them on congenial soils. The apples of a thousand years ago are as good now as

they were then ; but of course improvement is gradually going on and we are getting better varieties.

Peaches pay when we get a crop. Two years ago Early Barnard gave us two bushels to the tree. Crawford will not pay with me. Old Mixon is as good a peach as the new varieties ; yet the peach also varies like the apple, depending upon the situation and soil where it is grown.

In my apple orchard the borer infests some trees and not others, and is also very persistent in its attentions to certain trees. It is a very easy matter, however, to keep this insect in check, if you will keep the ground around the bodies of your trees free from weeds and grass, then go along the rows of trees two or three times during the season, and the eggs can usually be found by the little holes in which they are deposited, and they can be crushed by pressing over them with a knife blade ; or if the insect is in the bark of the tree, his castings are quite plainly to be seen and he can be dislodged.

The Canker-worm is our worst pest. I have never yet found any means of entirely getting rid of him, though I have spent time and money without avail ; I do not find the tar bands reliable. Of late, however, I am happy to say they seem to be disappearing. I would say that I found Rawles' Janet and Willow Twig quite exempt from the attacks of the canker-worm. It has been argued here that non-success in apple-culture is due principally to climatic changes. I myself am satisfied that climatic influences to a certain extent control the growing of this fruit, but not so much as soil.

MR. WIER.—I am somewhat surprised that brother Robison don't know why borers affect some varieties more than others. I will tell him the reason : some varieties are earlier in their strong downward flow of sap than others, and in such varieties the borers are drowned in their burrows. September is the best time to hunt out and destroy the borer, as his castings are easily seen then, and it does not require much cutting to reach him.

MR. ROBISON (in answer to a question).—I find borers do more damage in certain spaces, within certain limits, rather than on certain varieties. I don't think the borer is drowned out, at least I never saw one that appeared to be. All kinds of apple-trees seem subject to their attacks, but, as I said before, in certain places.

MR. WIER.—The beetle lays her eggs indiscriminately on all varieties, and they all hatch equally as well on one variety as another ; it is after hatching, in June or July, that the young borer makes his way into the wood through the bark, and this is when the flow of sap drowns him.

MR. MINIER.—I hope to hear more from orchard cultivators; this subject is getting rather interesting.

With me, the chickens keep down the borers. We do not feed them, but compel them at that time of year to hunt their own living.

A Voice.—What is the best grass for an orchard?

MR. MINIER.—The best grass for an orchard is what is termed orchard grass.

A Voice.—Where can it be had, if it can be bought at all?

MR. MINIER.—It can be procured from seedsmen in Chicago. I think I have seen it advertised for sale. When cut it should be left on the ground to serve as a mulch.

I object to this deep cultivation in orchards, which has been recommended; if you cultivate deeply you will tear up the roots of your trees, and then they will become unhealthy and may die. If plowing must be done in the orchard, let it be done very light.

MR. GALUSHA.—I have found plowing in an orchard beneficial; but, of course, the roots should not be torn, for this would be an attack upon the life of the tree, and I would object to this for the same reason that I objected to mutilating the trunks and branches; it might induce fruitfulness, but at the expense of health and longevity. In young orchards I plow deeply in the centers of spaces between rows, and shallower as the trees are approached—examining to see that roots are not broken. I pulverize the soil finely with harrow and clod-smasher to secure moisture in time of drouth.

DR. SCHREDER.—A few years ago this Society recommended root-pruning. How is it now?

MR. PEARSON.—It was not recommended by the Society, I think, but was started by one of the members as a preventive of blight. I think a society ought to disband who will discuss blight. (Laughter.)

While up, I want to say a word about peaches. If I were to plant any more I would plant the Heath Cling; they will bring more money in the market than any other variety. And, oh! ain't they nice? Why, I buy Heath Cling to can, when I have got more than I can sell of other varieties, just because we want it. They have some seedling clings in Alton that are good. People will eat and can good clings if they can get them.

MR. ROBISON.—Do I understand Mr. Minier to say that chickens feed upon the borers?

MR. MINIER.—They cannot well get at the larvæ, but, as I said before, I think they hunt out and destroy the beetles; besides, they catch vast numbers of moths, saw-flies, etc.

A. H. GASTON.—The Downy woodpecker will pick out the borers. Take care of him.

DR. SCHREEDER.—Will he stay in the orchard when you get him there? (Laughter.)

MR. MINKLER.—Yes, and *when* the chickens scratch away the dirt from around the trees the woodpecker will catch the borers! (Renewed laughter.)

little more friendly sparring about the chickens eating borers and catching the beetles was indulged in; but, as no one had seen the work done, no conclusion was reached. The discussion (or badinage) was arrested by a call from the President for the

REPORT UPON FARMERS' HORTICULTURE.

C. N. DENNIS, of Hamilton, presented his report, reading as follows:

The subject of Farmers' Horticulture *is* general horticulture in its broadest sense, as it is only the farmer who is properly situated to practice it. Horticulture in cities and suburbs is of necessity dwarfed, more or less, but here also it is that we find some of the best results in specialities—a verification of the old adage, "A little farm well tilled." Webster defines horticulture to be the cultivation of a garden; and a garden as a rich, well-cultivated spot or tract of country, a desirable spot. The soil of Illinois is naturally rich, and if her farmers would do their full duty the State would be a rich, well-cultivated tract of country, and if properly horticultured (have I made a new word) would be a desirable spot, such as was and is approved by God, as is shown by His placing Adam in the Garden of Eden in the avocation of horticulturist. And when he disobeyed He drove him out to the more ignoble avocation of raising "hog and hominy" by the sweat of his brow.

The old adage, "What is worth doing is worth doing well," is just as true to-day as when it was first uttered; and the object for which this committee was formed is to induce the farmer to engage in horticulture more extensively, scientifically and successfully. To do this he must make less mistakes, buy less fancy frauds at high prices from unprincipled peddlers, plant less trees of kinds that *did well* in New York, Ohio or Kentucky, but *never did and never will* do well in his locality. In fact, he should join, and attend the meetings of, the State and local horticultural societies, become and keep posted in the kinds that do well in his locality, learn and practice the best modes of cultivating them, and then in cheerful confidence await the result. This he can safely do, as in his fruit and ornamental trees (if properly cared for) he has stock in trade, with Divinity at the helm; and as God does not get up corners for the express purpose of catching somebody, he will be reasonably sure of securing dividends, aye, good paying dividends, sometimes as high as

one hundred per cent. in a year. Again, it is duty, first to his family; for the man who does not provide as many of the comforts of life for his family as practicable does not fulfill his nuptial vows. The stock-raiser who does not provide a shelter from the summer's sun is just as unwise, nay criminal, as though neglecting to provide sufficient food; and what so good and cheap as a living tree—and if an evergreen, it is all the better. A good evergreen thicket is a better shelter for stock than thousands in Illinois will get this winter. As a hen-house it never gets lousy, and as a climatic modifier it is unsurpassed. The nurserymen of Illinois have large stocks of evergreens which are becoming overgrown, and which they will sell for less than cost, and any farmer who will carefully plant a hundred will make a profitable investment. If a home (farmer's home) is nicely fitted up with fruit and ornamental trees, roses, shrubs, vines, flowers, large and small fruits in abundance, and the house well stocked with good books and papers, all supplemented by good-humored politeness, fewer boys would seek the hardening, polluting influence of city life; and the ones that did would often sigh, "How dear to my heart are the scenes of my childhood."

There is a vast army of noble workers trying to get men to Heaven by faith and works, and how lamentably they fail. We are told that "faith without works is dead," and that a tree (society) is known by its fruits (results); therefore, let us get results (fruits) either *with* or without faith, and then if we don't get to Heaven we will get a kind of heaven nearer to us and be made better and happier by it. It will have a reflex action on our families, improve their health and happiness. The example will spread throughout a neighborhood, be taken up by some traveler and transplanted to some distant place, to again take root, spread and bless.

In conclusion, let me urge every one to engage in horticulture for the reasons: (1) That it pays as a business. (2) It improves the appearance and adds to the value of the farm. (3) It adds to the health and comfort of the family. (4) It improves a neighborhood and prevents the predicted trouble occasioned by the destruction of the forests. (5) It is a living monument to the person engaged in it, long after his departure to the untried realms, and unimpeachable evidence that the world is the better for his having lived in it.

L. C. FRANCIS, of Springfield, another member of the committee, was not present and had not sent in a report.

PARKER EARLE, of Cobden, from the same committee, being called upon, read the following, which he said was intended only to introduce and give direction to discussion:

Horticulture, as far as it means the culture of all desirable trees and flowers, the making of fine lawns or the surrounding our homes with rural beauty, or the production of all possible varieties of fruits for home use, is to be commended to and pressed upon the attention of every farmer in the land.

But so far as the word means commercial fruit-growing the less the farmer has to do with it the better for him, and the better for the rest of us. Large enterprises in farming and fruit-growing have not been generally carried on successfully together. They continually conflict in their demands upon the attention and labor of the farmer.

Many of us may be able to attain some success in one or two branches of fruit-growing or of farming, as a specialty; few, if any of us, can accomplish much with them all. In attempting it we spread out too thin.

At the close of the reading Mr. EARLE remarked: You will all agree that my report possesses one merit—that of brevity.

DISCUSSION UPON THE REPORTS.

DR. HUMPHREY.—*Mr. President*, I don't like to hear a professed fruit-grower discouraging the growing of fruit by farmers and others. Farmers can set aside a portion of the farm, say an acre, and attend to it; a portion may be devoted to the garden, in which may be raised vegetables and small-fruits, and a portion to the orchard. By this means the morals as well as the wealth of the farmer will be improved: the morals will be improved, because if the boys have fruit at home they will not steal it somewhere else; the wealth will be improved, because the farmer will have what apples he needs at home and perhaps a few to sell, so will not be obliged to go to "the store" for what little fruit he wants.

MR. McWHORTER.—It is best for farmers to attain a better knowledge of the cultivation of fruits of all kinds which can be grown in their locality.

DR. SCHROEDER.—This horticultural society was created to give instructions in the art of growing fruits and vegetables. In the old country the farmers with their other labor make a business of growing and taking to market, as well as using at home, many varieties of fruits and vegetables, and thereby profit in health and purse. In Europe the women and children do most of this work, and I could not help observing, in traveling over those countries, how healthy and strong they were. American women don't do enough work, especially in the garden. Children should be taught to raise early and other vegetables and also fruit. The farmer's wife should help the husband; she should have something to sell from the garden, and in this way would help support the family and take some of the burdens off the husband. I have a great deal of respect for our farmers' wives, but they don't work out of doors enough to be healthy. They should raise all the fruit and vegetables on the farm and not be running to the city to buy every little thing.

MR. MURTFELDT.—That's the reason why I am going back to Europe. I can get rid of this work myself and make the women do it. (Laughter.)

MR. MINKLER.—How would it do, Doctor, for the men to help the women do the housework?

DR. SCHROEDER.—Yes, I do it. (Laughter.)

MR. MINKLER.—I wish to urge the farmers to plant evergreens, for wind-brakes. I would rather have a continuous row around my barn-yard than a tight board fence twenty feet high; they are good for the chickens to roost in, and better for this purpose than any chicken-house that a carpenter can build.

Rows of evergreens should be planted around our farms—they cost but little.

I saw one of the most villainous acts performed at Mendota awhile ago that I ever witnessed. A man had cut down his orchard and was cutting down evergreens that had been planted twenty or thirty years, to make room to grow *corn*.

The evergreen trees make nice ornamental hedges; nearly all of them may be sheared into a hedge; the white pine bears the shears as well as the spruces and cedars.

In reply to the question whether evergreen hedges would turn stock, Mr. Minkler said yes, for they can't see through them.

MR. MINIER.—I am a farmer horticulturist, and my orchard clears me from ten to one hundred dollars per acre, and I would not try to discourage any one from raising trees, plants, flowers and fruit. Trees grow fast, they grow while we sleep, and it will be but a few years, if we plant rightly, before we will have all the fruit we need.

I would plant peach-trees, for if we get one crop in ten years it will pay.

Weeds and insects are blessings to man in disguise, they compel us to cultivate, which is a benefit to the tree and fruit.

A woman raised in the house and afraid to touch anything out of it may be a lady, but is not a woman.

MR. GALUSHA.—There is an increasing interest among American women in fruit-growing and in cultivating flower-gardens. Those of us who are nurserymen can bear witness to the fact that the wives and daughters of the farmers are generally the moving spirits in the purchases, especially of the small-fruit plants, frequently coming with the husband or father to the nursery to make sure of the plants. It is not an unusual thing for orders for plants to come by mail directly from the ladies; and

any nurseryman is a dolt who would not fill such orders with nice plants and give liberal count. The women do all the gathering of the small-fruits upon the farm and much of the cultivating too; possibly the American women may yet become as healthy as the famous German women, of whom the Doctor is so proud.

MR. SPALDING.—We cannot do enough towards inducing farmers to raise fruit; it is all folly to say we cannot raise all the fruit we can consume in the State. Springfield receives apples from Ohio, Michigan and New York by the car-load; Chicago is full of Eastern apples. Shall we continue to let these States supply these fruits which we can as well grow ourselves? Farmers can grow them. Ask farmers what they will take for their apple orchards! Nine out of ten will tell you, "I will not sell at any price," which would show their opinion as to its profitableness. Fruit-growing is profitable for the farmers if they will take proper care of their orchards.

MR. MURTFELDT.—I think Mr. Earle did not intend to discourage farm orcharding, but only meant that those who entered the business of commercial orcharding should attend to that and nothing else.

Our climatic conditions prevent us raising apples of superior excellence profitably; other States have a better climate for this purpose than we, and that is why they have better fruit, and having better fruit, of course we buy it. We must labor to the end that we may raise as good fruit as others, and that end can be best reached by raising seedlings that will be adapted to our peculiar climate, as this Society is now doing.

MR. WIER.—I am of the opinion that apple-orcharding for commercial purposes should be a business of itself, and the same may be said also of the small-fruits.

MR. ROBISON.—The farmer must raise enough fruit on his land for his own use, adapting the quantity to his own needs. By the proper laying-out of his fruit-plot so as to use the plow and cultivator mostly, he can with little labor have a great variety of fruit on a small amount of ground. I would plant evergreen trees around the house and wherever wanted in groves, but would not stretch them in lines around the whole farm; it makes the landscape too monotonous, and besides, they occupy more room planted in this way.

THE SECRETARY.—*Mr. President*, I rise to make an announcement, as I see some are leaving the hall. Prof. David Swing will lecture in the Assembly Hall, opposite, this evening, for the benefit of the two literary societies who have so kindly donated to us the use of these two beautiful

halls. They request that we take a recess during the hour of the lecture to allow our members to attend.

A motion to this effect was then made and carried, almost unanimously.

MR. EARLE.—*Mr. President*, I feel gratified that my little paper has elicited this lively, and, I think, healthy discussion.

The President invited the ladies present to participate in the discussion, since the influence and horticultural work of the ladies has been made one of its topics.

There was no response to this invitation.

MR. RAGAN (of Indiana).—*Mr. President*, I wish to extend an invitation to the members of this Society to attend the meeting of our State Society, which takes place next week, at Dublin, Indiana. I will furnish passes to any member who will signify to your Secretary his purpose to attend.

ELECTION OF HONORARY MEMBERS.

On motion of Mr. McWHORTER, Messrs. C. W. Murtfeldt, of St. Louis, and W. A. Ragan, of Indiana, were made honorary members of this Society.

MR. MURTFELDT then arose and said :

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

I thank you for the honor you have conferred upon me. I was formerly a resident of Northern Illinois, though now I live in St. Louis, and take a deep interest in the horticulture of your State.

As a member of the Kansas State Horticultural Society I invite you to the annual meeting of that Society next week. You will be heartily welcomed.

MR. RAGAN.—*Mr. President and Gentlemen*, I return thanks for the courtesy shown me.

CHANGE IN THE PROGRAMME.

J. S. JOHNSON said that he was somewhat out of health and found he would not be able to be present to-morrow, when his report on General Horticulture would be due, and asked the privilege of reading it this evening, before the hour of Dr. Swing's lecture.

The request was granted by vote of the Society.

On motion, the report on Floriculture, which would be the order of business at the hour of the lecture this evening, was made the second business in order for to-morrow afternoon.

The regular order of business was then resumed by the call of the President for the reports.

REPORT ON CURRANTS AND GOOSEBERRIES.

SAMUEL EDWARDS, of Mendota, presented the following report :

Mr. President and Members of the State Horticultural Society :

Forty years ago currants and gooseberries grown in and along the borders of the kitchen garden, and an occasional mess of black-cap raspberries from fence corners or a new clearing, constituted the list of small-fruits for nearly every farm in Western New York, my old home.

With what anxiety the good housewife watched for the currant blossoms to fall, that she could use for pies and sauce the incipient fruit. The hairy gooseberries were deemed a luxury.

People often speak of the wonderful progress of this age in mechanical inventions. Has it not been fully as great in improved modes of cultivating and in the extension of our lists of small-fruits?

Compare the currants and gooseberries of the olden time with those grown at your own homes and those of your neighbors.

For thirty years you and the revered ones who have rested from their labors have toiled for the consummation of those results and similar ones in pomology, arboriculture, landscape, vegetable and kitchen gardening—in the glorious work of re-instating man in a garden wherein “grows every tree pleasant to the eye or good for food.”

While striving for greater attainments, choosing for our motto “Excelsior,” have we not great reason for gratitude that we have been permitted to be co-workers in the good already accomplished, and to cherish fond hopes for the future?

But what has this to do with growing currants and gooseberries? Little, it is true; but, as you saw proper to place me on this committee with one who has been eminently successful in their culture, I can say but little directly upon the subject which will be regarded with interest.

Land, for a plantation of these fruits, should be in good condition for growing a crop of corn; thrifty young plants set in fall, or very early in spring, four feet apart each way, five feet between rows, are better for all currants except white grape.

Frequent, clean cultivation should be given the fore part of the season, mulching with coarse manure the latter part of June. A good dressing of manure should be given annually; coal and wood ashes are good to be used with other manures. In this latitude and farther south partial shade is advisable for currants. As they attain age the older wood becomes massy and should be cut out each winter, the longest shoots shortened one-third, and a part of the smaller shoots cut out.

Red and White Dutch, Cherry, Versailles, Fertile d'Angers, Victoria, Long-bunch Holland, White Grape and Black English or Naples (no difference visible) are all the varieties of currants retained by me.

American Seedling, Houghton, Downing and a green English variety of gooseberries are all I can recommend. After investing in many

new, high-priced fruits—notably the Pride-of-the-Hudson raspberry—I decided not to test the new gooseberries Emerald and Ruby *at a dollar each!*

E. C. HATHEWAY, of Ottawa, member of the same committee, reported as follows:

So much has been written and said respecting these fruits, that it seems quite superfluous to attempt to make any report that would add to the knowledge we already possess concerning them.

Notwithstanding the repeated urgings to give better cultivation to these fruits, in order to increase their productiveness, thereby increasing the money value of the fruit market-garden, or creating a supply of cheaply grown, yet very valuable fruit, in the home garden; yet we find these fruits, as a general thing, occupying the neglected corner, or in the fence row, where cultivation cannot be well given them. Why this is so is to me an unsolved mystery.

There certainly is no fruit that is more easily grown, or, especially in the case of the currant, more hardy; and, as to productiveness, there is no fruit more so than the currant and the small varieties of gooseberries of American origin, such as Houghton and American Seedling.

Then, again, the refreshing and cooling juice of the currant, in its pleasant acidity, offers us one of the most valuable agents known in the *Materia Medica* for the soothing of fevers, being, as a refrigerant, quite equal to the tamarind.

In the black currant we have a most valuable remedy for bowel and summer complaints, either in the leaves, branches or roots, used as a *steep* to drink, or in the fruit, made into a jelly and used in water.

Currants should be planted three or four feet apart in the row, and the rows not less than six feet apart, better eight; this admits of plowing and horse-culture.

Plants should be of one or two years' growth in nursery, from cuttings, but *never* old roots divided up. Neither do layers ever make as upright and sightly bushes as cuttings. In localities where the currant-borer is unknown the tree form for both currant and gooseberry will do, but with us they should be grown in stools. Attention should be given to pruning, which should be thorough, keeping the bushes well open, annually cutting away the old wood which has fruited, say twice, and annually selecting a few of the strongest shoots to become fruiting canes, and cutting away all the rest of the young growth at the crown of the stool.

Annually, or biennially at least, the plantation should receive a good liberal dressing of manure, and in summer sufficient cultivation to keep down weeds; or a good heavy mulch should be spread upon the ground. The latter is best through the fruiting season, as it keeps the fruit clean, also the ground cool, thereby lessening the liability of the leaf to drop in hot weather, which would destroy the fruit.

The crop, the past season, was very good wherever the plants were well taken care of; but neglected patches produced but little fruit, and

the latter case being the rule prices consequently ranged high—here in our local market at Ottawa from \$1.50 to \$2.00 per bushel, wholesale, for currants.

We have but comparatively few insects to contend against with these fruits, but the operations of these few are sufficiently great, if neglected, to generally destroy the whole crop.

A few years ago the most troublesome of these pests was the currant span-worm, or *geometer* caterpillar; of late, however, I have seen nothing of them; the most effectual way of ridding the bushes of them is by thorough hand-picking.

The stalk-borer and leaf-aphis are our worst foes at present. The stalk-borer is not so easily banished, but can be kept well under control by proper pruning, and the brush taken away and at once burned.

The larvæ is generally found in the canes that have borne once, and but seldom in the young shoots; it burrows in the pith of the cane, tunneling its way upward; it remains in the cane over winter, and therefore, if the pruning is done in the autumn or winter, is quite easily eradicated.

White hellebore mixed with water, or a weak solution of carbolic acid, either of which may be applied in spray to the leaves, being careful to wet the under sides of them, will destroy the leaf-aphis.

As yet, so far as varieties of currants are concerned, I have found none to supersede Red and White Dutch and White Grape.

Victoria, with me, is not sufficiently productive, neither is the Cherry. Long-bunched Holland is the best very late variety, but here will not sell in market, its place being filled with other berries and apples. Black Naples for family use is the best of the blacks, but no black currant can be made profitable to grow for market, so far as my experience goes.

Many varieties might be mentioned as "fair to good" in bearing and quality, but I think it useless to multiply varieties when they possess no merits of greater value than those we already have.

Of gooseberries the Houghton and American Seedling are small in size, but great bearers, and of very good quality.

Smith's, Downing and Mountain Seedling are larger and more salable. I would discourage planting the English varieties, as they are very liable to mildew, but in localities where they are not troubled with this difficulty I would suggest the planting of Crown Bob, Roaring Lion, Red Champagne and Whitesmith. These should be severely pruned and but few canes allowed for fruiting, and the fruit on these thinned to obtain the largest specimens.

As the foregoing remarks principally apply to currants and gooseberries as raised on my own place it may be well to state that my soil consists of a rich sandy loam, highly cultivated and heavily manured with both special and domestic manures.

On motion, the Society then adjourned to half-past six o'clock this evening.

FIRST DAY—EVENING.

The Society re-assembled as per adjournment.

The first order of business being the report of the Committee on Entomology, the Secretary suggested that as the lecture or report of Prof. Thomas was to be of a general and popular nature he would secure a larger audience than this hall can accommodate and it should therefore be deferred and be delivered in the Assembly Hall.

THE PRESIDENT.—Dr. Thomas will deliver his lecture at some future time, not yet fixed; there is not time for it this evening.

On motion of the Secretary, the lecture of Prof. Thomas was fixed for to-morrow evening in the Assembly Hall. The special order was then taken up, being the report from Mr. Johnson.

REPORT ON GENERAL HORTICULTURE—THIRD DISTRICT.

By J. S. JOHNSON, ELVASTON.

Mr. President and Members of the State Horticultural Society:

In performing the task of reporting on the General Horticulture of Central Illinois, composed of twenty-one counties, I am at a loss to know where horticulture ends and agriculture begins, they are so intimately connected and managed by almost every farmer, as well as gardener and florist.

Since your last meeting I can say of a truth, we have had a very unusual twelve months of meteorology in this locality, $40\frac{1}{2}^{\circ}$ north, and in the extreme western part of the State. We went into winter with trees in good condition, wood well perfected. The snow fell on the 7th, 11th, 12th and 13th of December, 1878, to the depth of eighteen to twenty inches, ground not frozen and quite dry. January 2d the thermometer showed 20° to 28° below, and remained for a week. During this time I think peaches, blackberries and nearly all our cherries and tender roses were destroyed above the snow line. February was very mild. The December snow all left, and, for the first time in the remembrance of ye writer, did not raise the branches by its going; the ground not being frozen, the snow-water went directly into the earth. February 12th snow fell two inches; on the 15th, 16th and 17th six inches; on the 26th the mercury was 4° below zero. March 1st, 2d, 3d, 4th, 5th and 6th warm; 7th and 8th 75° above zero, and I planted potatoes, lettuce and radishes. March 27th violets in bloom in flower beds.

Cabbage, turnips and potatoes under snow all winter grew as well as if transplanted from cellar; apples were found under trees as good as when gathered in the fall. April was cold and dry; rain fell on the 11th, wetting the ground three inches. Still cold and very dry through May

and June. On 3d of July we had rains, but none worth mentioning again until August 5th, and but little then. No more rain fell until November 8th and 10th. This much for the season, hoping some scientist will be so good as to tell us what planet, star or world has disturbed the order of things so that neither dews nor rain have visited us for twelve months.

The unprecedented winter and summer killed many of our hardy apple-trees; some died in spring, many more in autumn, with fruit and leaves all on; more died in low grounds than on high lands, in the same orchards. Maiden's Blush, Janet, Winesap and Willow Twig suffered most. In some orchards as much as twenty per cent. died. Old peach-trees were nearly all killed, and few young ones survived. The roots of trees which were killed to the snow line have sent up new shoots which have made good growths.

One word about the cause of such destruction of our fruit-trees. During winter the wheat and grass grew all the time. The heat must have been near forty-five degrees, and in this condition the sap was flowing in all the roots with rapidity, while above the snow line it was frozen to such a degree that in many instances the bodies burst open, and from others under the snow the bark was thrown off like bursting from excessive sap.

This excessive flow during winter in the roots has, in your humble servant's opinion, been one of the causes of the death of so many of our trees.

Apples in Hancock county were not a general crop; though in a small strip of country, say six miles north and south and ten miles east and west, lying nearly east from Warsaw, they were better than usual. One small orchard of four acres of Ben Davis, belonging to A. C. Hammond, made 700 bushels to the acre, which sold at fifty-five cents per bushel. This, without doubt, was the best in the district. The trees were from fourteen to fifteen years old. The varieties that have been a success this year are the following, named in order of bearing: Ben Davis, Wythe, Jonathan, Red Canada, Winesap, Rambo, Stark, Hubbardson's Nonsuch and Willow Twig. Of summer apples we had Early Harvest, Red June, Red Astrachan.

Orchards set in 1878 lost no trees; those set in 1879 lost five per cent., and the loss in old orchards will average eight per cent. in this county. All apples have ripened very early. We commenced barreling and shipping to Texas Sept. 12th, at fifty-five cents per bushel, and the same apples are now worth \$1.00 per bushel. We have no method of utilizing our surplus fruit but making into cider and vinegar, and as vinegar does not pay, all small and specked apples are made into cider. I find E. McCune has made 410 barrels, A. C. Hammond 300, Hammond & Co. 300, and there have been made for sale, say 100 more, making in this small fruit-section spoken of 1,110 barrels, price six to eight dollars per barrel. The manner of making is to grate the apples; the capacity of the mills, 100 bushels in thirty to forty minutes, yielding three to three-and-one-half gallons per bushel, though the amount this

year is at least one-half gallon less, owing to apples being too ripe. All of said cider has been put in 40-gallon iron-bound casks, and put in hot, or "canned," as we call it, to keep from fomenting; it will remain without fomenting until opened.

Peaches, there were none; the few young trees that lived are full of fruit-buds and very forward, waiting for old Boreas to blast our hopes.

Of *Cherries* we had but few; our dependence is on the Early May, and they were nearly a failure.

Plums.—I saw but a few grown in this county. The Chickasaw grown by Mr. H. Thompson, of Adams county, were as perfect as were ever grown. They were beauties. He says "curculio-proof."

Pears.—I would not recommend the cultivation of pears unless a man has money he wants to squander.

Blackberries were a failure this year. The following are recommended for early and late: Kittatinny early; Snyder and Lawton for late. Some are cultivating the Taylor, and think it will prove the best of all.

Raspberries were very fair for so dry a summer.

Miami and Doolittle stand at the head of Black-caps.

We have a seedling grown in Hamilton, this county, by Mr. Carrier, that is worthy of mention; it is very hardy, an upright grower, needs no trellis, fruit large, and bears equally with Cluster.

In Red-caps the Turner stands first for a lazy man's berry.

Currants the last season were not plenty; our favorites are Red Dutch and Cherry; the latter wants rich land and good cultivation and to be well cut back.

Strawberries were a short crop; our best are Russel's Prolific and Crescent Seedling.

Grapes.—Our vineyards were a success as far as the Concords were concerned, and there is no other variety that we can name that would pay to plant.

I can only speak of a few vineyards out of the many: Brow Brothers gathered and made into wine from ten acres of Concords 4,000 gallons. The first mash is white wine, the lees are then put in tub, left to ferment, say from four to eight days, and when pressed make red wine. The Americans and Germans run the white wine, then put the lees in tubs and as much water as they have taken juice, and sugar enough to make by fermentation a red wine, which they sell for some ten cents less per gallon than the white. The Brows have sold theirs at forty-five cents per gallon, making to the acre \$180. Next year they will have fifteen acres and in 1881 twenty-two acres. Four hundred gallons to the acre, they say, is not a large yield; those that add water and sugar make much more—some say 1,000 gallons. I was in hopes that I could give the acres in Concord grapes in this county, but find it too large a task, and will leave it to the census man.

Our garden vegetables ought to share in our attention with fruits. One-half our living, nay, I might say more, comes by way of vegetables,

which every family should raise for themselves; it takes but little time to raise them, compared to the amount of good living, saying nothing of the health they bring.

It is true you cannot raise asparagus, pease, beans, onions, carrots, beets, cabbage, cauliflowers, squashes, cucumbers, radishes, potatoes and melons without labor and good attention. The better the cultivation and richer the ground the better and more perfect they will be. It is not necessary for me to enumerate the best kinds, they have already been published many times in your reports. I would recommend that the head of every family instruct the rising generation in horticulture in its highest sense. In fact, I would have it added in connection with botany in our common schools as one of the sciences.

Our Enemies—The Insects.—They deserve more than a mere mention. The apple has been injured by tent-caterpillars, canker-worms and codling-moth, the greatest injury being done by the moth, in some orchards nearly every apple being attacked. We have had enemies on our vegetables. Four varieties on potatoes—the Colorado beetle and the ten-lined, four-lined and black blister-beetle, in many localities devouring the entire crop. A bug we call squash-bug, shaped a little like a turtle, with a hard shell of a dun color, infested the squashes; he would leave when fresh lime was used, but would soon return.

One more, which is new here, is the worm that has destroyed nearly all our cabbages, and, from appearances, has prepared itself for a good start next season. I have a few seed gathered for this Society to examine, which will be found in the query-box. We used lime, cold salt water and hot salt water; the hot brine was found to be the best, but none a full success.

Scale-lice on maples and Osage hedge trees were plenty, but a friend was found following, taking the substance from them before they could do us damage.

I feel to rejoice in the improvement that has taken place in the last five years in this district in the cultivation of flowers. Where we only saw a few in the towns and cities, we now find them at nearly every house, in all their glory. Small orange-trees, in bloom and fruit, are occasionally seen, while geraniums, heliotropes, begonias, dahlias, carnation pinks, tea-roses, fuchsias, calla lilies and cacti, with a large quantity of coleus plants, are often seen, and are beautiful to behold. I am aware a few old fogies say they would prefer corn, but give me the boy or girl with a cultivated taste for the beautiful in nature.

I wish to say a word for the planting of forest trees, for protection and timber.

My attention, some fifteen years ago, was called to the subject of timber-belts by noticing an orchard with a natural grove on the southeast of it. When the apple-trees were in full bloom there was a three-days' cold, southeast storm, and that orchard was not affected like those without the timber-belt. I think more fruit is destroyed in time of bloom from the meteorological conditions than from all other causes combined.

It would pay for any man, in comfort to his stock (if in no other way), to plant timber-belts.

Plant on all our prairie farms timber for fuel and for use in the arts. For fuel plant soft maple; for the arts, black walnut, hard maple and chestnut. Soft-maple seed, planted and well tended, will make in two years a growth of ten feet; then transplant and tend well for two to four years, and in twelve years you will have trees from twelve to fifteen inches in diameter.

For ornament, a few in the yard, planted not too thick. of the evergreen varieties, and a few clusters in the background of the same, make the premises look home-like and cozy at the same time.

I find, by actual tests, that a double row of pines, cedars or arbor vitæ mark a difference of five to eight degrees in winter; stock of all kinds will take advantage of it, if you will but give them a chance. Oh, yes, give the poultry such protection, it will pay in egg-fruit.

Plant for ornament. No person should *build a house, improve a lot or farm without ornamenting* the same, if he expects to make his sons and daughters satisfied with home-life.

A great amount of advice has been given in regard to setting evergreens.

My opinion is, when you let the sun strike the roots of an evergreen (as will be the case when shipped a long distance, and sometimes when purchased near home) you will be subject to loss, for the sap in the evergreen contains a gum, and when once hardened there is no possible way of softening it to make it flow through its pores again, and it must die. My advice would be to purchase trees near home, keep the roots damp and set the same day taken up, cultivate well, and you will raise ninety-nine out of every hundred.

I submit the following two sub-reports, which are the only ones I have received:

REPORT OF MORGAN COUNTY—BY A. L. HAY, JACKSONVILLE.

J. S. JOHNSON.—*Dear Sir,*—In compliance with a request from O. B. Galusha I send the following report upon the Horticultural interests of this county:

While partially following the line of topics suggested by him, I will not confine myself wholly to them or attempt to cover the entire list.

First.—The severe cold of the past winter was accompanied with a heavy fall of snow which thoroughly protected the Strawberries and the roots of all other plants, but the entire canes of the Blackberry were killed, and all prospects for a crop of course destroyed.

Raspberries were considerably injured and the crop shortened at least one-third, but the Turner recovered sufficiently to burden the market, and for the first time in its history forced its market value down to a level with the black-caps.

Many trees were badly damaged either from the effects of the severe winter or the unprecedented drouth of the past summer, and have gone into bankruptcy. This is especially the case with the Mountain Ash, of which many beautiful specimens in this vicinity are dead.

Owing to the late spring the blossoming of all fruits was from two to three weeks later than the year previous; however, a late frost in May very materially damaged the Strawberry crop, and in connection with the protracted drouth, which began in April

and from which we are still suffering, so shortened the yield that our market was at no time glutted and our producers realized from fifteen to twenty-five cents per quart for their entire product. There was probably not a quart of home-grown blackberries offered on our market.

The Cherry crop, with the exception of the Morello, was an entire failure; the trees were in good condition and showed about half an average crop of blossoms, but the late frosts and the dear little birds made the story and the crop a short one.

The early Apples were not very abundant, the Early Harvest producing more than any other variety, while the Red Astrachan, of which there are a goodly number of trees in this county, did not show a blossom. The yield of fall apples was much more abundant, the market being supplied at very low rates. The amount of winter apples produced far exceeded the expectation of any one, the poor or barren lands giving decidedly the largest crop and the best specimens. However, where old orchards did not do well young trees, under apparently similar circumstances, produced remarkably, one young orchard of Ben Davis giving the largest yield ever known in this county. The Winesap also gave a good yield in most orchards. Janets in young orchards cropped well and gave good, large fruit in good condition.

The crop of Pears was remarkably short; trees passed the winter in good condition and blossomed well, but late frosts harvested the crop while in bloom and saved the grower a great amount of trouble and vexation.

The Concord Grape is capable of producing more genuine surprises and more grapes to the square inch, under unfavorable circumstances, than any other fruit cultivated in this county. After battling with the severe cold of winter and the unprecedented drouth of summer, and the army of hungry birds in autumn, the yield was so abundant as to force their market value down to two and three cents per pound.

Any man who would stand up and advocate the extension of vineyards under such circumstances would probably be shot on the spot, if not otherwise injured.

The result of my experience leads me to practice as little cultivation in the growing of small-fruits (in our rich, black soil) after the first year as possible. The great trouble in such soils is a tendency to run to wood, thereby becoming too tender to endure our severe, changeable winters, and the canes of the raspberry and blackberry becoming utterly unmanageable, while grapes encircle everything in their loving embrace and reach out for other worlds to conquer. Looking at the cultivation of the apple and pear in the matter of dollars and cents, I believe that a slow, steady growth after the time for fruiting arrives will insure more and better fruit than the tender, rampant growth caused by cultivation.

In planting an apple-orchard for profit I should say, set close—sixteen or twenty feet each way—head low, let them branch just at the ground if they show a desire to do so; being close together they will not spread all over the ground, but grow straight up and leave plenty of room for wagons to pass between them.

In regard to the cultivation of the pear I will only say that the more you cultivate the fewer pears you will have. After all the discouraging attempts at pear-culture here we are falling into the practice of stealing them from those who occasionally meet with success. If people will plant pears I would recommend standard trees, or to set the dwarfs so deep that they will root from the stock.

The hill or drill system for strawberries, with clean cultivation and beds renewed each alternate year, gives best satisfaction with us; many are yet grown solid or in mats, but the fruit is inferior in quality and finds a poor market.

Raspberries should be set three feet by six, with new canes stopped at about two feet in height, and the second growth stopped again in July, and plantations renewed every three or four years.

Blackberries set three feet by eight, and new canes stopped at about four feet in height, give best results.

Our market for fruit is mostly local; occasionally a glut induces the grower to ship to distant points; the ordinary twenty-four-box case, with every conceivable style of box, according to the fancy of the grower, is used.

Berries for the home market are picked as early in the morning as possible, while those for shipping are picked mostly after four o'clock P. M., and shipped on the evening

trains. Where the crop is large this of course necessitates a great many pickers systematically managed, or the close of the four hours before train-time would find the shipper with a vast amount of unfinished business on hand.

Mr. J. Baldwin, the largest small-fruit grower in this county, appears to have found the very secret of success in this direction. At the tap of the bell a little army of from fifty to seventy-five, or even one hundred pickers, each carrying a case containing twenty boxes, and each twenty-five pickers under the care of an overseer, start into the field; the cases are deposited in the shade at the ends of the rows and each picker places two boxes side by side in a little apron or pocket, made for the purpose and fastened about the waist. This prevents the dropping of boxes from careless holding, and consequent loss of fruit, and gives the picker the free use of both hands, and two pickers, one upon each side of the row, insures a clean harvest.

At the second tap of the bell the little army return to the fruit-house, carrying their berries with them, where they are packed in cases, marked and started for market. Each picker must return the same number of boxes, either filled or empty, that he started out with; if one is broken the pieces must be returned or the picker is charged with a box of fruit.

From the experience of others and from my own, I am satisfied that a light thin dry soil is better adapted to fruit-culture than our ordinary rich black prairie lands.

This is proven by the uniformly good crop realized from orchards and small-fruits planted on what are called our barren lands, while entire or partial failure is so often met with upon our otherwise productive soils.

Were I setting an orchard for profit and had the choice of location I would select a northern or western exposure, not a steep declivity in either direction, but with fall enough to break the force of both the summer and winter sun, believing that more trees and plants are annually sun-struck than are injured from all other climatic causes combined.

As for shelter-belts, I am always in favor of them; but for protection to orchards and fruit plantations I would plant them upon the south and west sides of the grounds, leaving them exposed to the north and east.

Of course rapid-growing trees are preferable for this purpose, especially in new, treeless districts. Probably the soft maple answers the purpose better than any other one variety, and if interspersed with elm the maples may be removed as they increase in size.

The Lombardy Poplar has failed entirely in fulfilling the promise it made of making a good timber protection. Nearly all this variety of tree, in this county, over ten years of age, are now dead, and their places must be supplied with others of more durability or remain vacant.

Under the head of "Present State of Horticulture," I will say that the past year has not been one calculated to make the hearts of the horticulturists glad. The almost total loss of the strawberry crop, except in isolated cases, was the first severe blow; the loss of the cherry crop, following so closely thereafter, was not calculated to encourage the fruit-grower very materially; the drouth so affected the raspberry crop that the yield was not satisfactory, although the market was overloaded with a very poor quality of fruit, and consequently it commanded but an inferior price. The crop of grapes was good, but their market value was too low to be remunerative. The market for winter apples opened at about sixty cents, and as the season advanced the price receded to fifty and even forty cents per bushel.

I cannot say just what fruit pays best at present, but I presume that the blackberry was the most profitable of any the past season, as it was so thoroughly winter-killed that the grower did not expect anything from it, and consequently did not squander any time or money upon it, therefore lost nothing from it except the use of the land it occupied.

It seems a little presumptive for any one to select a list of fruits and pronounce them the best for any locality, for a variety that might be a success with one person might prove just the reverse with his neighbor; not through the influence of climate or soil so much as through the disposition to "git up and git" of the grower, and especially might this be the case with small-fruits.

Where dollars and cents are the object in fruit-growing, I still believe that quantity has more to do with success than quality; that a great quantity of poor, miserable-looking berries or apples, or a variety that will produce a great quantity of large, good-looking fruit, though they be inferior in quality, will return more money to the producer than a much better quality of fruit produced at greater cost.

With the strawberry the old Wilson still occupies a prominent place; and next I believe comes the Monarch, which does not set such a great number of berries, but carries them all through to good-sized marketable fruit. One of my neighbors has the past year been very successful with Forest Rose and Crescent, both in a small way, but being new sorts with us they have not been fairly tested as yet.

The Mammoth Cluster, Doolittle and Davison-Thornless still lead the list of the black-cap raspberries; and the Turner comes square to the front as a red berry. Of course there are others claiming favor, but the Turner comprises the great bulk of red fruit grown in this county.

The Early Richmond cherry has not yet been superseded, and probably will not soon be laid in the shade by any competitor. Of course there are many better cherries, but one ripe cherry in the mouth is worth more than a bushel that rot on the tree just before they ripen.

Our market is annually well supplied with home-grown Wild-Goose and Chickasaw plums; therefore, if their quality is poor they are more profitable than one hundred other better varieties that cannot be grown here.

Any peach that would stand our climate and produce fruit in two years out of five would be considered the best for us, but at present we have none such, and as I do not like to abuse an old friend whom I have not seen for several years I will say nothing about them.

The Red Astrachan and Early Harvest for early apples; the Rambo, Maiden's Blush, Jonathan and Snow (or Fameuse) for autumn, and the Winesap, Janet, Willow Twig and Ben Davis give a long enough list for winter. I do not consider the Ben Davis a good apple, but it fruits well and sells well, and that ought to be enough to expect from any one variety.

As a rule noxious insects have not been remarkably active during the past season; the robin and cat-bird have done more damage than any other insects now in mind. We always expect as many as one worm in each apple, and the codling-moth is not the insect to let man overestimate its working capacity, and we have not been disappointed this time. As for remedies, the shot-gun is the only one of value in dealing with the two first-mentioned species, and more apples and hogs are the only ones known to be a benefit in the latter instance.

REPORT OF ADAMS COUNTY—By W. H. THOMPSON.

The severe cold of the past winter killed all the plum-trees in this county, except the Chickasaw and Wild-Goose varieties; also most varieties of cherries, peaches, blackberries, Delaware and hybrid grapes, hardy perpetual and annual roses, etc. Stump-the-world, Morris White and Late Crawford are among the varieties of living peach-trees. Concord, Ives, Clinton, Martha, Lady and Norton's Virginia survived and yielded heavy crops.

Fruit Crop of 1879.—Berries, plums, pears and cherries were scarce; hardy grapes abundant.

Cultivation.—Berries and all small-fruits want high culture; grapes, close pruning in spring, but none in summer, except surplus laterals or suckers; pears, at bearing, do best mulched or in clover; all plums are best in tramped, poor land, without manure—pigs and chickens are most convenient and beneficial. Apple and peach orchards at bearing should also be treated to clover, and hogs turned in to eat fallen fruit. These orchards should be plowed shallow every few years and re-seeded to clover; small grain sown in them induces the borers; a pint of salt close to and around the base of the trunk of each tree every year kills the grass there and checks the operations of the borers; pears need more salt, also rusty iron imbedded in the soil under the trees is beneficial.

I consider rich, high and dry land and a northern exposure as best for most species of fruits.

For Timber-Belts, rapid-growing evergreens—spruce, pine, etc., are most effectual all the year, but are detrimental except for summer winds, as high exposed locations are most productive of fruit.

Pruning.—Orchards are more injured from excessive pruning than from neglect. Shape the young tree, and never after cut large limbs; hollow, open tops are short-lived, and no wonder, when Nature is so perverted; one main trunk from top to base, with enough side branches (though not a popular theory), is the strongest and best tree.

Best Sorts of Different Fruits.—If grown for money, the most prolific and salable; if for dessert, suit the taste. Select the fewest varieties for a succession. The most profitable on our black prairie soil might differ in other localities. A few of the most hardy and remunerative are given:

Raspberries.—Black-cap and Mammoth Cluster.

Blackberries.—Snyder and Kittatinny.

Strawberries.—Charles Downing and Wilson.

Currants.—Red Dutch, White Grape and Cherry.

Cherries.—Early Richmond (for profit).

Grapes.—Concord (most profitable), Ives' Seedling, Hartford, Clinton and Norton's Virginia; Concord Seedlings (White) Martha and Lady are both hardy and prolific. Rogers' Hybrid No. 1, if protected in winter, is the most profitable grape for late keeping; the vine is a vigorous grower, very prolific; fruit with foreign flavor.

Plums.—Wild-Goose and Chickasaw varieties. I am introducing a seedling Wild-Goose which I procured at Union Village, Ohio, and from the seed have grown trees giving a succession from late July to October, which surpass all varieties for hardiness and profit. It is doubtless the best family and market plum for Illinois; the tree, hardy and vigorous, occupies twenty feet of land, and has never failed me a crop.

Pears suffer from blight and are not extensively grown. The standard trees succeeding best are Flemish Beauty, White Doyenne, Belle Lucrative and Osband's Summer. Those with dark or reddish bark, such as Flemish Beauty and Osband's Summer, are most hardy.

The Duchess d'Angouleme is unsurpassed as a dwarf.

Peaches.—The money is in a few varieties, viz.: Troth's Early, Early Crawford, Old Mixon Free, Stump the World, Smock Free, Lagrange, Heath Cling and Allen's October.

Apples.—The following are adapted especially to the soil and climate of this county: Early Harvest, Maiden's Blush, Rambo, Penn. Red Streak, Rome Beauty, Ben Davis, Winesap, Jonathan, Fallwater, Willow Twig, Rawles' Janet.

DISCUSSION UPON THE REPORT.

MR. MCWHORTER.—I would like to know if *Prunus Americana* and *Prunus Chicasa* are identical?

A. H. GASTON.—All plums, natives in America, are Chickasaw plums.

MR. MURTFELDT.—My daughter has given some study to this cabbage-worm, the *Pieris rapæ*, and has found it infested with parasites, which may keep it in check.

MR. HATHEWAY.—These insects were very bad upon my cabbages last summer, and I thought at one time that I would have no cabbages, but by using one grain of carbolic acid crystal to one gallon of water, sprinkled over the plants, I kept them in check and raised a good crop of cabbages.

MR. MURTFELDT.—My daughter has discovered them on mig-nonette.

DR. THOMAS.—I have tried every remedy that could be thought of to drive them away or destroy them, but have found quite all to fail. Brine was the only thing that seemed to check them, and that only temporarily; I have watched them eating away quite unconcerned when they were buried in slaked-lime dust. There are methods which I think, if followed, will quite rid us of this pest, and I will endeavor to discover to you more of this matter to-morrow evening in my lecture on "*Life in Little Things.*"

SPECIAL COMMITTEES.

The President announced the following committees:

On Fruits on Exhibition.—Messrs. McWhorter, Nelson and Earle.

On Final Resolutions.—Messrs. Emery, Ridings and Webster.

On Obituaries.—Parker Earle.

On President's Address.—Dr. Humphrey and Messrs. Robison and Baller.

DISCUSSION RESUMED.

MR. GALUSHA.—I cannot agree with the statement in the report of the Third District, that "the Turner raspberry is the lazy-man's berry."

The Turner is a wonderful grower, and throws up such multitudes of suckers as to cover the ground and prevent fruitage, unless kept in narrow rows and thoroughly cultivated. A neighbor of mine tried an experiment this year on his patch of Turners, thus: all the rows having been heretofore treated alike, he manured all as usual last winter; and during spring and until the berries began to ripen he thoroughly cultivated a part of the rows, while he merely plowed the others once, as is the usual custom to do to keep the young plants between the rows in check. The result was a good crop of good fair berries on the portion once plowed, but a much larger crop of the largest Turners I ever saw on the cultivated portion. If grown by a lazy man who would not even manure and plow, he would have a patch of lazy-man's brush, but few lazy-man's berries, and those of an inferior size.

J. S. JOHNSON.—By lazy man I meant one who would give only ordinary cultivation; and that the Turner would give good fruit with such care.

DR. HUMPHREY.—I wish to say that in my county (Knox) apples were a failure the past season; they did not bloom. My trees are eleven years old, but I did not get three bushels of good sound winter apples.

Black-cap raspberries in some places were very good, and in others bad failures; strawberries quite an utter failure; Concord grapes the best I ever saw them; red raspberries, especially the Philadelphias, were quite a success; currants were a failure, which I think was due to the stalk-borers working upon them. Early Richmond cherries were a good crop. Black Morellos were good in some localities, and in some others there were none.

The Snyder blackberry is a wonderful success so far; what it may prove to be in the future we can only surmise; we think the question of its hardiness is now quite well settled; our greatest fear for it, however, is that it may succumb to rust, which has attacked and conquered so many of other varieties; it does not bear its best until its fourth year from planting, and thereafter.

J. S. JOHNSON.—I want to hear the cause of the death of so many apple-trees the last year explained.

A. H. GASTON.—We all know that the ground was warm under the snow. Some nursery-trees were killed down to the snow line.

MR. ROBISON.—I had no dead trees this year on my place, from the effects of cold. Snow fell early and on unfrozen ground, but I think the ground froze afterward, as it was very cold. The canker-worm killed some trees, however. Our Willow Twigs bore a fair crop, and in some orchards they bore very heavily.

MR. McWHORTER.—I wish to ask Mr. Johnson if the trees that died had not been affected by the cold weather of the previous winter, and thereby had become debilitated, if, in fact, they were not killed?

J. S. JOHNSON.—The trees were in fine condition before the winter set in. During the winter the snow fell to a considerable depth, and below the snow the bark was loosened and forced from the tree, but above the snow line the trees burst or split open; in Adams county the trees died the most on low ground. My idea is that the ground being unfrozen below the snow the sap was active and forced itself upward and gorged the tree, so when the extreme cold came on the tree was burst open by the expansion of the sap.

MR. McWHORTER.—Did these trees make vigorous growth the previous summer?

J. S. JOHNSON.—Yes, they made very good growth.

J. T. JOHNSON.—I live on one of the highest bluffs on the Mississippi river, and my orchard is planted on an inclination to the north. I lost but one tree from cold weather of last winter, although my orchard occupies a place with the greatest exposure in our locality; the snow

laid very deep among the trees, however. Along the bluffs there are what are called "draws," or ravines cutting deeply down through the high lands at right angles to the river. Along these run small streams, and on the low lands along the streams were some very fine orchards, the trees of which had been planted from twelve to fifteen years. Last spring the trees in these orchards commenced dying, and during the summer they nearly all died. The trees were very fine specimens, and appeared unusually healthy before the cold weather of last winter. They commenced, seemingly, to die in the extremities of the branches, and gradually died downward to the ground. Along these little streams the most intense cold prevailed, the thermometer ranging much lower than on the high lands adjacent.

In reply to a question, he said he did not know whether the roots of the dead trees were affected, as he did not examine them.

MR. SPALDING.—What was the greatest degree of cold through these "draws?"

J. T. JOHNSON.—From 28° to 30° below zero, and perhaps lower; it was at least 25° below every day for a week.

MR. HAMMOND.—In my orchard I lost twenty-five per cent. of Janets; they bore heavily the year before; Ben Davis and Winesap died also, but Maiden's Blush trees were not injured at all.

THE PRESIDENT.—Any trouble with the bark?

MR. HAMMOND.—Yes; I found it loose in the spring.

MR. HOLDRIDGE.—We did not have it as cold in LaSalle county, yet we lost Janets, but no Maiden's Blush. I never saw a dead tree of Maiden's Blush that was large enough to bear fruit.

MR. WIER.—I recollect that we lost a great many trees in 1876; this loss was caused by the cold winter of 1873-4. Wagoners and Janets bore heavily in 1873, but have been dying ever since; we have also had dead trees this year; the severe winter of seventy-three and four damaged them, and the intense cold of last winter finished them.

MR. McWHORTER.—We must congratulate Mr. Wier on his ability to cover up something we don't know anything about.

Upon motion, the Society adjourned, to meet again after Prof. Swing's lecture.

At the close of the lecture, it being late in the evening, the Society, upon re-assembling, adjourned till nine o'clock to-morrow morning.

SECOND DAY—MORNING.

The Society was called to order by the President at the appointed time on Wednesday morning, and prayer was offered by Rev. Mr. IRWIN, of the M. E. Church, of Normal.

The regular order of business was a report from the Committee on Vegetable Gardening.

The Secretary stated that neither member of the committee had handed in a report; whereupon the President read the following:

“Is it practical to cause barren apple-trees to bear fruit by girdling the trunks or branches?”

Signed, JOHN BURNHAM.

MR. BURNHAM.—In Kane county the older apple-trees are dying out and the younger ones don't bear; and we want to know if we can safely bring these trees into bearing. I have a large orchard which was planted twenty years ago, yet we don't get fruit enough for our family's use.

MR. NELSON.—The people in our section are setting new orchards; the old trees are dying out, caused, we think, by the severe winter of 1873 and '74. Many of the old trees look healthy enough, and some of them make a good growth, but upon examination we find them all rotten and hollow inside, very many having only a half inch to an inch of solid wood, like a shell, on the outside. Such trees should be cleaned out and new orchards planted. The young trees are all healthy and sound. We lost no trees from the cold last winter, except those that were “dozy” and dead inside.

We don't have any such trouble in Will county as Mr. Burnham speaks of, but raise all we want ourselves and ship a good many besides.

MR. SPALDING.—We can produce a great many sorts of apples in Illinois of good quality, but many sorts of trees are not productive; we hear many complaints of the Northern Spy; it grows well enough, but it will not bear; so also with Bellflower, but they can be made to bear if certain methods are followed.

MR. NELSON.—Northern Spy will bear when trees get old enough. It is notorious that this variety will not bear for the generation that plants the tree, and any one planting it in this country need not look for fruit until the tree gets to be twenty years old.

MR. SPALDING.—We must plant for ourselves as well as for the generations that are to follow us, therefore must plant varieties that will

bear young; we cannot afford to wait twenty years for apples. If hard winters will kill the trees, so much the more necessity for getting trees to bear while young. I think we can incline trees to bear early by planting close, and as they crowd each other take out alternate trees. I have tried the plan of girdling every other tree where planted close, so that if the girdled ones were killed no real harm would come to the orchard, but find that no harm comes to the girdled trees, and it sets them into bearing at once, and they bear full too.

THE PRESIDENT.—At what age would you girdle the tree?

MR. SPALDING.—Six years old.

THE PRESIDENT.—What varieties do you girdle?

MR. SPALDING.—Janets principally. In Central Illinois, with our rich soils and warm summers, our trees grow too fast; by girdling the trees we check the growth.

A Voice.—What time do you girdle?

Answer.—In April generally, as the trees if girdled then will heal up the wound completely in a single season. I have girdled them, however, in different months, with good success. If the work is done in June the wound will heal quicker than if done at any other time. We can treat the trees roughly to appearances and not hurt them, for these trees have gone into bearing the following season and never after fail to be full of fruit. I have found, however, that Northern Spy is not affected *as much* by girdling as most others. Mr. Johnson, with whom I am acquainted, has Northern Spy and Yellow Bellflower trees girdled, which are bearing well.

I feel satisfied that girdling will not kill apple-trees *unless* too wide a space of bark is taken off, as I have performed the operation at almost every season of the year and no bad results followed, and have also girdled trees twice the same season, and it did not kill them.

MR. BURNHAM.—Can alternate bearers be made annual bearers?

MR. SPALDING.—It is claimed that by the process of girdling they can be made so.

MR. BURNHAM.—It can be made more profitable if we can force our trees into full bearing early and then continue to keep them so. I want to have my trees bear all their crops in twenty years.

THE PRESIDENT.—Have you tried girdling or compressing by using bands of wire or other material around the body or limbs of trees with a view to force them into a bearing state?

MR. SPALDING.—Yes, by strings or bands, and this quite often is accidentally done by leaving the wire (attached to the tag) carelessly

upon the tree; the growing tree is cut by the wire, the downward flow of sap is impeded and in consequence fruit-buds are formed. We sometimes find young trees in nursery rows bearing, but are not long at a loss as to the occasion of it, as almost invariably we find the bark cut through, and often we find the wire entirely out of sight, the bark having entirely closed over it.

MR. BURNHAM.—I have a neighbor who saws half way round the tree on one side, and then saws half way round on the other side a little higher up; the wounds heal up, and trees thus treated have borne well ever since.

MR. SPALDING.—In relation to the matter of trees being dead or hollow inside, I think such trees will bear fruit and live a great many years. I don't think it does much, if any harm, and would not condemn a tree for this reason.

A Voice.—How wide a ring of bark would you take out?

Answer.—Half an inch to an inch in width, and it will heal up without injury if done any time from April to August.

A. H. GASTON.—I have stripped the bark entirely off a tree in June, and the tree healed up without injury.

MR. SPALDING.—I would not recommend anything of the kind; it may not always kill, but it is not necessary to be so severe.

J. S. JOHNSON.—I have had trees girdled in April by sheep, and the trees *all died*. I don't want any girdling done on mine.

A. H. GASTON.—In girdling we must be careful and not touch the inner layer of bark.

J. S. JOHNSON.—I understand Mr. Spalding to say that he pays no attention to the depth of the cut.

MR. SPALDING.—I pay no attention to depth of cut, but take off the ring of bark say a half inch wide. If any one doubts my statements in relation to what I have done in my own orchards, I will say that if he will visit my place at any time I will girdle any number of trees, to show him that I am sincere in this matter, and will also show him a great many trees that have been girdled at *all* seasons in many years without injury.

MR. DE GARMO.—I can confirm the statement of Mr. Spalding, as I once knew an orchard in which the bark was entirely stripped from the bodies of the trees in the month of June. It was maliciously done with the intention of destroying the orchard, but the trees all recovered and bore well afterward. Will girdling make the Bellflower bear?

MR. SPALDING.—Yes, but does not seem to influence it as much as it does some other kinds. A neighbor girdles old trees of Bellflower and has apples; the orchard was planted thirty years ago.

A Voice.—Will the wounds heal as well when made in April as in June?

MR. SPALDING.—No, sir; they will heal in June quicker than at any other time of the year.

MR. MURTFELDT.—Some one made the remark that “we want a little more pepper.” I’ll throw in a little. This process has been known for many years as an attack upon the life of the tree. Of course the tree will not always die at once, but it at once attempts to do the next thing to it, *bear fruit*; but it certainly cannot be as healthy and long-lived as though its life had not been aimed at, and it had been let alone. I hope this Society will be cautious as to what encouragement or indorsement it gives such things as this.

PROF. TURNER.—When I was a boy and lived on my father’s farm in Massachusetts we had some Roxbury Russets that would not bear. We girdled them and it set them to bearing and did not seem to injure them; since I came to Illinois I have practiced it more or less on apple and pear-trees; it works well. I have tried it also on grapes, but it does not seem to do so well. I girdled the Northern Spy every other year.

MR. MURTFELDT.—Why on every alternate year?

PROF. TURNER.—Because I wanted to change the time of bearing—wanted to make them bear regular crops every year instead of alternating.

A Voice.—How did it work?

PROF. TURNER.—All right for a while, but they soon fell back into their old habits, and I let them go.

A Voice.—How did you girdle?

PROF. TURNER.—I cut with a saw around the tree, through the bark, being careful not to injure the wood. As I said before, the grape-vines that I tried were injured by the treatment. I believe that all the trees in the country could be safely stripped from branch to the ground, in June, if protected from sun and wind and kept moist.

MR. WIER.—There is where I want to put in some pepper: *It will not kill the tree.*

MR. MINKLER.—Do you do your girdling in spring, and does it affect the fruit that year?

PROF. TURNER.—I girdle in June, but no result in fruit occurs until the following year.

MR. RAGAN (of Indiana).—I think we should be cautious about recommending this girdling; I have girdled in order to get large fruit, but the life of the tree is jeopardized by the process; trees will bear largely the first year after, poorer the next, and so down the scale. Nourishment is

carried to the top of the tree to the leaves through the white or inner wood, therefore girdling does not prevent the sap from flowing upward, but if girdled at certain times after the sap *has* flowed up, the tree will die. Stripping will kill outright only when the tree is not in full sap, but girdling lightly will not kill, perhaps, at any time.

MR. WIER.—I must take opposite ground from Mr. Ragan. I *know* I can take the bark from a tree at *any* time and not kill it; I can take all the bark from a tree in June, and protect the tree from sun and air, and it will heal. I sometimes find trees barked by mice in winter. I bank them up with earth and the wound grows up all right. Considerable has been said about being careful not to injure the white wood; you can cut out a portion of the white wood and yet the wound will heal. It is a mistaken idea that bark is formed by building along the cells at the edges of the wound; it is a granulated exudation from the white wood beneath. I had fruit on an Early Harvest tree which the mice and rabbits had barked for eighteen inches up from the ground, which was very fine, and it also ripened two weeks earlier.

A Voice.—What became of the tree? Did it heal up?

MR. WIER.—No, it died. (Laughter.)

DR. SCHROEDER.—I don't want it to go out among the people that we are in the doctoring business. The State Society should discountenance all this business. Here it is: the trees don't bear; what is the matter? May-be they are debilitated from some cause; what do we do? Why, we do as the old-time doctors used to do—stick in the steel and let out a little more of his life, as though he was not near enough dead already. (Laughter.)

The first day of this meeting some of those girdling "*fellers*" wanted to kick out some of the varieties of apples because they didn't bear, and here they are to-day giving us a sure remedy for the trouble, something certain to make them bear. (Prolonged laughter.)

I have tried it on grapes, and they die, *every time*; I have made big bunches by girdling, but fruit was no better. That is how I got the big bunches that made your eyes stick out when I showed them at State fairs, and you all wondered "how in the world *did* the Doctor raise them?" (Laughter.)

If we must have trees girdled, why don't we let the little borer do it for us? He will do it without pay, only his board. But as soon as the little fellow gets at it, doing it for us, we go for him with a sharp stick. (Laughter.) It is bad business to plant trees and then doctor them. We don't want trees if we have got to eternally doctor them.

THE SECRETARY.—*Mr. President*, this discussion has already taken too much of our valuable time, but since so much has been said in favor of this mutilating process I cannot let it pass without entering my protest against it; for I wish to warn the inexperienced here, and those who will read our published transactions, that girdling trees to promote fruitage is unwise—except to get a few large specimens for a special object, for, as has been truly said, it is an attack upon the life of the tree, and the recovery from the attack depends upon the extent of the damage and the recuperative energy of the tree; for some varieties of trees, like some human individuals, will recover, or partially so, from attacks to which others would succumb.

It is a law pervading the entire vegetable kingdom that the dying energy of a tree or plant is expended in reproducing its species; and *the very fact of the result, spoken of*, in larger and more fruit, *is a sure indication that the tree or branch is nigh unto death*. Its full recovery is next to impossible, and its premature decay or death quite probable; hence, girdling should only be practiced when trees or branches can well be spared.

MR. HOLDRIDGE.—When we wish to kill trees by girdling we cut through the sap-wood, else it is not sure to kill them. While this subject may be an old one to many members it is new and interesting to me. I am getting some new ideas. I have seen one orchard in which the trees were girdled by rabbits in the spring, and the trees apparently recovered.*

MESSRS. DE GARMO and AUGUSTINE mentioned instances in which trees entirely girdled by mice died, while those in nursery, girdled but half way around, recovered.

MR. ROBISON.—In this girdling process, as practiced by Mr. Spalding and Prof. Turner, the bark from above and below grows together and makes a union again, if the wound is not too wide, and no injury results; but if girdled in April, I think the bark should only be cut around with a knife and no bark be removed, as death must certainly ensue where a space exists between the upper and lower edges of the bark. Where mice and rabbits girdle there are generally small portions of the inner bark that are left, and where this is the case if the tree is mounded up with earth soon after the wound is made to a point higher than the wound, then the tree may live; but where the inner bark is all gone, I

* The Secretary did not understand him to state whether the trees were entirely or but partially girdled.—EDITOR.

think the tree will die. I don't believe, with Mr. Wier, that the white wood exudes new bark. I have girdled cottonwood and willows by taking the bark all off when the leaves are ripe in August, and it killed them dead; not even a sucker ever showed itself.

DR. SCHROEDER.—Are you for or against girdling?

MR. ROBISON.—Both; but would do as Mr. Spalding says we can, by wiring around the limbs, just to get some large specimens, but believe it best to do it on a small scale.

MR. SPALDING.—I do not advise stripping—nothing of the kind; neither do I advise a radical system of girdling, but to girdle lightly and at the proper time, and no harm can possibly ensue, as in four or five weeks the bark is thoroughly united again.

MR. WIER.—Mr. Robison disputes my assertions. I can only say that he don't know what he is talking about. I know, from positive evidence, that the bark is formed by the granulation of sap that exudes from the white wood. I will take an orchard of 500 or 600 trees, four or five years planted, and cut away the bark for five or six inches entirely around the tree and into the wood, and I will agree to pay one dollar for every tree that dies, if any one will give me fifty cents for every one that lives.

THE PRESIDENT.—We must now close the discussion, as there are many valuable papers to be read and discussed.

Mr. Wier will now read his paper on Entomology.

REPORT UPON ENTOMOLOGY.

Mr. WIER read the following:

NOXIOUS INSECTS AND THEIR ENEMIES.

This is a subject to which I have paid considerable attention during the past twenty years, and my conclusions are that the insects well known as noxious have but very few enemies, and this appears to be the principal reason that they become so numerous as to become injurious to our crops. And it is to try and correct some erroneous opinions that I write a few lines on this subject.

In the first place, birds are considered by nearly all the one greatest enemy to noxious insects; that they, by constantly feeding on them, keep them from destroying everything in the shape of vegetable life; that they are the great conservators of man's crops from destroying worm, bug and beetle. This view has been generally accepted without proper investigation, and is very far from being correct; and this proper, practical investigation will prove. Radical as it may appear, I am inclined to the belief that if all the birds were stricken out of existence to-day, after five

summers had passed we would have no more destruction by noxious insects than we had during the season just passed, and that the chances are at least even that there would be fewer insects the fifth season after the birds were all destroyed than there were before. Why? Simply for the reason that the great destroyers of insect-life are insects themselves, and though the birds destroy myriads, their effect on the great mass practically amounts to but very little; and besides, the birds generally destroy at least as many beneficial parasitic insects as they do noxious, and I will only qualify this seemingly rash assertion by saying that they destroy more beneficial insects than they do of those that are known to us as noxious; yet, it is also a fact that some birds keep in entire subjection certain classes of insects that would be extremely noxious were it not for the birds; but the swallow, the swift and the night-hawk, as they flash through the air of an evening, may, and do, in a few moments overbalance the good work of all other birds combined during the day, by gathering to their destruction in their carnivorous mouths the tiny parasitic gnats that swarm in their love-flights through the air; each and every pair of these gnats, so destroyed, was capable of the destruction of fifty to two hundred and fifty ravenous caterpillars or other noxious larvæ. The orchardist who with intense satisfaction watches the visits of the Baltimore oriole to the nest of the tent-caterpillar in his apple-tree, at each visit carrying off a grub, becomes disgusted when on investigation he finds that the oriole is only rendering the existence of this noxious caterpillar possible by tearing the captured grubs open and taking from their bodies the grub of a parasitic ichneumon fly that had a foreclosed trust-deed on the caterpillar's life. But strange as it may appear, the oriole is doing a double duty, he is not only rendering it possible for the caterpillar to increase and multiply his species, but the ichneumon as well, for if he did not thin out and decimate the fly it would soon entirely destroy the tent-caterpillar race, and then it would necessarily cease to exist for want of its proper food; but it is not possible for such catastrophies to happen unless the wheel of Nature is badly obstructed. The more we study this great law of "eat and be eaten," the greater our astonishment becomes at the vast and intricate system of checks and counter-checks in all life. The entire dependence of the life of one species on that of another has led some naturalists to believe and assert that the entire destruction of a certain species would destroy the harmony of Nature and bring about almost chaotic results. But I think there is no fear of such results, were one, ten or a hundred species of life completely destroyed, for each void place in Nature is covered from ten thousand different points, and is instantly occupied, and the disappearance, the sudden destruction of even a prominent species would, it seems to me, be like the casting of a pebble on the surface of a glassy lake; it would only cause a slight disturbance, possibly wide-spread, but soon quieting, with no appreciable effect on the great mass of life, good or bad.

Another great and general mistake made in this relation is this, that because birds of a certain species are entirely insectivorous they are necessarily the particular ones that are the most beneficial. This is far

from being a fact, and investigation will show the reverse to be true. Birds that feed entirely on insects, such as the swallows, swifts, night-hawks, whip-poor-wills and bats, feed only when flying, and investigation proves that their food is largely made up of our best insect friends and aids, namely, the parasitic gnats, flies and ichneumons; and it is a mooted question whether this class of birds should have the protection of the law or not. My investigations, which I admit have been crude and imperfect, tend to show that they should not have protection, but be destroyed at will, as I think that thorough investigation will show them to be noxious in a certain degree. We are all liable to mistakes and to jump at conclusions. That eminent scientific and *practical* (for he is one of the very few truly scientific men who also observe the practical) ornithologist, Dr. Elliott Cones, cannot speak too highly of the strictly insectivorous swallow, nor say too hard things of the almost strictly graminivorous English sparrow; yet I am confident that a set of books kept by double or single entry would show a larger balance on the right side in favor of the homely, saucy, thieving and pugnacious sparrow; yet I must agree with him in thinking that no more idiotic piece of business was ever accomplished than the introduction of this *most noxious* bird of England into this country, the *one* tiny bird that the brave Briton, as history tells us, has been fighting and trying to exterminate for centuries. It would be equally sensible for Central Europe to introduce our plum-curculio to look after its prunes!

But enough. Before any one has the right to write authoritatively on the relations between birds and our insect enemies, the facts should be reached by the most thorough, patient, scientific investigation. Who is better qualified for this work than our own Professor S. A. Forbes?

But I must make one more bold and characteristic assertion before leaving this subject, which is this: Birds, as a rule, do not feed upon, and in that way, or in any way, destroy what are *generally known* as noxious insects to any great beneficial extent. This may be proven by asking what birds destroy potato-beetles—black, striped or yellow, Colorado or native—the tarnished plant-bug, or other chinch-bugs, the squash-bug, the cucumber-beetle, the apple and other fruit-tree borers, the codling-moth, the plum-curculio, the Hessian fly? and so on *ad infinitum*. It is true that birds do feed upon and destroy many species of insects *that might* become noxious but for them; and further, which is very aggravating, some of the most useful of the birds in this way are the ones most hurtful to the fruit-grower, such as the robins, thrushes, cat-birds, etc.; and I am forced to say, in conclusion, that, after all the facts bearing upon the relations of birds to insects are determined, it is barely possible that man may successfully better his condition by conserving certain birds and destroying others.

We now come to the great destroyers of noxious insects, namely, other insects. This part of my subject has been so ably handled by our own and neighboring State Entomologists that it is unnecessary for me to enlarge upon it. I will, therefore, only give a few observed facts, going to show what a slender chance there is for some species of young cater-

pillars becoming butterflies, and how suddenly myriads of noxious insects can be swept out of existence by an enemy.

I once noticed a field forty rods long by twenty wide, covered very thickly by a common weed, the heads of which at one end of the field showed a bright orange color, which died out gradually at the middle, and farther on towards the south end a dark shade appeared, which soon became black, but quickly gave place to the proper color of the weed, which extended unbroken over the south end of the field. This strange coloration attracted my attention, and I determined to investigate the cause. Commencing at the north end, I found the bright orange to be caused by the pupa-cases of the larvæ of one of our largest lady-birds (probably *coccinella novemnotata*); farther in the cases were still occupied by the pupæ. A little farther the larvæ were affixing themselves to the extreme tips of the weeds to undergo their transformations. A little farther in and thousands of beetles were emerging from these cases.

And here commenced a field of slaughter long to be remembered; more lives were being taken each hour than of human lives during the whole of our great rebellion. The weeds grew as thickly as possible, and were luxuriant. The lady-birds had been attracted at the north end of the field by a large, black plant-louse, which had spread, generation after generation, in serried ranks of millions, towards the south, sucking the life from the weeds as they passed. They had been discovered by the lady-birds and their eggs were deposited among them, which soon hatched and let loose among the tender plant-lice the gluttonous, tiger-like destroyers; but the plant-lice had advanced in their march of destruction considerably while the lady-bird eggs were hatching, and the destroyer did not obliterate them until they had destroyed the weeds for more than twenty rods.

From this example we can learn some lessons: In the first place, we see how wonderfully fast two kinds of life can multiply when all things are favorable; secondly, how quickly one species can destroy and be destroyed; and, thirdly, how the irruption of a noxious insect, though it may do us serious harm at the time, may ultimately prove to our great advantage, in this way, by furnishing food in plenty for some very beneficial insect, thereby increasing its numbers to such an extent as to be of great service in destroying other noxious insects; for most insectivorous insects feed indiscriminately on several species. The coming among us of the Colorado potato-beetle made great and lasting changes in our insect-life, many of which are in our favor. I have watched and studied these changes with great pleasure. The coming among us of this one species probably produced as great a convulsion in all life as we shall ever see produced in a natural way; for there is scarcely any life, vegetable or animal, in this State, that has not in some way been affected by its introduction, and before Nature had reached her proper balance from its introduction we meet with another visitor, obliterating another of our valued products in its devouring march, in the shape of the cabbage-worm (*Pieris rapæ*), and our efforts to destroy it and save our cabbages are as ineffectual as our first battles with the potato-bugs, and will continue to be

so. But Nature will give us a Nemesis in the shape of some tiny, insignificant little insect, before which the cabbage-worm will disappear like the white frost before the morning sun; yet we will always be troubled somewhat by these two pests; but as soon as Nature regains her balance they will be held in subjection, so as to be only occasionally noxious, like the plant-lice before mentioned, which left their enemies behind at the start, but will be overtaken and destroyed; and their introduction may prove to be to our ultimate benefit.

There are numerous species of insects whose young would destroy utterly, in one or more seasons, their proper food-plants were their enemies stricken from existence. And the converse is true of these enemies. The chances for a caterpillar to reach maturity in the shape of a butterfly or moth are exceedingly few; its deadly enemies are ever on the alert to place their eggs on its unprotected back, or to sink them in its vitals, or to carry it off bodily as food for their unhatched young. I once found feeding near together two of our largest caterpillars, those of the moth *Attacus cecropia*. On the back of one were glued eighty-two tiny eggs, on that of the other eighty-four, and from nearly every one of these eggs a little maggot would hatch which would burrow its way through the living tissue of the caterpillar and prey upon his substance to his certain destruction. If we observe carefully we will find that nearly every kind of life has its deadly foes, and is kept by them in complete subjection generally, so as not to become so numerous as to, for any length of time, occupy more than their share of space to the detriment of other life.

The great fluctuations in insect-life as regards numbers, often to our misfortune, have their origin in causes that can generally be easily traced, but are sometimes obscure. The more prominent of these causes are: Firstly, the almost complete destruction of a species by an enemy that feeds entirely on it. When the food is gone the enemy in that region *all starve*; the few left of the other, being relieved of this particular enemy, soon swarm in countless myriads (and may so increase in this way unchecked as to devour all its proper food within its reach and the whole brood starve to death before maturity, as I have seen chinch-bugs and locusts (grasshoppers) do); but its natural enemy attacks it on all plants, and again sweeps it from the face of our fair fields, and if all things are propitious destroys it so completely that again it must starve; and secondly, by climatic changes, destroying the eaten or the eater; or thirdly, from the one or the other being destroyed by disease, for insects are subject to disease the same as all other life. A notable example of the power of disease over insect-life will be recollected by many present, that happened about fifteen years ago, when by far the largest brood of chinch-bugs Illinois has ever known was almost entirely annihilated over the length and breadth of the State by disease, between two Sundays. By careful search hardly a specimen could be found for the cabinet the following season.

Had I time I would like to say something of the many (though not always unreasonable) mistakes made by the unobserving when they think

they have made discoveries for the complete protection against or for the complete annihilation of noxious insects. They simply jump at conclusions, and think that one swallow makes a summer. I will only give one instance, and it is to the point decisively:

Several years ago the street and park-trees in the city of New York were being disastrously defoliated by certain insects. Something must be done at once or the trees would be lost. That great community was at once relieved by some brilliant idiot publishing as an indisputable fact that birds were the great natural enemy of worms; therefore birds must be had, and that the English sparrow was the most stalwart of wormers, and that he was domestic in habit, and that he bred very fast and was hardy and active. Here was a mixture of truth and fiction very captivating to the New York heart; the source was considered good, and all was taken for facts, and the English sparrow "boom" commenced. A few charitable idiots imported a few dozen sparrows, the city a few dozens more, and New York was happy. The sparrow took possession; he had crossed the perilous "briny" to do it, and he did it; he smote our no-account native birds with bill and claw; he brought his bow and arrow with him, the self-same bow with which he had smote poor innocent Cock Robin for his own good pleasure ages ago, and any bird too large for him to conveniently handle he smote with his arrow. The next season, having cleaned out his new ranch of all useless feathered bipeds, of this hitherto unhappy country, the nest was built, eggs laid and young hatched, which were carefully fed upon kitchen offal and sweepings, choice selections from the droppings of animals, green peas, some fruits and a few poor innocent tender harmless worms. After rearing two or three numerous families, they all, fathers and sons, mothers and daughters, uncles, aunts and cousins, went diligently to work, carefully spreading the horse-droppings over the streets, helping mow the grass of the parks, and beautifully frescoing and calcimining the fronts of the houses, and the hats and bonnets of the citizens. But the great, horrid worms disappeared from New York's trees. The sparrow did it and New York was happy. The sparrow "boom" went on; Philadelphia heard of it; her trees were wormy; she sent a policeman in citizen's dress to New York, who stole a dozen sparrows, when, presto, her worms were gone and she was happy. Baltimore, Washington, Boston, Cincinnati, St. Louis, Chicago, all were struck. The sparrows were obtained; and they did not stop to look if the worms disappeared, it was not worth while. Five hundred sparrows had devoured the worms on 600,000 trees in New York city and Brooklyn, averaging three pounds of worms to the tree in three months. Fact; Mark Twain, Henry Ward Beecher and other eminent divines had seen it and said it; Prof. Thurber, P. T. Quinn and other practical farmers of a national reputation, ditto; Jay Gould, Miss Anthony and others eminent in science gave the scientific details; *all* the old ladies of Boston wrote long essays on *Sparrowensis*; the illustrated papers gave most beautiful pictures of myriads of "those great, horrid worms" passing through the sparrows. One speculative fellow tried to start a company with a vast capital for collecting sparrow guano,

but all capitalists were engaged so pleasantly in seeing the worms go down that they gave him no attention. Here capital made a grand mistake, for one must readily see from the abundant proof that from the amount of worms eaten by each and every sparrow fifty of them would furnish guano enough, of most perfect quality, unleached and unweathered, to render the whole State of New Jersey as fertile as a garden, even after allowing a very large margin for waste.

When the sparrow business was "red-hot," a renowned scientist, whose opinions were sought for and accepted as facts, undoubtedly, on two continents, ventured to thus write: "The English sparrow is, in the strictest sense of the word, a graminivorous bird, more closely so than any member of its family, the *Fringillide*: its young are fed, to some extent, while in the nest, on soft insects, such as the larvæ of *small* moths, found feeding on *grass* and leaves. The principal food of the adult bird is *horse*——." No farther word of the learned scientist's essay on the English sparrow was read by any of the sparrow maniacs, and things became lively generally. It were better for that poor scientist had he never been born, for column after column of the most abusive abuse was hurled at his head. The pastors of all the churches denounced him from their pulpits; Boston called a meeting in Faneuil Hall, at which the most learned politicians of the country were invited to give the true scientific habits of the sparrow, his worming capacity, and the ultimate benefit that would accrue from his introduction to our greatest national industry—agriculture. Laws were passed making it felony to insult a sparrow, or to cause the death of one; no one was able to invent a law severe enough. The ridiculous craze went on until every town in our country is swarming with the dirty, noisy, pugnacious, entirely-useless, and will-soon-become-very-noxious English sparrow, to the almost complete exclusion of our every way better and songful native birds.

Did the sparrows destroy the worms in New York City and Philadelphia? No, the worms disappeared by reason of their natural insect enemies. I have sat in Franklin Square, in Philadelphia, in August, with the sparrows swarming around and under trees entirely defoliated by caterpillars, and with their trunks nearly covered by their cocoons and eggs, and have watched the sparrows there and in other places for hours closely, day after day, without seeing them eat an insect of any kind; I saw them eat grass, crumbs and offal; I saw one play with a caterpillar for a long time, but he did not eat it.

So much for jumping at conclusions, delusions and unscientific science. (Laughter and cheers.)

DISCUSSION UPON THE REPORT.

DR. THOMAS.—I am somewhat amused at the latter part of the paper, but there is no question that a mistake has been made in the introduction of the English sparrow, which is absolutely useless; but as relates to the matter of birds performing no important part in the destruction of insects, this is going a little too far. In Europe, in some places, birds in former

times were allowed to be destroyed indiscriminately; but as the birds diminished the insects increased, and to such an extent that destruction to the crops was threatened, so the Governments passed laws protecting and fostering the birds, when the insects decreased again. I can see but one way to test this bird question: let the authorities stop the destruction of birds, and have preserves established for the purpose of studying their habits and their sources of food. We must do something, and this seems to me the most feasible of any plan yet broached.

I agree with Wier, except as to the little black beetles.

In relation to the cabbage-butterfly, I will say that the true parasite of the imported species (*Pieris rapæ*) has appeared in Illinois, which will no doubt aid us another year in keeping this pest in check. Another one from Europe has also been found. I think also that we have a species of ichneumon that preys upon them; I am not quite sure of this, however.

I have observed the past season that the *Pieris* does not remain as long in the pupal state in Southern Illinois as it does in New York, and a striking difference between the imported and native species has also been observed in the way the eggs are laid. We find the eggs of the imported species deposited singly on both upper and under sides of the leaf, while the native deposits in clusters and on the under side of the leaf only. The butterfly of the imported species is very pugnacious and is driving the native before it. The worm of the imported one is very peaceful and quite sluggish, and in this respect both native and foreign are alike.

Pieris rapæ does not bore into the head; another new but different worm does bore into the head, however. Flat Dutch and Fotler's Brunswick are freer from them than other varieties on account of the solidity of their heads.

PROF. FORBES.—I would suggest that thorough experiments be made to determine the value of birds, as to which are the more or the less beneficial or absolutely pernicious; this can be done *only* by long-continued and careful experiments. A preliminary survey should, however, be made by the examination of the contents of the stomachs of birds. A preserve should be established where observations could be made, long and patiently, and this could be done with but little expense to the State. Taking my examinations of the stomachs of birds of the State as a whole the result is somewhat in favor of the value of birds, but it is hard to tell whether some birds do more harm than good.

DR. THOMAS.—I would state that while I appreciate these examinations made by Prof. Forbes, I think a law should be passed establishing a

preserve for birds, and in that way to test the matter as to how much good or harm they do. The expense would be but trifling, while the results would be of great value; I would say also that I would banish the shot-gun. I don't believe in saving some birds, and in shooting others because they eat some of our fruit.

Upon the suggestion of Mr. Minier the students of the University were invited to examine the fruits on exhibition this afternoon.

The report from Committee on Vegetable Gardening, being next in order, was called for, and the Secretary stated that neither Mr. Kimball nor Mr. Hay, members of the committee, was present, nor had sent in papers.

Dr. H. SCHRÆDER, of Bloomington, another member of the committee, was present, and read a paper upon Asparagus.*

REPORT UPON FRUITS ON EXHIBITION.

The Committee on Fruits announced, through the chairman, Mr. McWHORTER, their readiness to report.

Mr. McWHORTER stated that the committee met with some embarrassment in the discharge of its duties from two sources: the slight difference in the merits of some lots where in competition for the same premium, and also from some doubt in certain instances whether it were best to award any premium at all on account of the fruit falling below the high standard of merit which it is deemed should be maintained.

We have, he said, done the best we could under the circumstances. The following is the report:

Mr. President,—Your Committee on Fruits have examined the fruit placed upon exhibition and in competition for the premiums offered by the Executive Board of this Society, and have made the following awards:

For Largest and Best Collection of Fruit,	
A. C. Hammond, Warsaw, first premium.....	\$25 00
H. M. Dunlap, Champaign, second premium.	15 00
For Best Ten Varieties of Winter Apples for Northern Illinois,	
S. G. Minkler, Oswego, first premium.....	10 00
For Best Ten Varieties of Winter Apples for Central Illinois,	
H. M. Dunlap, Champaign, first premium.....	10 00
James T. Johnson, Warsaw, second premium.....	5 00
For Best Collection of Seedling Apples,	
A. C. Hammond, Warsaw, first premium.....	10 00

* This paper was not handed to the Secretary. If a copy is furnished in time for publication in this volume it will be found among the "Miscellaneous Papers," farther on.—SECRETARY.

For Best Peck of Ben Davis,	
James T. Johnson, Warsaw, first premium.....	\$ 5 00
R. De Garmo, Assumption, second premium.....	3 00
For Best Peck of Rawles' Janet,	
J. T. Johnson, Warsaw, first premium.....	5 00
A. C. Hammond, Warsaw, second premium.....	3 00
For Best Peck of Jonathan,	
O. B. Galusha, Morris, first premium.....	5 00
A. C. Hammond, Warsaw, second premium.....	3 00
For Best Peck of Red Canada,	
J. T. Johnson, Warsaw, first premium.....	5 00
A. C. Hammond, Warsaw, second premium.....	3 00
For Best Peck of Fulton,	
A. C. Hammond, first premium.....	5 00
For Best Peck of Northern Spy,	
H. M. Dunlap, first premium.....	5 00
A. C. Hammond, second premium.....	3 00
For Best Peck of Willow Twig,	
S. G. Minkler, Oswego, first premium.....	5 00
W. H. Lightfoot, Springfield, second premium.....	3 00

Mr. Minkler exhibited a peck of Cayuga Red-streak, also a peck of very fine Minkler apples, but for which there was no premium offered.

There were also on exhibition some collections consisting of varieties for which the Board had offered prizes, but as the fruit was not of a high standard of merit, being not in good condition, no awards were made. These varieties were: Domine, Fameuse (Snow), Wagoner and Yellow Bellflower.

(Signed) T. McWHORTER, }
 PARKER EARLE, } *Committee.*
 W. T. NELSON, }

DISCUSSION UPON THE REPORT.

MR. WIER.—*Mr. President*, the only fault I find in the report is that the committee did not give the names of the varieties of apples taking the first premiums as best ten for each division of the State.

MR. MINKLER.—The ten varieties taking the first premium for Northern Illinois are not the best ten sorts which can be grown there, but are the best ten which I had to exhibit this year.

J. T. JOHNSON.—We are not to suppose that the varieties are actually the very best, only the best on exhibition.

MR. McWHORTER.—The committee did not find any collection which, in their opinion, contained the very best ten varieties.

THE SECRETARY.—*Mr. President*, I move that the committee be continued, and requested to make an additional report for the purpose of

giving these lists, but more especially to report upon other articles upon exhibition, as this will obviate the necessity of appointing another committee.

There are bouquets or baskets of flowers in the fruit hall, also several new seedlings, and, perhaps, some other articles which should be noticed.

The motion to continue the committee prevailed.

On motion, the Society then adjourned till half-past one o'clock this afternoon.

SECOND DAY—AFTERNOON.

The Society convened at the hour named in adjournment, with President BURRILL in the chair.

QUESTIONS FROM QUERY-BOX.

The Secretary opened the query-box and read its questions, which were discussed in the order of the reading. They were as follows:

Query No. 1.—I have a piece of ground, black prairie soil, clay sub-soil, which has been used for a vegetable garden for the past twenty years, and has been, from year to year, highly manured with stable manure. For the past three years the angle-worms have taken possession of the ground, countless numbers working in it, until the soil has become so hard that when plowed or spaded up no vegetables worth raising will grow upon it. What shall I do with it to restore it? W. T. NELSON.

DR. SCHREDER.—Plow and harrow often and turn on the chickens, they will clean them out after a while.

No other remedy was suggested.

LIMITING THE DISCUSSIONS.

On motion, discussions upon the topics were limited to three minutes each.

Query No. 2.—Can the originators of new fruits get a copyright on them the same as authors do upon books?

No response.

Query No. 3.—Have our cultivated apples, such as we see on the tables in the other hall, originated from our wild crabs?

MR. WIER.—Our apples originated from the European crab.

DR. HUMPHREY.—I think it is fully admitted that all our cultivated apples come from the native crab-apples of Europe.

MR. MINIER.—As the peach is said to have originated from the south almond of Persia, so has the cultivated apple of this country originated from the wild crab of Asia.

DR. SCHREDER.—Does not the big Book tell us that they were given to our greatest grand-parents, Adam and Eve? Surely, they didn't have such sour, bitter crab-apples to eat! (Laughter.)

MR. WEBSTER.—I have no doubt that our apples came from the crab-apples of Europe; I saw crabs growing wild there last summer which were nearly as large and as fine-looking as the Snow apple.

Query No. 5.—What causes the earth covered by plank, or a mulch, for twelve months, to become enriched and so well prepared for a seed-bed, either for horticultural or agricultural purposes?

MR. BURNHAM.—Does the snow when covering the ground have the same effect?

THE SECRETARY.—The earth accumulates nitrogen under the cover of boards or mulch, and is thus better fitted to furnish food to plants, which are largely nitrogenous.

J. S. JOHNSON.—Is it necessary to exclude the light to make nitrogen?

PROF. TURNER.—Not necessarily; but by excluding air and giving rest the nitrates accumulate.

THE SECRETARY.—This is a question for agricultural chemistry. It is now pretty generally accepted as *proved* by scientists that nearly all the elements of plant-food exist in molecules floating in the lower stratum of the atmosphere; that the rains, dews and snows carry these into the soil, where they are utilized as plant-food; and it is evident that if the soil is prevented from giving up its nitrogen, etc., by so covering it that plants cannot grow, and the sun and wind cannot dislodge and carry it away, and yet it is so left that the rains and melting snow can saturate the soil, it will soon become rich in all these aerial fertilizing elements. Let the ground beneath such covering be kept perfectly dry by a large building or shed and no such accumulation could take place.

Query No. 6.—Can pears be successfully grown in Illinois upon apple stocks?

A. H. GASTON exhibited a two-year-old pear-tree which had been root-grafted upon an apple stock, and planted so deep in the soil that the pear cion had evidently taken root, also the apple roots were still alive and partially, as he stated, sustained the life of the tree. He said: Pears can be grown on apple stocks successfully. I have here a pear-tree grafted upon an apple root.

A Voice.—Is it a Birkitt pear?

Answer.—Yes, it is a Birkitt. (Laughter). The pear cion has taken root and it is now a double-rooted tree, better than if it was entirely on its own roots.

MR. MURTFELDT.—Does the gentleman's experience extend beyond the little tree which he holds in his hand? (Laughter.)

A. H. GASTON.—I have seen trees that had been grafted forty years which had borne full crops a great many years. I have seen pears not only grafted on the roots but in the tops of apple-trees, which are now many years old, and which always bear well.

MR. BURNHAM.—*Mr. President*, I saw apple-trees grafted to pears twenty-five years ago, and now are living and bear full; I also know a man in our section of the State who has the pear grafted on the apple and the trees bear well.

THE PRESIDENT.—The time is now up for the discussion of this topic.

A Voice.—I move that three minutes more be allowed for discussion on this subject.—*Carried.*

THE SECRETARY.—*Mr. President*, I cannot be content to allow this discussion to end quite here, for fear some may be led astray. Had the gentleman exhibited the tree which he held in his hand to show an exception to a rule rather than as a *sample* of the union common between the pear and apple it would have been well enough.

I tried this thing pretty well twenty-five years ago and succeeded in getting some nice-looking two-year-old trees, but not two in a hundred perhaps ever made valuable trees; the union is not perfect and the pear will almost always break off at the point of the union.

These gentlemen are no doubt sincere, but I am sure they have only noticed the exceptional trees and cannot have had experience and extended observation in this direction. Some varieties form better union with the apple than others. I remember that I succeeded better with Henry-the-fourth than any other, but these exceptions are so rare that it is folly to attempt growing pear-trees in this way.

MR. MINKLER.—I had that fever once—*bad.* (Laughter.)

MR. NELSON.—So had I. Come up, brethren, and relate your experiences. (Laughter.)

MR. EDWARDS.—I succeeded in grafting the Bloodgood on an apple stock, the tree doing well.

MR. WEBSTER.—I have tried this thing with a little success, but would not recommend it.

PROF. TURNER.—I once had this fever too, but recovered entirely from it long ago.

Query No. 7.—Do the Duke, Morello and Early May cherries make as healthy, hardy and productive trees when worked on the Mazzard as on the Morello stock?

MR. GALUSHA.—No. They will do tolerably well when grafted below the surface.

MR. EDWARDS.—I have had some success in grafting on Mazzard stocks, though I do not claim that they are as good stocks as Mahaleb.

A Voice.—How did you graft?

MR. EDWARDS.—At the surface, and I mulched the trees heavily for protection.

A Voice.—The Mazzard is a good stock to graft on. (Cries of No, No, from different parts of the hall.)

PRESIDENT'S ADDRESS.

The Secretary called for the President's address, which by vote was made the special order for this hour.

President BURRILL then called Vice-President C. N. DENNIS to the chair and thus addressed the Society:

THE MISSION, IN ILLINOIS, OF HER STATE HORTICULTURAL SOCIETY.

The mission of the Illinois State Horticultural Society is to my mind a great and a grand one. Much has been accomplished during the quarter-century of its existence, and to-day patriotic citizens thankfully acknowledge and gratefully esteem its beneficial and benignant influences. Through these influences better political laws have been enacted, and important social and natural ones made known and established; wealth has been increased; our beautiful State has been adorned and glorified, and above all, and better than all, the abodes of our people have been made brighter and happier, more worthy of that dear name, heart-treasured in every loving breast—HOME.

This is the work that is to go on, this the accomplishment to be completed, this the mission, full and rich as the onward march of a high-honored humanity, to be fulfilled. If our Society prospers as it should, fertile Illinois shall, in time to come more than now and in the past, blossom as the rose, and all the trees of the forest shall clap their hands in glad acclaim to the memory of those whose deeds live after them, in blushing fruits and fragrant flowers, in perpetual psalms and enduring tokens of love.

We have much encouragement to press on in the good work so well begun. Our material advantages are scarcely to be overestimated. Our

friends from sister States will excuse us if we of Illinois indulge a little, even in this presence, in the expression of our just pride and patriotic love for the beautiful and bountiful region of country which we claim as our own. It stretches out in its wide area over flower-decked prairies, diversified woodlands and sun-glorified landscapes; it reaches down through feet and fathoms of fertile soil and mines of measureless wealth; it extends upward through fragrant air

"Laden with the breath of orchards
Big with bending fruit"

to the silvery clouds of sunny skies. The sun himself looks out from his throne of midday splendor and lovingly smiles upon the fair face of favored Illinois.

The love of home and country is instinctive in every human breast, and its exercise gratifying and ennobling even in inhospitable climates and in Nature's roughest regions; but happy, thrice happy we whose patriotic love and pride is strengthened and exalted by dwelling in this garden of the Lord. Happy, thrice happy the cherished children of our fragrant and fruitful prairie State! We surely have the material elements of a rich and prosperous commonwealth, the essential physical conditions for an enterprising and progressive people; we have, as can scarcely be found anywhere else on this great, green earth, the combination of all the diversified material requisites for happy homes and cultured citizens, and so we have the natural requirements upon which may be based an exalted and ennobled civilization, and an enlightened and elevated social, political and moral life.

No people confined to arid plains, parched by long-continued drouth, dwelling upon sterile soils walled about by rocky barriers and pinched to the extremity of life for food and fuel, can take many steps, at least in our day, in solving the great problem of man's social and moral advancement. It is essential for progress, it is a primary requisite, as a foundation upon which may be erected the proud structure of a fully developed humanity, that the climate be favorable and that mother Earth lend her increase in such manner and proportion that the question of "what shall ye eat and wherewithal shall ye be clothed" shall not be too hard to answer. An abundant food supply secured by an appropriate equivalent in labor is a corner-stone of wide dimensions in the magnificent temple of human development. Freedom from the thralldom of unconquerable poverty, from the servitude of persistent and pinching privation, is an admission ticket, written by sovereign hand, to the glowing vestibule of this temple, where encouraging sounds may be caught of the inspiring music within.

It is the great province of Agriculture to furnish the world with the staple articles of food, and it is to the prosperity of agriculture in our State that we must look for this fundamental basis of prosperity for our people. Conditioned upon *its* rise must also be conditioned *their* rise and progress in the scale of physical and intellectual development. And Agriculture comes before Horticulture. The fields must be plowed,

roads must be made, mills erected, houses builded, meat produced and bread provided before much attention can be given to the quality of a radish or the blush of an apple. Lord Bacon said with truth, that men come to build stately sooner than to garden finely, as if gardening were the higher perfection.

But without trespassing upon the domain of Agriculture, it is one of the missions of this Society to contribute towards the proper food-supply of our multiplying population. Our farmers need to have, for the welfare of their own homes and the others for which they provide, the gospel of good gardening continually preached to them. Ask the housekeepers of our State whether or not there is room for improvement here; and, especially ask the housekeepers whose right it is above all others to have the best products of richly-cultivated soil for their tables, the farmers' wives, whether or not they have their merited aid and sympathy with regard to the kitchen and dining-room supply. The rough pioneer work has with us been mostly accomplished, and all honor to the brave men and sacrificing women who have done it, that we, their sons and daughters, may live with less of hardship to endure and under better conditions for improvement. But, under the altered circumstances of living, it is not enough that our tables are supplied with bread and meat. The rough rations of a soldier are appropriate in their place, but in the refinement of homes our physical well-being—and if so all other kinds of well-being—requires a due proportion of easily-digestible, fresh and crisp garden vegetables with appetizing and health-giving fruits. Even the pretty tinting of the surface and much more the improved flavor of fruits have their real value in alimentation as well as art, and are worth laborious efforts to secure. Horticulture has much to do with hygiene, and neither agriculture nor any other culture can afford to ignore or belittle its importance in this respect.

Again, with the increase in population the processes and methods of horticulture must be more and more extended, that the supply in amount of wholesome food may be proportioned to the requirements. Thus are the teachings, by precept and example, of this Society to be more and more in demand and the mission of the Society to be more and more enlarged and exalted. To produce the best fruits and food vegetables with the least outlay of labor and money is not a thing of chance. They do not, like Topsy, come into existence without parentage and the fostering care of patient and skillful hands. There is required an intimate, working-acquaintance with science, and a masterly knowledge of high art on the part of those who would best succeed. Especially is this true with the teachers of this branch of learned industry, and these latter are to be found nowhere in Illinois if not within the membership of this Society. Captain Cuttle said of his famous watch, "There, Wal'er, take her for my sake; set her for'ard half an hour every morning and a quarter every afternoon, and she'll do you credit." But there must be no guess-work here. Mistakes have and doubtless will be made often enough in spite of heroic and persevering efforts to the contrary. Unscrupulous adventurers will foist their worthless wares upon a too credulous populace,

and vexation and discouragement follow. Eternal vigilance, high-minded and large-hearted counsel and assistance are imperatively demanded. The members of this Society have a high commission to perform and the Society itself an exalted permission to be instrumental in adding to the fruitful wealth of our glorious State, whereby an easy and abundant sustenance may be had of healthful and hopeful quality, for its teeming thousands of the bravest hearts and fairest faces among the sons and daughters of our race.

The past has accomplished wonders; the crab has become the apple, the poisonous almond the peach, the dry and bitter colewort the cabbage and the cauliflower, the woody spindles of the wild plants the nutritious parsnip and carrot. The potato, now so universally used, became in America an article of ordinary food since our war of independence. Is the future to do less? Is our better science and higher art to fail for want of devotion? Let us rekindle the fires of our enthusiasm and go up and possess in its fullness the goodly land.

But, after all, it is not natural wealth that makes a State. It is not the richness of the fields, the fullness of the forests, the treasures of the mines, it is not the beauty of the landscape nor the freshness of the atmosphere that makes earth valuable and man contented and happy.

“Cellars and granaries in vain we fill
 With all the bounteous summer's store,
 If the mind thirsts and hungers still—
 The poor rich man's emphatically poor.”

COWLEY.

Human nature requires more than bodily necessities and comforts. Man shall not live by bread alone. There is other food of a higher kind, for the higher spiritual nature with which we are likewise endowed. The hunger of the soul is as real as that of the body, and its unsatisfied cravings are as detrimental as bodily starvation to the onward and upward progress of the race. In vain do we eat and drink, in vain are we clothed and sheltered from the scorching sun and shivering storm, if the mind is not awakened to a realization of the beauty and worth of its surroundings, if the heart is not touched by the sweet influences of associations and intimate acquaintance, if the affections are not drawn out purified and strengthened through daily exercise upon the ennobling and lovely things of earth and heaven. To be supplied, however bountifully, with those things which minister to the bare necessities of our physical lives, and these alone, would render possible only a cramped and mean existence, entirely unworthy of the Creator and of the creature made in his image.

Deprive us of the beauty which the eye drinks in from the natural world, of the melody and harmony to which the ear attunes itself from the groves and the valleys, of the fragrance of the flower-freighted air, the breath of the morning, and especially of the associations which these call up in the mind, and the aspirations which they kindle in the heart—deprive us of these and the world would be dark and dreary, life a burden and immortality a dread.

But with the fullness and fairness of Nature about us, and with our senses quickened that we may become possessors of the lavish gifts which she bestows upon whosoever will enjoy them, existence is a warmly appreciated pleasure and every contribution to the welfare of life a thankfully received and treasured blessing. Even the untutored soul of the savage is stirred with the throbbings of a higher life as he gazes upon that "orient pavilion flushed with a thousand gorgeous and shifting hues, from out whose dazzling portals issue the outgoings of the morning." The whispering breezes through leafy branches tell many a tale to the dusky inhabitant of the forest of love and the purer enjoyments of life. The starry flower opens its bright petals to the admiring gaze of the Indian maiden and teaches her lessons of grace and beauty, of goodness and purity, of truth and love.

Yet it is not over the rude and the barbarous that the beauty, variety and harmony of the objects of Nature and Nature's art exert their full power. It is only by those whose cultivated senses, refined intelligence and awakened sympathies permit the soft and silent influences, springing from a close and loving communion with the visible forms and vibrating sympathies about us, that the richest treasures are found and the fullest lessons learned in Nature's store-houses and in Nature's school-rooms.

"To him who, in the love of Nature, holds
Communion with her visible forms, she speaks
A various language; for his gayer hours
She has a voice of gladness and a smile
And eloquence of beauty, and she glides
Into his darker musings with a mild
And healing sympathy that steals away
Their sharpness ere he is aware."

BRYANT.

The painted cup upturned to catch the glistening dew, the hanging bell tolling its perfume upon the air, the simple leaf fanned by the evening breeze, the clustering purple of the vine, the spire of the pine, the flecked shade of the generous linden, have awakened memories and associations that have given the intelligence a wider reach and better compass, the imagination higher flights and purer creations, the affections stronger ties and holier bonds, the aspirations nobler aims and grander purposes, the conscience quicker sensibilities and greater power for good among thoughtful and cultured men and women in all lands, in every age.

"When thy heart in its pride would stray
From the pure first-loves of its youth away,
When the sullying breath of the world would come
O'er the flowers it brought from its childhood home,
Think of the tree at thy father's door,
And the kindly spell shall have power once more." MRS. HEMANS.

Taught by our better instincts and the nobler philosophies of life joined to our dependence upon the objects of sense for so much of our knowledge and enjoyment, with such intimate relations to our moral improvement and future destiny, is it too much to say that the humblest

flower that blooms or the smallest leaf that spreads its surface to the sun is without its purpose and its power in the world of thought and feeling? It is true we may trample them beneath our feet and know not their soft appeals; it is true that the uncultivated and the busy burdened, toiling relentlessly for bread, and especially those fretting with a feverish fondness for gold and gain, may pass unheeded these well-springs of love and life; even the gay girl may cull from the luxuriant bosom of mother Earth the fairest flowers, fairer and finer than the array of Solomon in all his glory, and remain untouched by any feeling beyond that of the pleasure of her own adornment and the selfish pride in her enhanced personal charms. Too many, oh, far too many! claiming the proud title of man, and must it be said, sometimes even the exalted name of woman, have eyes and see not in these loveliest things of earth anything beyond green leaves and prettily-painted petals.

To understand their real language we must by familiar friendship encourage them to speak to our hearts their lessons of surpassing interest. their love-stories of sublimest emotion, their counsels of unclouding and unerring wisdom. It is through their associations with human histories, it is through their symbolic uses and sentiments in human homes and native lands, that we derive from these gifts of God our highest pleasure and learn to love them as things of truth and life. How dear the three-leaved shamrock, pressed in the bosom of an immigrant from the Emerald Isle! How the tears well up unbidden in the eyes at sight of some simple memento—a leaf, a faded flower—laid away in some sacred place, but not forgotten! What lively and lasting interest we have in the unsullied objects so long connected with the joys and sorrows of human existence. Flowers have wreathed the proud brow of victory, and cheered the patient bed of pain; they have adorned the bride in her loveliness, and rested upon the cold bosom of death; they have loaned their charms to the festive board, and sent a thrill of pleasure to the captive's cell.

“Bring flowers to crown the cup and lute,
 Bring flowers—the bride is near;
 Bring flowers to soothe the captive's cell,
 Bring flowers to strew the bier.”

MISS LONDON.

Rip Van Winkle, in his wanderings in the mountains, is made to say that he loved the old trees and felt that they were worthy of his affection. Who has not learned to look upon them as, in some way, not distantly related to himself? We come to regard them as things of life, possessed of a spiritual nature capable of sharing our joys and griefs. More than one day-dreamer has shared the confidence of a “Talking Oak” so pleasantly pictured by Tennyson. Most writers upon topics connected with the social and moral life of man make frequent allusions to trees, as illustrative of character or emblematic in a higher sense of the attributes of man. In the Scriptures the cedar, the fig, the olive, the palm, the vine, the TREE, are words of the common vocabulary. Poetry, bearing the badge of immortality for itself, abounds in references to the forest kings and sylvan queens.

How sadly should we miss the trees and vines about our homes, not more on account of their kindly shade and shelter, not more on account of their beauty in the adornment of the landscape, than for the nearness and dearness of our associations with them. When after the lapse of years the wanderer returns to his ancestral home, what objects so stir the emotions in swelling breast as the old oak whose spreading limbs his youthful swing upheld; the well remembered elm in whose swaying branches his wayward kite was lost;

“The lime at dreary eve
Diffusing odors;”

the rounded maple shading the rustic seat, where upon a moonlit evening, never to be forgotten, the warm welling of a heart was first allowed to shape itself in words? While planting and caring for trees about a vine-embowered cottage we may swing with Burns:

“To make a happy fireside clime
For weans and wife,
That's the true pathos, and sublime,
Of human life.”

Let memory call up something from the past or imagination picture for us a sweet and happy home free from the sordid strivings of the world, where love brightens the hearth and lightens the toil, where contentment dwells and fond endearment strengthens the golden cords of rich affection, and we shall have, with scarcely the possibility of an exception, the fair picture of a modest mansion, away from the din and clatter of the thronged thoroughfare, seated in green grass, bearing festoons of leaves and flowers and surrounded with friendly, peace-suggestive trees. One, gazing upon such a scene, not upon canvas but in living reality,

“Sweet as the primrose peeps beneath the thorn,”

breathes in something more than pure air and physical refreshment. He enjoys something more than the beauty which comes of color and outline, something more than the fragrance that floats upon the flowers, and something besides the melody that issues from the tremulous throats of birds. He forgets the measure of money, but is led to appreciate the priceless wealth and worth of domestic happiness and the inspirations derived from the good, the true and the beautiful. There may be wanting those heavenly flowers

“That never will in any other climate grow;”

but an earthly home like this, crowned with love, is the fairest type known to man of that Eden of the blessed, that paradise of the primal pair. If in these later gardens there is no tree of life, there is likewise no beguiling serpent. Their influence is wholly good, pure and vitalizing

“———As the gentle rain from heaven
Upon the place beneath.”

The rich and the gifted may enjoy and gather many gracious lessons from music, painting and sculpture ; but Horticulture, as a fine art, is pre-eminently attractive to all tastes, and above every other adapted to the soul-life of all conditions and classes of mankind. A rose smells as sweet to the beggar as to the millionaire.

“A violet by a mossy stone,
Half hidden from the eye,
Fair as a star when only one
Is shining from the sky,”

addresses itself appropriately and appreciatingly to the sorrowing widow and to the joyous Queen of May. Happy they to whom the refining influences of the love of nature has come ; thrice happy they by whom “the art that doth mend nature” is lovingly practiced and fondly cherished as a purifying and ennobling contribution towards the charm and potency of a true and joyous home.

What a wail is this :

“O, it was pitiful,
Near a whole city full
Home she had none.”

I have thus sought to portray the value to us as human beings, beyond mere sustenance and shelter, of the objects which we may collect in our parks and public grounds, with which we may adorn our streets and enliven our highways of travel, and by which we may surround and brighten our homes—culled from the infinite variety and matchless beauty of the vegetable world. I have endeavored to present the civilizing, spiritualizing effects of an intercourse with Nature and a loving association with her generous and guileless children, the plants and the flowers. The fascination and power of beauty, of intricacy and unity, of adaptation of means to ends, make the study and care of these common objects a perpetual pleasure, unsullied and unalloyed. To the toiling and striving no relaxation comes better than that of the garden and the borders ; to those with whom time might hang heavy, there are no better prescriptions than those written in God’s great book of Fruits and Flowers.

The grandest thing that can be said of a government, of the wide-reaching, all-comprehending authority and power of a nation, is that the homes of its common people are appreciated as sacred and enjoyed as blessed. Upon these homes rest the security and stability, the prosperity and perpetuity of all social and political organizations. In the measure that they are pure and appropriate, wholesome laws may be made and everywhere sustained ; in the measure that they are attractive and enjoyable, dissipation and crime are removed and their contaminating and blighting influences reduced.

It is the high mission of this Society to contribute largely to the refined culture of the home, and thus to promote the true happiness of the people of our great State. No human organization ever had, nor ever will have, on this green globe, a more exalted aim or a more favor-

able opportunity. To those who have had the advantages of schools and the companionship of authors, it opens the way to further and fairer interests and enjoyments; to those who have been deprived of such aids as these, or of the facilities afforded by wealth, it offers a rich education through an acquaintance with the instructions of living pages, wide as

“That horizon’s fair deceit,
Where heaven and earth, alas! appear to meet,”

crowded with interesting lessons and embellished by an art higher than any to which man has attained, illumined by a light warmer and richer than electric batteries can ever furnish. With the plans of this Society matured in wisdom and executed with devotion, co-operating with other ameliorating influences, Illinois, now crowned a queen among her sister States for her physical beauty and material wealth, shall, for the domestic happiness and intellectual and moral excellence of her people, wear upon her broad brow the diadem of the world!

Having been carried by my theme to such a length, I dare not presume upon your good-will and patience for much additional expression of opinion as to the future work of our Society. It, indeed, would be arrogant presumption for me to try to particularize what should be done and in what special manner it should be accomplished. There are many among you who have long made this a study, and who, by natural talent and experience are much better prepared to direct and shape the various departments than myself. Special and standing committees wisely selected for the different branches of labor and learning have been and are earnestly engaged in the endeavor to promote the usefulness of these parts, thus advancing and improving the whole. I shall only speak of a few general matters, and of these especially for the younger members and later friends of the fraternity.

With the heartiest commendation of what has been done, and with a feeling of gratitude for the self-sacrificing labors that the older members have not shrunk from, I may first state that the exalted mission, herein too feebly indicated, of the Illinois State Horticultural Society, can never be fulfilled without much labor—labor not for gold, nor perhaps for immediate reward of any kind. Living, no hosannas of praise from thronged multitudes shall sound in your ears; buried, no monumental marble shall pierce the clouds to tell posterity your fame, but there will be some appreciative co-laborers and followers, and monuments will rise fairer and better than chiseled stone ever knew, as tokens of your achievements. I congratulate all to whom the opportunity comes to engage in this fertile field of toil, and assure you it shall not be labor in vain. Grapes grow not upon thorns, nor figs on thistles; but men do gather by proper effort rich harvests of golden fruitage.

It seems to me our meetings have or ought to have two prominent, though perhaps not exclusive objects:

- 1st. To revive and kindle enthusiasm.
- 2d. To advance knowledge.

These are each again to be divided by two :

1st. As to the members of the organization.

2d. As to the people of the locality in which the meeting is held.

I understand that the first general division comes properly first in importance. To meet face to face, to grasp each other warmly by the hand, to talk of the days gone by and of the associations which we delight to recall, to gain a nearer acquaintance and firmer friendship, to sympathize with disappointment and defeat, to rejoice with joy and victory, to gather encouragement from worthy examples, and to strengthen the confidence in success through agreed-upon union of effort; these and their kind are reasons enough to call for an assembly, if no learned papers were read and no new facts elicited. Every meeting ought to be in some way so shaped that before its close the persons present should be made to feel a lively and growing enthusiasm for our work and a readiness to undertake renewed and increased efforts to carry into effect the proposed plans of their own and of the Society.

It appears to me that something more than we usually have in the way of social intercourse would tend to this end. A banquet or collation in some room hung with mottoes and decorated with flowers, with a goodly number of toasts and responses, with plenty of time for chatting, merriment, introductions, etc., could not be counted dissipation nor useless.

Again, China is called the land of flowers, but in China woman is excluded from the public assemblies. We have not done this. Indeed, many of the fairer sex have been admitted to all the privileges of members, except that of paying dues; and our meetings have been enlivened and our reports brightened in consequence. But have we had all the aid and assistance possible from those whose purer lives and finer qualities of mind and heart make them more than man's equal in the amiable art we seek to cultivate? Have our programmes and meetings been specially arranged and conducted to secure this welcome encouragement and efficient influence? Though we, the "lords of creation," say it to our shame, it is to the mothers, the wives and the daughters of these imperious lords to whom we must look, as a usual thing, for the carrying into effect at the homes of the people the sweet and pure influences that flow from the horticultural art. The lord—oh, how meritorious the name!—fills his pipe and elevates his feet above his head on the front piazza, permitting without compunctions of conscience the chickens to scratch up the precious treasures which have been fondly committed to the earth by a care-burdened wife, impelled by an inherent instinct which connects flowers with the divine emotions and rich affections of every true woman's heart. Blessings on the women of Illinois and crowns upon their horticultural tastes and labors! Let us solicit, at least in years not divisible by four, their increased attendance and assistance at our annual gatherings. Upon one of these other years they may possibly leave us out upon the programme, and raise the standard of excellence so high that we shall afterward feel like keeping back seats. At any rate, if our meetings shall have something more than heretofore especially designed to arouse

enthusiasm over and beyond that imparted by technical information, woman and the womanly qualities of mind must have a considerable share in it. Shall our assemblies be more of a horticultural reunion, as well as a horticultural school?

Turning now to the second great object named—the communication and acquirement of knowledge pertaining to our art, I shall only retain you to say that it does not appear to me necessary nor desirable that so great a proportion of the time be taken up in reading at length papers which are to be published in the reports. This is not because I value this reading less, but the time more. Three days in the year contain very precious moments for the assembled horticulturists of Illinois. Personal experiences and opinions ought to be called out and notes compared, questions and answers stimulated and direct communication freely and fully established. There are topics which cannot be generally discussed, and yet cannot or will not be understood from print. These must be presented in full and enlarged upon as required. There are such as require illustrations by specimens or drawings, such as record minute and unusually thorough investigations and need to be dwelt upon and explained; but in these it does not strike me as important that the verbal presentation should necessarily be the same in wording or amount as that offered for publication. I am certainly of the opinion that at least some of the communications now, according to custom, read *in extenso* might with profit be presented in an abstract embodying the main points and stating the conclusions in one-tenth part of the time otherwise occupied. This might be practiced even upon subjects calculated to awaken valuable discussion; but in these, as far as possible, some steps ought to be taken beforehand to provide for the best expression of opinion and argument. I recommend that such abstracts be sent to the Secretary, or to a committee appointed for the purpose, at least six weeks before the time of meeting, and that by some method copies be made and sent to such members as would be likely to be especially interested, and would prepare themselves to understandingly discuss the subject. Whether the paper should be read in full or by abstract might be left with the same officer or committee.

In regard to the publications of the Society, while I regard the volumes of the "Transactions" now printed as among the best issued upon the continent, and know that this estimate is placed upon them by many capable judges outside our own State, it seems probable to me that improvement may yet be made. There are to my mind in these also two main objects—

1st. The preservation and dissemination of knowledge.

2d. The cultivation of taste and the promotion of interest in the objects and processes of our art.

These are somewhat similar to the foregoing, but are reversed in order.

Public reports and documents as a rule have little interest for the people. Formal proceedings of societies, made up of statistics and business items, become lumber on most shelves, if they meet no worse fate.

Really important information and interesting reading is buried almost beyond hope of resurrection. Our annual volumes are valuable in the proportion that generally unreadable and uninteresting matter is left out. The size of the book is an item of no consequence, except that it must not be too large. The binding and general appearance is an important matter, and I congratulate the Society that this has been so carefully attended to in recent years.

I recommend that the Executive Board be instructed—though it is their privilege to do so without instruction—to make or cause to have made a very careful revision of the matter furnished for publication, with the view of excluding everything not of real and general interest, and that we as loyal members consent and agree beforehand to such revision. I am informed that changes would have sometimes been made but for fear of giving offense. This hinderance ought certainly to be removed. Of course the matter offered by subordinate organizations would have to pass the same ordeal. Selected and contributed articles, not part of the proceedings, are by law authorized and may with much profit be substituted for material, however useful for the meeting, not important in print. There is an abundance of matter that would not probably reach the readers of our volumes, at least in permanent form, that would greatly aid in making the books useful and our Society increasingly instrumental in accomplishing its good work.

I further recommend that all contributors of articles accepted for publication, whether read at the meeting or not, upon request made before the printer obtains the paper, be furnished with twenty-five copies of the sheets as prepared for binding, containing said articles. If worth printing at all, these articles are worthy of distribution, and no one would be more likely than the writer to interest himself in placing them where they will do the most good. In many cases such extra sheets would accomplish the purpose of a volume, and be more serviceable in gaining the direct attention sought for them. This is a common custom and can be carried out at little expense. No alteration of printer's composition, not even the paging, need be made. A little pasting and stitching is about all the extra labor required, besides running off the extra sheets.

In conclusion, permit me to say that the enthusiasm aroused and the knowledge gained at our meeting can avail but little if they are allowed to be as a light under a bushel, or worse still, as lamps slowly extinguished for want of trimming. Let us, as apostles of good news and glad tidings, by examples at our homes, by friendly counsels with our neighbors, by the reading of and contributions to current publications, by deeds of interest and of love, by self-sacrifice if necessary, strive to bear worthily and well, individually and collectively, our part in the grand mission, thus to be fulfilled, of the Illinois State Horticultural Society. (Applause.)

Dr. HUMPHREY introduced Miss Sally Soper, a delegate from the Indiana State Horticultural Society, who was made an honorary member.

EULOGY UPON HON. A. M. BROWN.

PARKER EARLE, Committee on Obituary, signified his readiness to report, whereupon the President announced that the report would be heard.

Mr. EARLE read as follows:

Our Society has often been a mourner by the bier of some noble member and brother who has "found higher, nobler work to do" above these earthly gardens and orchards. Since I was last permitted to meet with you at this annual harvest of good thoughts, some of the most useful men of the nation have left our membership to join in the labors of the immortal fields where blight and storm destroy not.

The names of Dunlap and of Hull, the indefatigable investigators and pioneers, and of Flagg, the Chevalier Bayard of American Horticulture—"a knight without fear and without reproach"—will live while the records of rural industry survive. Our losses have been great; we have had great wealth to lose.

But my duty now is to say a word in memory of another nobleman of our ranks, another ex-president of our Society, Judge Brown, of Villa Ridge, the news of whose death, the past summer, carried pain to so many hearts.

Alexander Montgomery Brown was born near Paris, Bourbon county, Kentucky, Dec. 11, 1818. His parents removing to Indiana, he was mostly educated in that State, where he graduated from Hanover College in 1838. He studied law in Indianapolis, and entered into practice, but removed to his old home in Paris, Ky., in 1844, where he continued in the practice of his profession until his removal to our own State. He was for eight years the editor of the *Paris Citizen*, a long-established and influential Whig newspaper.

His great love for horticultural pursuits led him to remove, in 1861, to Pulaski county, in this State, where he settled near the new station of Villa Ridge, upon the beautiful place which he occupied until his death. Here he commenced to build the pleasant home which so many of us knew, in the midst of the primeval forest; his fine peach and apple and pear orchards supplanting the great oaks, beeches and tulip-trees of this most luxuriant woodland region.

Horticultural art was newly born in Southern Illinois eighteen years ago, and the pioneers in that vocation had to strike out new paths, and adopt many new methods. Many years were given to experiments and researches deemed essential to the success of our young art in this new "environment." In all this patient and costly labor Judge Brown was foremost. No man has lived in our part of the State whose horticultural labors were of greater benefit to his neighbors and the community. He foresaw the importance of our section as the great early fruit-producing region for the Northwest. He believed in Southern Illinois. He believed in fruit-growing as a special business, and that it had a great future. He believed in horticulture as a refining and ennobling art for everybody.

Judge Brown was in the best and fullest sense of the word a *country gentleman*. Delighting in all the æsthetic influences of country life, with a nobleman's love of a tree and a girl's love of a flower, he gave the energies of a cultivated mind to all matters of research and improvement. His bearing was always dignified and gentle. His language never dropped below the line of strict refinement. His greeting was kindly for all, but particularly cordial and hearty for his many friends.

No man opened a more hospitable door than he; or invited to a family circle governed by a sweeter spirit, or overflowing with gentler courtesies.

Though preferring the seclusion of his farm-life to any positions of public service or honor, yet he was called to many offices of responsibility. He was from its organization a trustee of our State Industrial University, and no man gave it more intelligent or faithful service. He was for the usual term a president of this Society; and no man ever conferred more honor on the office. He was three times elected to the county judgeship of his adopted county, and no truer man has sat upon the bench.

Judge Brown died on the 27th of June of this year. He had suffered for several months from a very painful disease with uncomplaining fortitude, saying to his wife as the final hour drew nigh, "*Now I will rest!*" He has gone away full of honors, and has left us all bereaved. I believe I express the feeling of many members of this Society, when I say that this event brought to me a deep sense of personal loss. The world seemed poorer; life was robbed of some of its sweetness. He has gone away, but the good works of the true life remain. The community and the State he lived in will for generations be the richer for the life he lived among us. The influences of such a life will go on blossoming and bearing sweet fruits in the years that are to be. For may we not believe

"That not in Heaven alone,
But here on earth we live when we are gone,
And learn the helpful lesson of to-day:
The world goes on when we are gone away.

"The world goes on; and happiest is he
Who in such wise wins immortality,
That should he sleep forever in the grave
His work goes on and helps the world to save."

LETTERS, GREETINGS, ETC.

Mr. MINKLER inquired if any other State Society in the West is in session this week; and upon the announcement that the Ohio Society was in session moved that the Secretary be requested to send greetings by telegraph to that Society.

The SECRETARY said: I have lately received a very cordial letter from Dr. J. A. Warder, the president of that society, (which unfortu-

nately I have not with me,) expressing regrets that he could not be with us and wishing us a pleasant meeting.

Whereupon Mr. Minkler's motion was amended, instructing the Secretary to reply to our friend's letter in behalf of and presenting the good wishes of the Society.

Thus amended, the motion prevailed unanimously.

The President handed the following letter to the Secretary, which was read :

CLAYTON, IND., Dec. 8, 1879.

PROF. T. J. BURRILL.—*My Dear Sir*,—I avail myself of the opportunity of writing you, in response to your cordial letter of the 1st.

The bearer of this, my cousin, W. A. Ragan, and delegate from our Society, will represent us in your convention at Normal. I hope he will present a cordial invitation, on behalf of our Society, to such of your members as may feel able to attend our meeting next week at Dublin. I can assure you, my good friend, that it would afford me great pleasure to be with you this week. It has been my good fortune to attend at least four of your meetings in times past, and I can assure you that I have not only enjoyed them as seasons of great social enjoyment, but as great schools of learning for the student in horticulture. Your annual reports are a treasure to any library—valuable scientifically, practically, and as literary productions of merit, *no other similar reports equal them in value and interest.*

May your Society live long, and when Providence may have removed, one by one, the present efficient workers, may their mantles be handed down to worthy successors, who will keep alive the good work.

Hoping to meet at least a liberal delegation of Illinois friends at our meeting next week, I am with great respect,

Yours truly,

W. H. RAGAN, *Secretary.*

The special order for the hour—the Reports upon Floriculture—was then taken up, the President calling upon Mr. Baller for his report.

REPORT UPON FLORICULTURE—By F. A. BALLER.

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

It affords me great pleasure to write a little article on Floriculture, though the field is so broad and the subjects to be considered under this head so numerous, that it would be a bewildering and endless task to attempt to cover other than a small part of the ground.

It is said that every man has his hobby, and I presume I have mine in that Queen of Flowers—the Rose. But, before entering upon my task, allow me to congratulate my fellow-workers on the increased interest taken in Horticulture, and in the culture of Flowers in particular, as shown by all classes, the rich and poor alike, and is, in my opinion, one of the most encouraging signs of the times. But a few years since there were not plants and flowers enough sold here in Bloomington to pay for the fuel consumed in growing them, while at the present time \$25,000 per year would be a low estimate to place on the sales.

First on the list comes the old-fashioned kinds, commonly called June, or Summer roses, these are the hardiest of all, the most fragrant, and

comprise some of the most double, profuse flowering and brilliant colors: *Auretii*—crimson, shaded maroon and black; *Centifolia*—old cabbage rose, very double and sweet, rose color; *George the Fourth*—fine double crimson; *Glory of St. Helena*—fine red, shaded purple; *Mad. Plantier*—white, in clusters, fine for cemeteries; *Mad. Russel*—pink and crimson, in clusters, late flowering; *Mad. Stuart*—light rose, very double and sweet; *Mad. Hardy*—large fine white, one of the best; *River's Tuscany*—type of the old Damask, maroon crimson, etc.; *La Volupte*—rich rose, shaded fawn; *Persian Yellow*—not strictly belonging in this class, but indispensable, deep yellow, very double; *Triumphans*—bright red, shaded crimson. These are a small part of the list, but are some of the most desirable; their places are rapidly being taken, however, by the Hybrid Perpetuals, which are tolerably hardy, as well as being almost constant bloomers.

We will next notice the Moss roses, favorites with every one, though sometimes, owing to our hot dry weather in spring, not as mossy as when bloomed in a milder climate; the H. P., or Perpetual Mosses, are a comparatively new class, containing some fine varieties, originated by crossing the old mosses with some of the free-blooming hybrid perpetuals; they are not quite as mossy as the original mosses, and bloom on the ends of the young shoots through the summer and fall, making them very desirable: *A. de Dalmas*—pink, in clusters, free bloomer; *James Veitch*—fine crimson, shaded maroon, free; *Mad. Edward Ory*—fine bright crimson; *Raphael*—pink, in clusters, free; *Palet*—pink, good grower and very free bloomer; *Perpetual White*—white, in clusters, mossy in bud; *June or Common Moss*—these are the true old-fashioned moss roses that were prized so highly in old times, and there are no more beautiful flowers to-day, combining as they do beauty of form and coloring, fragrance, and the beautiful setting of moss that the poets have immortalized. Early morning is the time to see them at their best, when laden with dew, and before the sun has exhaled the delightful perfume peculiar to them. Any one who has not so seen them has not yet enjoyed one of Nature's richest treats.

Agatha—white, in clusters, beautiful in bud; *Crested Moss* (not belonging to this class, yet would be readily taken for a moss)—pink, in clusters; *Duchess de Istrie*—pink, very hardy and vigorous; *Captain Ingram*—crimson purple, fine grower; *Madam Wood*—beautiful, bright red; *Luxemburg*—fine dark red, a favorite rose.

I now notice a few climbing varieties, which for covering piazzas, summer-houses, fences or a strong post set in the lawn, are very desirable.

First on the list is *Ayershire White*—pure white, strong grower; *Baltimore Belle*—blush white; *Eva Corinne*—light flesh; *Gem of Prairies*—large, rosy-red; *Queen of Prairies*—strong grower, hardy, rosy-red; *Seven Sisters*—changeable, rosy-red and crimson, in clusters; *Tennessee Belle*—beautiful carmine, fragrant.

I now come to the most popular class of roses grown, namely, the Hybrid Perpetuals; comprising as they do so many exquisite kinds, with a freedom of blooming unknown among the summer roses, it is not much

to be wondered that they are favorites. I give a list of twelve kinds, distinct in color and of free-blooming habit and vigorous growth combined: Coquette de Alps—pure white, cupped, constant; Gen. Washington—rich crimson, double and free; Giant of Battles—scarlet, crimson, very free; Gen. Jacquemont—crimson, very beautiful in bud; Marquis Bocella—hardy, blush, constant; Mad. Masson—rich, ruby red, very fine and free; La Reine—large, globular, purplish rose; Mad. Chas. Wood—fine crimson, purplish, probably the finest rose in cultivation of its color; Peony—bright crimson, constant and free; Princess Camille de Rohan—maroon, shaded black and crimson; Pius IX.—rich, deep rose, shaded purple; La France—rich bloom, peach color, very fragrant. All the above roses are quoted hardy, and most of them are, in the true sense of the word; yet all are benefited by bending down and covering with a few sods, or, better still, a barrowful of stable manure thrown on each and lightly forked in round them in spring. The proper time to plant hardy roses, in my judgment, is in the fall, though they will succeed well planted in spring, and from pots can be planted at any time in summer. All these need pruning back closely in spring, say to two or three eyes from the previous season's growth. All old and spindling growths should be cut out entirely, and after the first bloom is past bending them down will start a new strong growth from the ground, in hybrid perpetuals, which will bloom finely through summer and fall.

Bourbon Roses.—These are nearly as hardy as the hybrid perpetuals and are very free bloomers. I give a list of six varieties, which are very fine: Appoline—large pink, in clusters; Bourbon Queen—flesh, shaded fawn; George Peabody—fine crimson; Joseph Gordon—bright red, in clusters; Hermosa—bloom, rich pink, cupped; Malmaison—large, beautiful, flesh changing to white.

Noisette, or Climbing Monthly Roses.—Cloth of Gold—beautiful lemon yellow; Gloire de Dijon (classed with the Teas, but it has the habit of a true Noisette)—color deep buff, shaded yellow and salmon; Lamarane—pure white, in clusters; Marshal Neil—splendid deep yellow; James Sprunt, or Climbing Agrippina, probably a China, but succeeds well as a climber; Washington—pure white, in immense panicles; these, to be enjoyed, should be trained to a pillar or rafter in a green-house or conservatory, when, with good care, they are hardly ever out of bloom.

Tea Roses.—In a short article like this justice cannot be done to them. They are of very easy growth, and can be had in strong young plants in spring very cheap, in all shades—pure white, blush, bronze, rose, yellow, crimson, etc. No lady who has once grown them will willingly do without them, they are so beautiful for bouquets all summer and fall. I can name but a few varieties, though there are probably more than a hundred different kinds: Adrien Christoval—deep rosy pink, bronze, shaded; Bon Silene—bronzy pink, very fragrant; Duchess de Brabant—rich warm pink; Mad. Bravy—beautiful pure white; Perle des Jardins—rich deep yellow; Safrano—saffron buff, very free and fine.

China Roses.—Agrippina—fine double crimson; Archduke Charles—pink, edged crimson; Cels—blush, very free bloomer; Queen of Lom-

bardy—pink, changing to crimson; Viridescens, or Gem Rose—very curious and beautiful; White Daily—beautiful pure white, desirable in bud. These last four classes are called tender roses, but they can often be kept through winter safely by bending down and covering late in fall, not too heavily at first, but gradually, as cold increases, and uncover them in the same way in the spring, being careful to protect them from late spring frosts even after growth has commenced, as damage at this time will cause the death of the plants.

Mr. C. I. HAYS, of Champaign, another member of the committee, being requested by the President, read the following:

The reports on this subject heretofore read before this Society have failed to elicit such a degree of interest as the occasion should have warranted. Whether the fault has been in the reports, lack of appreciation in the audiences, or general apathy to this the most æsthetic branch of horticulture, is not for me to say. There is something wrong. Who or what is to blame? It may be the writer of this article is sensitive beyond reason regarding his calling; perhaps his stock of patience is of the minimum degree, or possibly, considering the few who love the beautiful for its own sake, Floriculture has been noticed and discussed even beyond its proportionate degree of merit. The professionals and amateurs of this branch are the ones who should be the zealous, active agents to push the matter, bring it to the notice of this Society, and through the latter to the public, and let the people understand that we are neither dead nor sleeping.

The year 1879 has drawn almost to a close, and in Floriculture what has it taught us? Have we grown in knowledge and wisdom? Is our business in better condition than one year ago?

In regard to our knowledge, have we come nearer the solution of those questions regarding the influences of temperature, the amount and manner of applying moisture, the best methods of handling stock and other matters of which there is much dispute?

Peter Henderson in his work on Practical Floriculture made a rattling of dry bones in his assaults on the old, clumsy, unprofitable ways of doing work. He has done much good in that direction; would that more Peter Hendersons would arise and bring out the opinions of capable men who, if not provoked to answer some keen writer, would not give their knowledge publicity.

Of course such a man as Mr. Henderson, in his mass of good things, will be apt to give some trash or even bad suggestions, but let us pick out the wheat and discard the chaff. His method of indiscriminate watering by a shower-bath is a saving of time in the act of watering, but results in a loss of many plants. It may be economical in those cases where the florist employs a score or more of hands and raises plants by the 100,000, but where the owner's chief help is his two strong arms, and where a loss of even a thousand would cripple his resources, it is not profitable.

I remember my tutor, an Englishman, only one-and-a-half years from Bristol, taught me to place each separate cutting in a distinct hole

(made by a dibble for its reception) and carefully pack the sand in place by the same slow process. After many years I learned better: with the sand in a firm condition, a single stroke of the arm and the excavation is made for twenty to fifty cuttings, these are dropped in place and a half-dozen strokes of a brick and all is complete. With nine-tenths of plants this process will root just as many as the other way, besides being more expeditious.

“Knowledge comes but Wisdom lingers,” the poet says. Have we learned by experience to look upon the novelties just received from Europe with suspicion? Do we realize that because the Royal Horticultural Society has made special and honorable mention of Mr. A’s *new, striking, unique, wonderful, gorgeous* and beautiful plant, be it a rose, dahlia, geranium or what not, it is no indication that such will succeed with us in *our* climate?

Or, coming still nearer home, because certain plants succeed in New York or Massachusetts, do we bear in mind before purchasing or before recommending them to the public in our State, that they may prove tender with us, or if they do not die will only partially succeed? Taking the word or even experience of Eastern growers regarding the good qualities of a plant, be it a shrub, tree or plant, is not sufficient to warrant us in recommending it to our patrons. Don’t we rush into novelties with too much haste? Isn’t there a matter of false pride with us in the making of our catalogues, believing that the public will think us slow coaches if one or more pages are not filled with novelties?

The writer has been *taken in* by the glowing accounts of certain plants which were not worth the postage on a single package, besides the loss of time, vexation and disappointment not taken into account. To be strictly honest in our business we should not recommend a plant to our patrons unless we know it can be grown successfully, if they use reasonable care. I’ll go one step farther: it is incumbent on us to give directions for the proper management of such plants as are difficult to grow.

Are we so poor in *manly honor* to fear that if the rose just bought be successfully grown we shall lose the sale of another? I wist not, and yet purchasers have inquired of me about plants with such a doubting intonation, that I knew they had been deceived, even before they told me. Such policy is suicide. Solomon knew more about correct business principles than such people; he was wise enough to be liberal, and encompassed a great deal of truth when he said, “There is that which scattereth abroad and yet increaseth, and there is that which withholdeth and yet tendeth to poverty.” How can we best acquaint our customers with such knowledge as will make them succeed with plants? With the seller of a few hundred plants it may be by personal instruction. Ask them if they have succeeded, and act accordingly. With the grower of 100,000 this would not be possible, but certain plants could be classified together, and a small pamphlet or circular of two to four pages, giving explicit directions for each class, could be sent with the goods. The success of your customer is your success, and outside of all moral obligations it is the best policy you could pursue.

Among all the new plants recently offered, which are now so reasonable that all might purchase, *Beauvardia Humboldtii* and Carnation Peter Henderson are the most promising. The first has unusually large blossoms (nearly one-and-a-half inches in diameter), pure white in color and very fragrant. The latter is the carnation we have been long expecting, prolific in blossoms, vigorous in growth, and has the good quality of not bursting the calyx in expanding.

The new coleuses, of which there are many, are beautiful in color when grown in the house or in the shade, but for massing in beds there is as yet none equal to *Nigricans Verschafeltii* and South Park. Speaking of carnations reminds me of the question so frequently asked, "Why don't people grow them more as house-plants?" They will succeed if kept from flowering in the summer, then lifted the last of October, potted in well-drained soil, exposed to sunshine and kept in a *cool* room. (Temperature from 45° to 60° Fahrenheit.) The house-plants people attempt to grow are in nearly all cases kept where the air is so warm that it wrings out the moisture from the plants, then comes decreased vitality, insects and death.

Geraniums, carnations, Chinese primroses and roses should be grown in a separate apartment from the parlor or sitting-room; a temperature of say 45° to 60° will be a strong thing in their favor; insects will be less likely to trouble them. The mealy-bug is the worst pest of green-houses. Who has a better remedy than the old-fashioned way of scrubbing-brush, soap and water? I have tried to kill them with strong solutions of strychnine, and it was a failure. Whale-oil soap, perhaps, you may suggest; it is no better than common soap. In such a generally reliable publication as the *Gardeners' Monthly* we occasionally have seen statements of the efficacy of alcohol. I fairly soaked the insects in solutions ranging from fifty to ninety-six per cent., but they were only stupefied, and in a few hours were as lively as ever. The Superintendent of the Chicago Floral Company told me that he kept them in check by thorough and oft-repeated syringing.

Finally, is our business increasing? The taste for things of beauty is rapidly growing, and we may confidently look forward to a better appreciation of plants. The last six years have been educators of the public in matters of taste for artistic goods to a greater degree than most of us yet realize; and thereby reacted favorably on our business. A careful inquiry will show that our business has not been depressed like other industries. Though for the last four years we have not spent one cent in advertising our green-houses the sales have constantly increased.

In the sea the big fish eat the little ones; on land it is somewhat similar; large floral houses, that employ from fifty to two hundred hands, are apt to injure the sales of the smaller, to a great extent. But it is a matter of gratification to me, that all or nearly all of those large firms that flooded the markets with cheap and poor plants have come to grief. If the stock sent out is only first-class, then the cheaper it can be grown the better for all; but cheap rubbish is dear at any price and demoralizing

to all engaged in the trade. Let us endeavor to raise the standard of our profession by growing better stock, giving value received in each instance, proving all things, holding fast that which is good, not deserting old varieties, but rather improving them; stick close to our business and our business will stick close to us.

J. S. JOHNSON stated that Mrs. Mitchell, of Warsaw, who is a member of the Committee on Floriculture, was prevented from attendance by affliction in her family. He thought she had a paper prepared, and if so would forward it for publication.

DR. HUMPHREY.—Mrs. Tryon, of Galesburg, another member of the committee, expected, but a few days since, to be here and read a paper.

THE PRESIDENT.—Have any of the ladies present any thoughts or suggestions to give us relating to flowers?

MRS. JONES (of Indiana).—*Mr. President*, I cannot make a speech, neither will I attempt one, but will simply say for the benefit of the essayist who has so much trouble with the mealy-bug, that if he will use dilute liquid ammonia, sprinkling it over the plant, I think he will have no more trouble from that source.

REPORT UPON STRAWBERRIES—By O. B. GALUSHA.

* Mr. GALUSHA, from the Committee on Strawberries—their Culture and Varieties, being asked by the President for his report, responded as follows:

Mr. President and Fellow Members:

I am again asked to report the experiences and observations of the past year upon Strawberries; and I can truly say that to report all the facts observed would require tenfold more space and time than can be allowed to the topic.

I will therefore endeavor to give the leading and more significant facts observed, not so much in the hope of imparting positive knowledge, as to give hints to enable you to arrive at conclusions for yourselves. The interest awakened in strawberry culture some thirty years since has steadily increased until at present the strawberry may be claimed as the second fruit in importance in this State, if not in our whole country. Whether, however, this fruit stands next to the apple or whether the peach intervenes cannot be positively known, since the peach is grown only in the southern half of the State and the crop is nearly all shipped; whereas, the strawberry succeeds as well at the north as at the south, and it is safe to say that one-third of the farmers of the State raise and consume this delicious fruit.

I would class the leading fruits grown and consumed as fruit, in this State, in the following order: (1) apples; (2) strawberries; (3) peaches;

(4) grapes; (5) raspberries; (6) currants; (7) cherries; (8) blackberries. If the manufacture and consumption of wine were taken into the account it would doubtless place the grape next to the apple in importance; also, were the tomato, which is a true fruit—though classed usually among garden vegetables—to be included it might take rank next to the apple, since its culture has become universal.

To illustrate the important place of the strawberry in the list of fruits I will refer to our own little city of Morris, containing about 5,500 inhabitants. I sold in this town, the last season (in round numbers), 12,000 quarts of strawberries, and this was less than one-half the amount consumed there, which would give an average of about five quarts to each person. At this rate, the two-and-three-fourths millions population of our State consume 13,750,000 quarts, which, at the low, estimated price of six cents per quart amounts to \$825,000.00.

It is not probable that the culture of this fruit has reached, or even approached very nearly, its maximum; and not until its consumption is more than doubled, and until it can be profitably grown and put into the hands of the consumers, during the flush of the strawberry season, at an average price of five cents per quart, will, in my opinion, the mission of this Society have been accomplished in this direction.

In making this suggestion I do not take into the account long shipments or payment of commissions to more than one set of middlemen. If people are impatient to secure this fruit before it ripens in their immediate neighborhood or county, and are able to do so, they will, of course, procure that grown farther south and pay higher prices; but as before stated, since it can be grown as profitably and abundantly in the northern as in the southern portion of the State we should not relax our efforts towards improving its qualities and cheapening the cost of its production until the poor as well as the rich can partake freely of this most refreshing and health-giving fruit.

Much has been done during the past year towards this end.

The scramble after new varieties is rather increasing than diminishing; for there have been more "best" new berries advertised during the year than ever before; in fact, one can scarcely take up an agricultural or horticultural journal without reading of the "unequaled excellencies" of some sort of which he never before heard. If only one in twenty of these prove, upon trial, to sustain the claims made it will be a great advance towards the grand desideratum of large crops of large, rich, firm fruit, cheaply grown.

It is encouraging to know that a few at least, of the many so-called improved varieties, are really an advance in the desired direction. I will speak specially of these in my report upon new fruits.

In reporting upon this fruit last year I estimated the cost of picking at one-and-a-half cents per quart, which is rather below than above the prices heretofore generally paid; the introduction of more prolific varieties bearing larger fruit cheapens this expense. Upon my own place, during the past year, industrious girls averaged eighty (80) quarts per day *through the season*; and when the crops of Crescent, Charles

Downing and Kentucky were at their best their daily gatherings reached over one hundred and thirty quarts each. The price paid was one cent per quart, which was higher wages than could have been received from almost any other employment; and this might justly have been somewhat reduced; in fact, some producers paid but three-fourths of a cent per quart this year, and it is safe to calculate that with the best modes of culture, and growing those varieties best adapted to each kind of soil, the price of picking will be reduced to one-half cent per quart, and the actual cost of production to two cents per quart.

Planting and Cultivation.—Another year's experience in planting has not changed my practice, described last year, of setting each plant upon a mound in a hole with roots spread and crown scarcely below the general level, and of using freely weak liquid manure at time of planting and before the surface earth is placed around the plant. The August, September and October plantings, however, were nearly all of pot-plants, which are more expeditiously planted and more satisfactory, since there is no such thing as failure with a single plant where the work is well done, the plants each receiving from a half a pint to a quart of manure-water when the earth is half filled in about the ball.

The plants set in spring should be about eighteen or twenty inches apart in the rows, which should be three feet apart. Thorough cultivation should be commenced early and continued well through autumn, running a narrow shovel-plow deep in the center of the space, and pulverizing and leveling with cultivator, leaving the row of plants from one foot to eighteen inches wide. At the first hoeings the plants should be layered along the row within this limit, and all others treated as weeds. In late autumn, and after the ground has frozen so as to bear a team, the mulch may be put on, which may consist of horse-stable litter—using only that made where prairie hay is fed. Where this is not obtainable planing chips, cut corn-stalks, slough grass, whole corn-stalks or oat straw may be used. As heretofore I still use corn-fodder cut into short lengths with a horse-power cutter, as I stated at our last annual meeting. This, shaken from large baskets over the plants, settles into the spaces between the leaves and gives sufficient protection without smothering the plants, and does not require removal in spring, but remains as a summer mulch to keep the vines fresh and the fruit clean, and as it gradually decays gives stimulus to growth and fruitage.

In addition to this it has been for several years my practice to sow along the rows a mixture of ashes, plaster and hen-manure, adding a little salt—using six to eight bushels of this mixture per acre. This is applied early in spring, and sometimes a slight sprinkling, thoroughly pulverized and mixed, is again applied just at blossoming time.

After the crop is harvested—as soon as condition of the soil will admit—plow the spaces with a one-horse mould-board plow, turning two furrows together, and harrow the entire ground level. The runners will then occupy the spaces, and early in autumn they may be again plowed, or, if it is desired to renew the plantation, the old strips may be plowed under and leave the young plants only for next year's fruiting. Where

uncut mulch is used it is opened from over the rows in spring and left in the spaces until after the crop is gathered. Treated in this way a half dozen or more successive crops may be taken from the ground; in fact, I see no reason why there will be any occasion for destroying the plants and making new plantings unless grass is allowed to grow or insects, preying upon the plants, threaten their destruction.

How to Combat the Insects.—The strawberry-worm was not very troublesome this year upon old plantations, and were hand-picked and crushed from the newly-planted vines several times during the season of cultivation. This practice, which costs but little, will, if carefully and persistently carried out, keep these pests well in check.

The strawberry-leaf folder is almost everywhere present among the vines, and sometimes so numerous as to almost entirely defoliate them. His attacks, unlike those of the strawberry-worm, are not made until after the crop is gathered; and hence he can be more surely destroyed. It has been recommended by some writers, and practiced to a small extent in this State, to cover the vines during a dry time and just before the earliest leaf-folders change from the larval to the pupal state by spreading straw over the plants, and burn straw, plants and insects together. This seems harsh treatment, yet the most luxurious vines it has been my fortune to see this autumn were growing where all was blackness about three months previous. The vines were thoroughly manured, plowed and harrowed after the burning. I shall look for an immense crop of fine fruit upon this plantation of Mr. Vickroy next year, and also expect to see vines nearly free from insects. It would not seem safe to practice this destructive cultivation during a drouth, but only when the condition of the soil is such as to insure a quick succeeding growth. I am practicing, as an experiment, the hill-culture or single-plant system, and will report results next year, if with you then. It will be remembered that in my last report wider spaces or rows were recommended than now; for I find that with nearly all varieties the best fruit is obtained from rows not more than eighteen inches wide; and where the best berries will command extra prices I would confine them to one foot in width, so as to give more light and a better circulation of air for the fruit and foliage. With such rank, dense growers as Crescent, Windsor Chief, Miner, Crystal City, Centennial Favorite, Sharpless, Duncan, Glendale, Cumberland Triumph and Star of the West, full exposure in narrow rows is essential to secure large, fine fruit; while Wilson, Kentucky, Downing, Pioneer, Duchess, Col. Cheney, Durand's Beauty, Cinderella, Continental, Seth Boyden, Forest Rose may be grown with profit if planted three-and-a-half to four feet apart and allowed to occupy strips two to two-and-a-half feet.

Varieties.—There is no species of fruit grown in our country of which there is such a diversity of opinions in respect to the real or comparative value of varieties as the strawberry; and it is safe to say that nine-tenths of this difference is due to the fact that this fruit is more capricious or rather more particular and discriminating as to soils and modes of culture than any other. This holds good in respect to nearly all varieties in cultivation; and it is rash, and unjust to the introducers of new valuable

sorts, to denounce a variety as a "humbug" because it falls short, even far short of its proclaimed excellencies, when grown in different soil or climate from that of its original birth-place. For instance, the Crescent has been called "a humbug of the first class" in my hearing by one fruit-grower in the State, and mentioned quite disparagingly by several others, while a large majority who have grown it rank it as first-class, and some of our best cultivators of the strawberry, after testing varieties of best repute, claim that Crescent surpasses them all. Monarch of the West, about which so much has been written, is another striking example of the influence of soil and location upon the habits of this species. Some soils in the West are so well adapted to develop both plant and fruit that it is placed at the head of the list when grown in them, while in a majority of instances with ordinary culture it is comparatively unprofitable. The reverse seems to be the case at the East, where, if we are to believe the reports in catalogues, it is generally productive.

But this peculiar sensitiveness of the strawberry to soils and treatment is now so generally admitted that it need not be farther dwelt upon.

The cold dry weather of last spring retarded the earlier varieties so that there was less difference in time of ripening between them and later sorts than I have before known.

Upon my grounds the leading varieties ripened their first berries as follows; though the first general picking of each was five or six days later: May 26, Charles Downing; May 27, Crescent, Black Defiance; May 28, Cumberland Triumph; May 31, Prouty, Duchess; June 1, Capt. Jack, Champion, Duncan, Cinderella, Col. Cheney, Monarch of the West; June 4, Centennial Favorite, Wilson; June 5, Continental, Forest Rose, Springdale, Windsor Chief; June 7, Great American, Miner's Great Prolific; June 8, Kentucky.

Cowling's Seedling, Sterling, Pioneer, Star of the West, Seth Boyden and others, omitted in my notes, ripened their first fruit about medium season.

It will be seen by these notes that varieties did not follow their regular order in ripening—that this exceptional season affected some more than others in retarding their times of ripening—the result being to bring the earlier and later sorts nearer together in season.

It will be expected that I recommend a list of varieties; but for the reason already given no list can be made which would prove the most valuable for all, and any list will require modification nearly every year as improvements are made in varieties and culture.

The following varieties, *in the order named*, will *generally* be found valuable in this State:

For strong clayey, Loess and rich prairie soils, for near market and home use: Crescent, Miner, Charles Downing, Duchess, Windsor Chief, Cumberland Triumph, Sharpless, Champion, Captain Jack, Duncan, Continental, Seth Boyden, Great American, Prouty.

For sandy-loam soils, near market and home use: Crescent, Charles Downing, Windsor Chief, Duchess, Black Defiance (home use), Centen-

nial Favorite, Miner, Kentucky, Sharpless, Cinderella, Champion, Crystal City, Capt. Jack, Col. Cheney, Seth Boyden, Cowing's Seedling.

For distant market: Sharpless, Capt. Jack, Chas. Downing, Wilson, Continental, Prouty.

For high cultivation in hills or single rows for home use and for fancy berries: Sharpless, Great American, Crescent, Seth Boyden, Miner, Monarch of the West, Essex Beauty, Centennial Favorite.

There are other varieties which produce large, fine fruit, and have high local reputation; among which are Pioneer, Star of the West, Springdale, Sterling, which, though grown on my place, my observation will not warrant me in fixing their places in these lists.

Forest Rose, which has during the last two years enjoyed so high a reputation, recovered partially from the rust which afflicted it so terribly last year and bore a large crop, though the fruit was scarcely medium in size.

In my report upon New Fruits I will speak of the habits of some varieties of recent introduction.

DR. SCHRÖEDER.—Will you give the names of three or four varieties which are the best for everybody to plant?

MR. GALUSHA.—I don't know any such varieties; as I intimated in my report it is impossible to name even one variety which is best everywhere, for what would be best for me might not be best for Dr. Schröder.

DR. SCHRÖEDER.—Well, give us the names of three or four varieties that are *generally* best.

MR. GALUSHA.—The Doctor will find them in the list; for I stated in the report that I named them in the order of their merit or *general* success. I do not say that I would plant, for the purposes named, from *either* of those lists, in the order in which the varieties are named, but I have given these lists as my *present judgment* of the *general* comparative value of varieties for such soils and for the purposes named.

E. HOLLISTER, Senr., of Alton, member of the Committee on Strawberries, was not present, but the Secretary read the following report which had been forwarded:

In this locality the spring of 1879 will long be remembered for its disastrous results on this crop, the season being three weeks later than the last, and so dry, that everything suffered. On April 7th, we had a slight rain, and on the 14th quite a heavy shower, from which time till May 13th it was terribly dry.

The first ripe Strawberries were received in this market May 19th, Chas. Downing, from a two-year-old bed, not mulched. From my own place I picked the first quarts of strawberries from Triumph de Gand, May 26, and found Crescent Seedling, Cumberland Triumph,

Duncan, Duchess, Col. Cheney, Capt. Jack, Bøyden, Prouty, Chas. Downing and Wilson beginning to ripen.

On May 30th we had a slight shower of rain, and on June 1st it rained for two or three hours. On Monday, June 2d, were the largest receipts of strawberries, after which the crop rapidly gave out.

Although the season was so late, as compared with the last, yet being so dry brought in the Black and Red raspberries by June 6th.

The effect of the dry season not only cut the crop of strawberries in quantity, but also caused a large amount of the crop to "button" off, and a great many were entirely unfit for use and were not picked. The size also was greatly diminished, and consequently prices were very low.

There was never a more beautiful sight than the appearance of the beds in full bloom, and never a more promising show for a good crop. Yet, from lack of moisture, there was not one-tenth of a crop.

The finest and most perfect berries were the Triumph de Gand, and the most abundant the Capt. Jack. Had it not been for this variety, out of about two acres of many kinds, one-tenth of which were Capt. Jacks, the crop would have been written a total failure; as it was, there were a few bushels of them.

Of the newer varieties I have discarded Champion, Duchess, Golden Defiance, Cowing's Seedling, Sterling and some others. The Duncan proves to be early, good size, firm and prolific, and will give it further trial. Kerr's Late Prolific is doing well, Springdale and Cumberland Triumph are large, fine-looking, prolific, rather soft.

For largest fine berries, suitable for distant shipment, I name in the order of their merits: Triumph de Gand, Monarch of the West, Jucunda.

For best paying results, the Wilson, Capt. Jack, Chas. Downing. With generous culture, and without, with ordinary care and sometimes with neglect, these last will be found to stand by in time of need.

There are many new candidates for favor; among the more promising are the Sharpless and Forest Rose. We look for great things from them, but shall not be disappointed if they, in turn, go down to leave place for some of the old "stand-bys." If for no other purpose, it may be well to keep a supply of the Wilson and Downing to help some of the new beauties to do their best. It has been remarked by some, that when placed near such, many varieties do better than when alone. A writer recently gave his experience in this direction with regard to the Monarch of the West, and his observation led him to discover many imperfect blossoms.

In this locality many strawberries have been set this season, and despite the very dry summer have made a very remarkable growth; the kinds most largely planted are Wilson, Chas. Downing and Capt. Jack.

The Wilson was never known to make runners so fully before; they also show a good many blossoms, estimated by an observant grower at one-twentieth, with now and then a half-grown berry; and the result on these is looked forward to with some apprehension that the crop will be shortened.

DISCUSSION UPON STRAWBERRIES.

A. H. GASTON.—I will name for Dr. Schröder the Crescent and Wilson—placing the Crescent at the head for home use and home market, and Wilson at the head to ship.

SECRETARY GALUSHA.—I make the growing of berries my specialty, and test fairly and fully every variety which gives promise of success, and, with twenty-five years' experience, think that I am competent to judge. If I know about *anything* I know *strawberries*. The Wilson *has been* among strawberries what the Concord has among grapes, as far as the market value of the crop is concerned; but this can no longer be said of it in any soil or location. Wherever, as yet tried, it will succeed well, Capt. Jack (its offspring) will succeed better as a market berry, being larger, of better quality and more prolific. There are several others which *now* surpass our good old friend the Wilson. Sharpless, Miner, Charles Downing, Continental, are excellent shippers.

Planted side by side on my grounds, and with same care, Crescent has borne more than two bushels to one of Wilson, but it is not as firm to ship (though Capt. Jack is as firm).

MR. WEBSTER.—The Crescent does well at Centralia, but Wilson is best for shipping. We have made more money out of Charles Downing for shipping than any other sort; Prouty also does well with us, and many of the other new varieties bear well; but the crown-borer is so destructive that we have to plow up our beds as soon as they have borne one crop, and plant again on fresh ground.

DR. HUMPHREY.—In selecting lists of strawberries we must make allowances for locality and soil, as a variety which is first-class with me may be almost valueless with another.

MR. ROBISON.—I would like to ask Mr. Galusha if he has fruited Sharpless.

MR. GALUSHA.—I have quite a large plantation of Sharpless set in October of 1878 and last spring, and allowed a portion of them to fruit; I can say that it is a magnificent fruit.

J. T. JOHNSON.—The only use I *now* have for Wilson is to use as a fertilizer for other sorts; I get more fruit from Crescent, Russell, Downing and Kentucky than Wilson.

THE SECRETARY.—I wish those who *still* adhere to Wilson as a market sort (and no one contends that it is a really good berry to eat) would plant Capt. Jack and Wilson side by side and they will then

ascertain which is the more profitable. No one yet heard from, who has fairly tested them, plants much of Wilson afterward.

MR. WIER.—I have been growing strawberries for nineteen years for home market; I have tried nearly all the new varieties—tried them side by side. Wilson with us has not been productive; when on high ground it does pretty well, but I have raised on the same number of rods (twenty rods) of Capt. Jack and Crescent twenty times as many berries as I have of Wilson. The Crescent and Capt. Jack are the only kinds I would plant for profit.

MR. NELSON.—The Wilson has been the leading berry for market; a few years ago you could sell Wilsons in Chicago at big prices, but not now; there has been a change in this respect—there are berries that are better. I think Capt. Jack will be one of the best berries to ship, yet I would not discard the Wilson.

THE SECRETARY.—Mr. Earle tells me that he shipped Capt. Jack berries from Cobden to Pittsburg, and also into Minnesota (nearly 600 miles), and they arrived in good order.

MR. HATHEWAY.—The past season the Crescent, fertilized by Wilson, produced on seven-eighths of an acre on my grounds over 8,000 quarts of large, brilliant, good berries. Charles Downing and Capt. Jack would be good varieties to use for fertilizing Crescent and other pistillate varieties.

My Crescents brought in our home market (Ottawa) two-and-a-half cents more per quart than the *best* Wilsons. I shipped first-class Wilsons to Chicago at same time as Crescents, and the Wilsons brought ninety cents per 16-quart crate and Crescent \$1.75 per 16-quart crate the same day. (In answer to a question)—Crescent is far more prolific than Wilson.

An animated discussion ensued, in which, however, no facts conflicting with those already given were brought out and but few new ones.

The following embraces the important points:

Mr. Miner had found wood-ashes an excellent fertilizer for strawberry plants; so also had Mr. Galusha, though he prepared a mixture somewhat like the one described in his report. Mr. Wier found Capt. Jack berries a little larger than Crescent. Mr. Hatheway said that in almost every quart of Crescents he sold were berries nearly or quite four inches in circumference; the only objection he had to Capt. Jack is that the fruit-stalks are longer than the leaf-stalks, so that the blossoms are above the leaves, and thus more liable than most other sorts to be cut off

by frosts. Mr. Wier finds Capt. Jack a perfect fertilizer for Crescent—planted one row of Capt. Jack to three of Crescent. Mr. Dennis recommended Russell, Crescent and Red Jacket for his locality. Dr. Schreeder said Wilson had “made his pocket fat,” and he would “stick to it.”

Planters were cautioned against planting Crescent, Green Prolific, Col. Cheney, Springdale, Champion and Windsor Chief, unless Capt. Jack, Downing, Wilson or some other strongly staminate sort is planted near them, for they are all pistillates (or nearly pistillate) and will not fruit much alone.

The last speaker in this discussion was Mr. NELSON, who said :

I would not advise depending on the Crescent entirely (or on any one sort, for that matter), but to go slow with it, and if you find it suited to your wants then *launch out*.

I wish to say that Crescent has done well with me ; last year a small patch of a few rods bore—well, I won't tell you how much, for fear you will doubt my word. (Laughter.)

REPORT UPON RASPBERRIES AND BLACKBERRIES.

H. K. VICKROY, of Normal, reported upon Raspberries and Blackberries, as follows :

The following varieties of raspberries have been fruited in this county the past season: Davison's Thornless, Doolittle, Mammoth Cluster, Seneca, Miami, Florence, Highland Hardy, Turner, Philadelphia, Brandywine and Ganargua.

The Davison's Thornless produced a fair crop of berries, which was marketed by the time Mammoth Cluster began to ripen. It is valuable on account of its earliness.

Highland Hardy ripened the same time as Davison's ; it is a bright red berry of fair size and medium quality compared with Turner, the plant is hardy, and is also valuable on account of its earliness.

Doolittle produced a *good* crop of fine berries ; with good cultivation this is an excellent berry, though it is a little more difficult to gather on account of the fruit being more scattered over and through the bushes. We should be careful about discarding the old and well-tried varieties.

Mammoth Cluster still holds its place among the best. The fruit of this variety can be gathered more easily than any I have fruited, the berries being in clusters and nearly all on the outside of the bushes. It did not stand the cold of last winter as well as some others. The color of the fruit is a little objectionable, it has a mouldy appearance.

Seneca is the best black-cap variety I have fruited. The plant is a stronger grower than Mammoth Cluster, very productive, the fruit black and showy and of good flavor. It ripens about the same time of Mammoth Cluster.

Turner stands at the head of the list of red varieties that have been fruited in this vicinity for home use and near market. They should always be marketed in pint boxes. This is certainly a delicious berry to use on the table fresh. For a family berry it is number one. Another advantage this berry has for a family berry is its long bearing season.

Philadelphia is excellent for canning. It is a better berry for canning than Turner, but it is hard to dispose of in the market.

Brandywine is a good shipping berry, large, firm and bright red; the plant is not a very strong grower, but is hardy.

Pride-of-the-Hudson—well, it is not the pride of the Illinois! No, not by a long ways! It killed to the ground last winter, and made a very feeble growth this season. By some it is called the “Straw-raspberry,” as it sends up but one slender shoot, resembling a straw; perhaps we don’t care for it as tenderly as the originator did. No doubt this variety does fairly in a FEW localities, and from the reports I should judge they were “*few and far between.*”

Ganargua is tolerably hardy, very productive; fruit below medium in quality, pretty good for canning and pies, but poor for market, on account of its dirty-looking color.

Florence is a yellow berry, very productive, and I think would be good for drying, for it is nearly dry when you pick it from the bushes.

The Gregg, Miller’s Daily and Sweet Home I have growing, but have not fruited them; the Gregg is *very* promising.

I prefer planting in the fall, unless my plants are growing near by where I want to plant; in this case I take up the plants, with a little dirt adhering, after they have made a growth of a few inches in the spring, and, if handled carefully and reset, in this way they do fully as well as fall-set plants. They should be set from two to three feet in the row and seven feet between the rows, eight feet would be better for the strong growing varieties; the red varieties might be set a little closer between the rows. The young shoots should have the tops pinched or cut off at the height of two feet; this causes laterals to be thrown out, and when the laterals have made a growth of eighteen inches they should be checked in the same way, then let them grow till the end of the season. In the winter or early spring the laterals should be shortened to within fifteen and thirty inches—according to the strength of the plant—of where they were last pinched. Laterals should not be pinched more than once unless they are of a very strong-growing variety, and even these, I think, would be better to let grow, for if pinched too much they will not mature sufficiently to stand the cold. Thorough cultivation should be given, with some implement that leaves the ground level, till the first of August. I would prefer mulching with straw to cultivation, or with some similar material, to the depth of four to six inches.

Blackberries.—“Well, what about the Snyder?” “Did it winter-kill last winter?” These are questions I am often asked. Well, it did winter-kill on the low land; I can’t explain why it did, for it has heretofore stood as low or lower degrees of temperature and produced berries

to the tips. At the time of our coldest weather last winter there was no frost in the ground and two feet of snow over it.

They were not all killed, however, for we had a good crop of fruit; some berries nearly as large as Kittatinny and Lawton. The Snyder will not bear neglect; it requires good cultivation, good feeding, judicious pruning and thinning; it is such an immense bearer, that unless cut back severely it sets more fruit than it can mature, unless under very favorable circumstances.

The Kittatinny and Lawton winter-kill and rust so badly their cultivation has been given up in this neighborhood.

The blackberries require the same cultivation, pruning, etc., as raspberries; they should be planted from two to three feet in the row and not less than eight feet between the rows, and leaving a ten or twelve foot space between every six rows to get through with a wagon to haul out the old wood.

WILLIAM JACKSON, of Godfrey, from the committee, reported as follows—read by E. C. Hatheway, Mr. Jackson not being present:

Mr. President and Gentlemen:

In submitting, for your consideration, the following report, it will be necessary to take carefully into consideration soil, location and general treatment. Strict attention to my own business has prevented extended inquiries into the success or failure of others; I will endeavor to give as clear a statement of my own experience as possible.

My soil is what would be called a stiff, clay loam, producing originally a good growth of white and post oak and hickory. It will produce a crop of blackberries for six years in succession without much deterioration in quality; after that time, notwithstanding all possible care may have been taken, such as pruning, mulching, etc., the canes begin to get weak and are naturally more prone to disease and rust, which will ultimately destroy them. I think this weakening or deterioration, especially in the blackberry, may be attributed to a lack of plant-food in the soil, necessary to the production of healthy plants and fruit.

Another common cause of failure, and one from which I have suffered myself, is that of planting upon ground that, generally speaking, is fit for nothing else, hilly, poor ground being considered good enough for blackberries. This is a great mistake.

The rust is always more or less of an evil, but it may be controlled by slipping off the shoots, at least twice a week, during the growing season, which will certainly require no more labor than any other crop of small-fruit. I have some Kittatinny plants, set November 15, 1869, and many of them are in good bearing condition yet. Some of them, however, where the soil has been apparently exhausted, or where they have been badly treated, have yielded to the rust and are almost gone.

I am aware that it has been said that the blackberry may be grown on the same ground for an indefinite length of time. Such was my opinion, but I have been compelled to change my ideas on that matter,

by personal observation and experience within the past few years, and now think that growing these and all kinds of small-fruits on the same ground for an unlimited time will result in pecuniary loss and vexation of spirit.

But, *Mr. President*, there is another cause of failure in growing small-fruits, especially blackberries and raspberries; that is in attempting to do too much. How much better to be able to say, I have succeeded in little, than failed in a great deal. Let the motto be, "better quality" rather than "greater quantity."

It is to be hoped that the time is not far distant when a comparatively small amount of land, which at the present may seem insignificant, will be considered all-sufficient; then we will see less of glutted markets and poor fruits, for the simple reason that the fruit grown will be tempting to both eye and palate.

In regard to the rust in the blackberry, in particular, it is possible that in the near future we shall find a prevention, if not a cure, for this disease; if not, we may be able to look upon it as a "blessing in disguise" and console ourselves with the idea that for extraordinary labor we may expect extraordinary pay.

"What everybody can do never benefits anybody much."

There are not nearly as many blackberries grown here as there were some years ago, and there is but little, if any, increase in raspberries.

The most profitable and popular varieties of Black-caps are the Doolittle and Mammoth Cluster; and of Red varieties, the Turner and Brandywine. There are others, that have *dealers' promises* to be good, that are not yet tested. The "Gregg" will, I think, come up to expectations and prove an acquisition to the black-caps. The Ganargua and Rochelle are good in quality, but their color will prevent them from becoming a popular market fruit.

Time of Planting.—In my own experience I find, as a general thing, the fall to be the best time to plant; the young shoots start at that time and are more safely handled than in the spring. As a rule, there is more time to do it in the fall than in spring. The red raspberries, when planting soft-wood plants, are, however, an exception to this rule. I much prefer to plant young plants of these later in the spring, and have been very successful, rarely losing a plant. There is another thing in its favor, it is an expeditious way, and of course this is worth considering at a time when every moment counts.

Distance.—Much may depend upon circumstances. If plants are scarce I should set five feet apart in the row, and the rows about seven feet apart; but if plenty, and fruit is the only object, the best plan I have yet found is, when the plantation is large, to have every third and fourth rows ten feet apart, to allow an easy passage for a team; the other rows may be six to seven feet apart, and I then plant three feet apart in the row, by this means I am sure of a good stand in less time.

Pruning.—The young canes ought to be cut back to three feet, or a little less, and it will be necessary to go over them, at least, once a week. There can be no certain time specified for this work, as location, soil

and season will make considerable difference, and each one must be governed by his own circumstances. The laterals ought not to be allowed to grow more than fifteen inches. Red raspberries, when land is an object, may be planted in rows six feet apart, and with a little modification the same rule will apply to blackberries. It will, however, be necessary to rigidly cut up the suckers or the quality of the fruit will suffer for that season. As the plants get older they do not sucker nearly so much.

Black raspberries may be set from five to eight feet in rows, and should be pruned to two-and-one-half feet high and the laterals to one foot. This will be a rule when fruit is grown for market. For family use, when space is limited, the rule will admit of variation.

Shipping.—I have found it best to make two grades of fruit. They may not always have been sold as such, depending upon the market; still the responsibility rests where it should, with the commission-man. If the lower grade fruit did not bring good prices, there could be no misunderstanding.

Packages.—The full quart box is best for blackberries and black raspberries. Some shippers may be using the "snide" box, which I consider a fraud and as such ought to be condemned by this Society. It may be said, and to a certain extent truly, that this kind of fruit is sold by the package, but at the same time the public expect them to hold a full quart. This they certainly do if the proper kind is used and boxes are properly filled. This confidence on the part of the public ought not to be abused; fair dealing will soon bring its own reward.

Red raspberries ought to be packed for shipping in pint boxes.

Such are my views, drawn from observation made on my own plantation, and I offer them with diffidence before this body. It would be presumption to claim that they are perfect, especially before many of you, "fathers in horticulture," who have given a life-time to the study and practice of fruit-growing. If they elicit discussion and bring out new light upon our work I shall be fully satisfied.

DISCUSSION UPON THE REPORTS.

MR. DENNIS.—The originator of the Sweet Home raspberry, mentioned by Mr. Vickroy, claims that it is earlier than Miami; but my observation of this variety convinces me that it is identical with the Mammoth Cluster or Miami. A neighbor has them both and I can discover no difference. In reply to a question asking if the canes of Sweet Home do not stand higher than those of Mammoth Cluster, he said he could detect no difference in cane or leaf.

MR. McWHORTER.—The Sweet Home seems to be a little longer berry than Mammoth Cluster, and has the same bloom on it; I think it is distinct, but I cannot extol it; I think the originator has exaggerated somewhat; I would plant it, however, as I think the berry a

little larger, though I can see no difference in the flavor—they *may* be identical, I am not sure.

MR. WEIR.—*Mr. President*, I am somewhat amused at the statement that rust is induced by deterioration of soil. Rust is caused by the action or growth of sporadic fungi, *it is a fungous growth* upon the leaf, and has nothing whatever to do with the soil. The Kittatinny was my best berry until struck by rust. So far Snyder has not rusted with me.

J. R. GASTON.—We have the Kittatinny and Snyder here in Normal, standing side by side; Kittatinny has rusted, but Snyder has not.

MR. HOLDRIDGE.—Early Wilson and Snyder do not rust with me, but Kittatinny does.

MR. WIER.—I desire to say that on high ground, somewhat *isolated*, the Kittatinny has done better than elsewhere. The question has often been asked, how can we cure the rust? I say it cannot be cured.

MR. MCWHORTER.—The wild blackberries, as well as Kittatinny, were killed dead with me last winter; Snyder was also somewhat injured.

J. S. JOHNSON.—It is a sad mistake to say that rust comes from exhaustion of the soil. Rust appeared on Lawton, Kittatinny and the wild blackberry, and completely destroyed them, on ground that had been highly manured and cultivated.

MR. WIER.—Defective foliage of the year previous occasioned the failure in the blackberry the past season. The same is true of apples, pears and cherries. The cane and also the fruit-bud is always built up the previous season for the sustenance of the next year's crop; if it had not received the previous year from the atmosphere and the soil all the elements needed, it cannot withstand the intense cold. Peach-trees have stood twenty-six degrees below, and have been afterward killed by ten below.

J. R. GASTON.—I never saw finer foliage on blackberries than was with us in 1878; yet quite all but Snyder were killed. Snyder does not like wet land, but on any land but that which might be termed sloughy it bears heavily.

MR. EDWARDS.—Taylor and Wallace (called hardy) killed last year.

MR. HAMMOND.—The foliage on all kinds was good last year, but Lawton killed down to snow line, and Kittatinny was badly injured.

MR. EARLE.—At Cobden Kittatinny and Lawton, side by side, rusted, Lawton not much, however; Wilson's Early is tender, but does not rust, neither does the Snyder.

A word as to raspberries: A neighbor has substituted Brandywine for Turner as a shipping berry.

This is not my experience; I can ship Turners 600 to 800 miles and have them arrive at destination in good condition; I ship in shallow pints, whether shipping North or South.

On motion, the Society adjourned till seven o'clock in the evening, to meet in the large hall of the University, its use being tendered by President Hewitt.

SECOND DAY—EVENING.

The Society assembled in the large hall at the appointed time. There were also present many citizens, and teachers and pupils of the institution.

The first business being the report from the Committee on Botany and Vegetable Physiology, Dr. A. G. HUMPHREY, of Galesburg, presented the following as his report:

ORIGIN AND EVOLUTION OF LIFE.

In my paper last year on the origin and evolution of life in plants, I showed from geological and palæontological evidence that the lowest forms of life appeared on the earth while our planet was yet in its primary epoch, and that as the earth changed, and new forces affected the land, sea and atmosphere, higher forms of life appeared. Judge Lanphere, of my own city, wrote a criticism on my paper entitled "The Origin of Life," and published in the *Chicago Tribune*, and later another paper with the same title published in the *Galesburg Republican-Register*.

Two leading thoughts appear in these papers:

1. All changes and phenomena in the inorganic world are from material causes and forces; and

2. Life is a "supernatural power, infinitely superior to matter, dominating matter and converting it into the mediums of expression of the purposes and omnipotence of the supernatural power."

I propose to show in this paper that life, not only in its origin but also in every vital phenomenon, depends solely and absolutely on material causes. The question as to the existence of a power above matter and superior to all its forces was not raised in my paper on the life of plants, nor do I consider it a question of scientific investigation.

All that we can know or find out of matter is from material manifestations. Science deals only with phenomena and the laws which connect them. There is an unknowable universe which science cannot penetrate. It is with the course of visible and tangible nature that science invites investigation. Prof. Simon Newcomb says:

"We find ourselves placed in this world in the midst of a vast theater of activity. We see an atmosphere agitated by storms; great masses of water rising in the air to form clouds, and, after falling to the earth, flowing as mighty rivers to the ocean; count-

less forms of vegetation rising from the earth, and then returning to it; a sun vivifying one and perhaps more planets with its heat; an infinitude of chemical changes going on around us; countless stars moving through space with velocities which transcend all our conceptions. To all appearance these operations have been going on for millions of ages past, and may continue for millions of ages to come. As the thinking man contemplates them, he is led irresistibly to the conclusion that they do not go on at random, but that they were joined by connecting links, or are in some way the product of knowable causes. * * * * Each state of things is the effect of the state which immediately precedes it, and the cause of that which immediately follows it. The course of nature is thus considered as an endless chain, of which the work of science consists in making out the forms of the links, and the modes in which they are connected."

The powers and forces of an immaterial cause are inscrutable, so cannot be known and no results can be foretold, while material causes can be observed and results accurately foreseen. If we find that not one vital phenomenon occurs in nature except under certain observable physical conditions, then it should logically follow that material forces are the cause of all motions of life in the exceeding variety of vegetable and animal forms; and further, that material causes originated the first forms of life as well as sustain and perpetuate existing forms.

The nebular hypothesis of the origin of worlds, and hence of our Earth, most clearly explained in Prof. Newcomb's new work on astronomy, is quite generally accepted by educated and scientific men. Assuming it to be true, then the matter of which our Earth is formed was once a "nebula" of fire mist, and, so far as science can determine, one element. It required the action of physical agencies during inconceivable ages to evolve the great variety of elements which science now demonstrates to exist. Geology, chemistry, molecular and mechanical action, in fact all the natural sciences, aid in explaining the modes of the changes during the formative ages of the Earth. After water originated by the union of gases and a humid atmosphere surrounded the Earth, then the lowest forms of life appeared in the primeval warm sea.

I fully agree with Judge Lanphere's able criticism that all life, both vegetable and animal, have a similar origin, and that the forces sustaining the motions of life in the vegetable world are very similar to, or identical with, those sustaining and constructing all animal forms.

The order in which both forms of life appeared on the Earth and the exact correspondence of different forms to different geological epochs is so essential to my argument that I present here a syllabus of the points from standard scientific authorities:

ERA.	EPOCH.	ERA OF
Archilithic.	Primordial.	Algeæ, or Tangle Forests (the lowest of vegetable forms), and Polyypi, or Acrania (the lowest forms of animals).
Paleolithic.	Primary.	Fern Forests and Fishes.
Mesolithic.	Secondary.	Pine Forests and Reptiles.
Cænoolithic.	Tertiary.	Leaf Forests and Mammals.
Anthropolithic.	Quaternary.	Man and Cultivated Forests.

The physical condition and the natural forces operating in the production of the first living forms were carefully considered in my paper on the life of plants.

As certain physical conditions of the Earth and its atmosphere were essential to the first appearance of organic forms on the Earth, so now certain and different conditions and relations must exist before the motions of life begin in any vegetable or animal germ. Not a seed germinates except under the conditions of moisture and heat; then by mechanical or capillary action (endosmosis) water is conveyed through the outer covering of the seed and chemical action takes place to form the true matter of life; then motions of life occur. Similar definite conditions are essential to start the motions of life in all animal germs.

Life, then, instead of being studied as a single force, may with scientific accuracy be analyzed as a phenomenon resulting from a correlation of many or all of the known physical forces. An "immaterial power, independent of and above nature," could not be subject to material conditions for its active manifestations; yet we see by observation that all vital phenomena occur under specific physical conditions, relations and forces. If the conditions causing life are materially changed, the motions of life cease. Observe the millions of vegetable and animal forms ushered into being during our short summer, which are all suddenly cut off by the first frosts of autumn. During winter in this climate all active motions cease in vegetable and the lowest animal forms, while the higher forms of animals are improved by the change. So the physical conditions which destroy one form add to the longevity of another—in proof again that all vital phenomena are absolutely subject to a great variety of physical forces. From such varied forces we should expect just such a variety of living forms as now exist.

Both variety in forms and complexity in organism of plants and animals are as easily accounted for by material causes as are the different elements and compounds in inorganic matter, and especially as the different forms of crystals. Crystallization is not a single force, but a phenomenon of matter resulting from the action of many forms of physical force. The forms of crystals are scarcely less varied than the forms of leaves and flowers of plants. The delicate, beautiful and wonderfully accurate fern-leaves often seen traced on a window in winter need quite as much an "immaterial force" to account for this strange result as any vital phenomenon connected with plants and animals; and yet who doubts that no other than material forces produced these varied crystalline forms, from the most simple to the most complex?

Every plant and every animal at the beginning of its life is a simple cell, a starting or growing point in embryo likeness of its parent. Most organisms produce during life thousands and often millions of seeds or eggs, each of which, with the necessary physical conditions and forces, will develop into a new individual. It is, however, well known that the germs produced by plants and animals are out of all proportion to the number that attain the motions of life; so, out of the infinite myriads of the germs of Earth only an exceedingly small number chance to

receive the material conditions necessary for the attainment of individual existence. If the life-force were an "immaterial power above and independent of nature, dominating and pervading all matter," then each of these germs should spring into life and attain the age allotted to each form; and, further, if life were an "immaterial force infinitely above nature," then the oak could just as well be started from a pebble as from an acorn, and a horse from a piece of ice, as by the laws of procreation each is quite independent of material laws and forces.

The causes giving rise to the varied organic forms of earth are from an apparently infinite variety of conditions and forces, holding through exceedingly long epochs of time. Says Spencer, in speaking of diversity of forms:

"If this vast genealogical tree be contemplated as a whole, made up of trunk, great branches, secondary branches, and so on, as far as the terminal twigs, it will be perceived that all the varied kinds of organisms represented by these terminal twigs, forming the periphery of the tree, will stand related to each other in small groups, which are united into groups of groups, and so on. The embryological tree, expressing the developmental relations of organisms will be similar to the tree which symbolizes their classificatory relations. That subordination of classes, orders, genera and species to which naturalists have been gradually led, is just that subordination which results from the divergence and re-divergence of embryos as they all unfold. On the hypothesis of evolution this parallelism has a meaning—indicates that primordial kinship of all organisms and the progressive differentiation of them which the hypothesis alleges."

All organic forms springing from perfectly developed germs (and the perfection or imperfection of all germs depends on physical parental conditions) with favorable material conditions manifest that vital action we call health; but with unfavorable material conditions the manifestation is one of disease. If the vital force were an "immaterial" something "above and independent of nature," then it should not be deranged by material causes. Its control of an organism should be supreme. Physical causes should not improve or impair, change or modify its manifestations. It should not get sick and need a physician. No such thing should be known as remedial appliances. There could be no medical science. Physiology and health, pathology and therapeutics would be meaningless terms. On the other hand, life being a correlation of forces in nature, physiology, pathology and therapeutics are branches of physical science. Unfavorable physical condition changes physiological to pathological action; then therapeutic appliances change the action back to health. Remedial appliances are largely chemical and altogether material. One material condition may stop all motions of life. Last summer (1879) an extensive and long-continued drouth prevailed in Central Illinois. Thousands of acres of corn were almost at a dead stand-still. One general rain made greater change in motions of growth in twenty-four hours than had occurred in three weeks.

In proof the most positive that all vegetation depends for all motions of growth on heat and moisture, both of which are material agencies, it may be urged that life, being an "immaterial force above nature," uses material conditions and forces to construct an organism. In this case it could not be independent of nor above nature, but absolutely subject to

specific physical conditions and forces, as we have clearly seen. If we understand the separate and correlated action of the known forces of nature, we may arrive at a clearer comprehension of the so-called vital force. Heat, light, electricity, magnetism, chemical affinity and mechanical force are transmutable into each other, back and forth. The mutual convertibility of forces into each other is called "correlation of forces;" and the persistence of the same amount, amid all these protean forms, is called "conservation of forces." If the vital force or the life of plants and animals is in any sense a separate and distinct force, it is so in nature and exists as one of the material forces, just as heat, light, chemical affinity, electricity, etc., are material forces; as in all its varied manifestations we find it correlated with these forces, much as they are correlated with each other.

Mr. Le Conte says: "The most important phenomena in the life-history of a plant, in fact the starting point of all life, both vegetable and animal, is the formation of organic matter in the leaves. The necessary conditions for this wonderful change of mineral into organic matter seem to be sunlight, chlorophyl, and living protoplasm or bioplasm. * * * * It would seem in this case, therefore, that physical force (light) is changed into nascent chemical force, and this nascent chemical force, under the peculiar conditions present, forms organic matter, and reappears as vital force. Light falling on green leaves is destroyed or consumed in doing the work of decomposition, disappears as light to reappear as nascent chemical energy; and this in its turn disappears in forming organic matter, to reappear as the vital force of the organic matter thus formed. * * * * To illustrate, as sun-heat falling upon water disappears as heat to reappear as mechanical power, raising the water in the clouds; so sunlight falling upon green leaves disappears as light to reappear as vital force lifting matter from the mineral into the organic kingdom."

President BURRILL introduced Prof. CYRUS THOMAS, State Entomologist, and member of the Committee on Entomology, who gave an interesting lecture, which was fully illustrated by immensely magnified drawings, colored to life, of the various insects in different stages of development, of which the lecture treated. The following is the lecture:

LIFE IN LITTLE THINGS.

BY PROF. CYRUS THOMAS, OF CARBONDALE.

Scarcely have we entered upon the study of living natural objects, before we encounter one of the most difficult problems ever presented to the human mind for solution—the problem of life—the question, What is life? A problem yet unsolved, a question whose answer is still, to a great extent, shrouded in mystery. There is not a living object in the universe of which we have any knowledge that has not a halo of mystery surrounding it. The life of every vegetable, from that of the minute *Protococcus* that sheds a crimson blush over the arctic snows to that of the gigantic *Sequoia* of California; the life of every animal, from the microscopic Monere to that of the huge Leviathan, is still more or less shrouded in a cloud of mystery, which the keenest glance of science has, so far, been unable to penetrate. So multitudinous are the forms

produced by this protean agent, so numerous the modes in which it operates, that, like a will-o'-the-wisp, it forever evades our grasp and eludes our search.

What is life? is a question which science as yet seems wholly incapable of answering. Even those who hold that it is of a physical origin are wholly unable to account for its inception, or to explain what it is. Science is, therefore, forced to content herself with studying its works and investigating its operations. These are within her reach, and may, if carefully studied, at length lead to the solution of the great problem, if that solution is within the reach of the human intellect. Its various modes of operating are so many indices pointing towards it. And when we see that the same force can, out of the same earthy materials, form a minute fungus, erect a stately tree, shape a microscopic infusorian and construct the great monster of the deep, we have some conception of its varied powers.

It is in the lower and more minute animal forms that its modes of operating appear to be most varied; although the individuals produced are less complicated than in the higher and larger forms; hence, the attention of science has been very largely directed to them of recent years.

As I have prepared a special paper for the Society for practical use, which will be printed in the proceedings, let us devote the time allotted me this evening to the phenomena of life as exhibited in some of the smaller and humbler animals.

Let us take, for example, the European cabbage-worm, or larva of *Pieris rapæ*, which has played such sad havoc with our cabbages during the past season, and briefly examine some of the more important points in its life-history, and by comparing these with corresponding points in the lives of other species note the various modes in which life operates; and at the same time mark the boundary-line of our knowledge in reference thereto.

At first, as is the case with all other insects, it is an egg—an egg which in this case appears as but a little glittering greenish-yellow speck on the leaf of the vegetable the parent butterfly has wisely chosen as a place where her progeny may find appropriate food ready at hand. And here, at the very commencement of our investigations, an interesting but puzzling question arises. How does the butterfly, whose mouth is adapted only to sucking nectar from flowers, and other liquid sweets, know that her offspring will need food of a different kind? By what knowledge is she guided to the appropriate plant amid such profusion of vegetable forms? Are we to suppose she retains a remembrance of her former caterpillar life, and the food adapted to that state? Possibly this is the case, and though science may scout the idea, she has no better theory to offer.

It has been found that the locusts hatched in Kansas and Nebraska will not deposit their eggs on the same ground occupied the previous season, but endeavor, for this purpose, to go back to their native habitats.

No other probable reason can be suggested than that they are aware climatic conditions and the presence of parasites render these areas unsuited for their offspring.

Perhaps it will be said that insects in thus selecting appropriate places for their young are led by *instinct*. But what is Instinct? Who can tell? It is only a word coined to cover our ignorance; a supposed irresistible law of their nature of which we know really nothing.

We see a little parasite approach our aphid, tap it with its antennæ, and, being satisfied, it punctures the body of the plant-louse with its ovipositor, and deposits a tiny egg in its body. Another parasite approaches the same plant-louse, and applying the same test leaves it without depositing an egg. It is evident in this case that the aphid is left undisturbed because another parasite had punctured it and deposited an egg. Is the second aware that one grub only will find sufficient food in the body of the aphid? The cabbage parasite, on the other hand, deposits a number of eggs in the same pupa. Is the parent Ichneumon in this case aware that her progeny will find sufficient food, or shall we attempt to hide our ignorance by saying it is *instinct*?

Let us now borrow some microscopic eyes and examine the eggs of our cabbage-butterfly. If the light is sufficient they will appear like little golden-green pears, fretted with delicate ribs and minute furrows, objects of microscopic beauty (pointing to the illustration).

But why is it that this species scatters the little glittering caskets singly here and there, while the nearest of kin, *Pieris brassicæ*, the notorious white cabbage-butterfly of Europe, deposits a cluster of twenty or thirty in a place? Science can give no other answer than that the differences in this respect are specific laws. If we turn to *Pieris oleracea*, the white cabbage-butterfly of this country, we shall find that it deposits three or four eggs in a place; while our native species, *Pieris protodice* (referring to figure), on the other hand, deposits them singly. It is probable that if we could trace the history of the species back to their origin in the past we could learn the cause of this variation, but at present this is one of the mysteries of insect life still closed to science. So far man is unable to write the entire life-history of a single species of the myriads of animals that inhabit the earth.

As we gaze upon this little golden-green globule and strive to imagine what it really is, thicker and thicker grows the cloud of mystery around it. What is it? An embryo animal? Puncture it, and a little fluid is all that is there. It is in fact a tiny bottle of life, sealed up, to be developed at the proper time. How is it possible for the stream of life, flowing down the race through the chain of individual links, thus to be severed, and, as it were, bottled up? An egg, which is but an enlarged cell, is beyond all doubt one of the most wonderful productions of Nature. How is blind force, if such life be, to plan the form, build it up and give the peculiarities belonging to the species? Science has no reply to make. And yet there are human wisacres who, though unable to explain this single process of Nature, will undertake to construct a universe and operate it.

If we watch the process of growth in our little egg we shall see the yolk-surrounding fluid first gathering into a denser ring, while that on the inner side is breaking up into granules (shown on diagram), as the first step towards forming cells, out of which the tissues are to be made. As the process goes on the surrounding ring becomes more distinct and is marked externally with prominences and strictures, until at length distinct segments are formed and the little caterpillar is clearly outlined.

The position the caterpillar occupies in the egg is quite different from that in the more flattened and disk-shaped eggs (diagram referred to); the head is also brought opposite the point of least resistance to an inside force. After eating its way out of its prison, the first act of the caterpillar, as long ago observed in reference to its congener, *P. brassicæ*, by Harold, is to eat the shell; a habit which appears to be followed by most, if not all, of the species of the genus.

Although the caterpillar, when it has attained its growth, is painted with the most delicate emerald tint, and trimmed with a dorsal line and lateral dots of gold, its beauty has but little attraction for the gardener, nor can he take any pleasure in watching it as it riddles the leaves of his cabbages with holes and bores its way into the forming heads. Though of a remarkably quiet and peaceable disposition, not venturing to encroach in the least upon the rights of other insects, passing carefully around even the little plant-louse rather than disturb it, the gardener, regardless of this, declares a war of extermination; and to this end salts it, brines it, limes it, powders it with hellebore, soot, ashes, tobacco, pepper, etc.; drenches it with hot water, soap-suds, lye, elder-juice, decoction of dog-fennel, dilute carboic acid and a host of other obnoxious things; and, finally, saves some of the most promising heads by picking the worms off of them.

How are we to explain the remarkable tenacity of life in a worm apparently so extremely delicate and tender? Not only will many survive the treatment described, but may often be observed feeding away when coated over with lime, hellebore, etc. They have even been frozen in ice, and yet, when thawed out, lived and completed their transformations. Why is it that a substance which destroys the currant-worm has no injurious effect upon them? Will you answer, that it is some peculiarity of their nature? But what is this peculiarity? The tissues of their bodies are apparently as delicate as those of the saw-fly larvæ.

And here we may call attention to the fact that although the caterpillar is so peaceable and unaggressive, on the other hand the perfect insect or butterfly is of an exactly opposite disposition. While other allied species, with the exception of *P. brassicæ*, are more or less confined to their faunal regions, this one not only ranges over Europe, from Lapland to the Mediterranean Sea, and over Asia from Siberia to the tropics and eastward to China, but has crossed the Atlantic and traversed North America from the eastern shore to the Missouri, driving before it, or out of the pathway of its progress, our native species. When it

appeared in the Eastern States the native potherb-butterfly (*P. oleracea*) at once began to disappear; and now our *P. protodice* is rapidly giving way before it.

In what does its aggressive power consist; and what peculiarity is there in its life or composition that renders it capable of becoming thus cosmopolitan? These are difficult questions to answer, but they must be answered before the life-history of the species can be fully written.

A remarkable difference in habits between very closely allied species is often unaccompanied by any appreciable difference in external anatomy or markings. Our common red-legged locust (*Caloptenus femur-rubrum*) is so nearly allied to the destructive Western species (*C. spretus*) that it is difficult to distinguish the one from the other; and there is still an intermediate species (*C. Atlantis*). Yet the Western species is truly migratory, while the others are not. Still more closely allied are *Acridium peregrinum* (illustration referred to) and *A. americanum* (illustration referred to), yet the former is the destructive species of the tropical regions of the Eastern continent, and is even found in America, while the latter is found in the southern part of our own State non-migratory. The only characteristic difference in the two cases is found in the form of the last abdominal segment of the males. Shall we ascribe such remarkable differences in habits to this small anatomical variation in one sex?

The army-worm is a true cut-worm, although not appertaining to what is usually called the cut-worm genus.

What gives rise to its migrating habit, which is not found in other species? I have even seen two different broods of the same species exhibiting the two different characteristics the same season; the one as an army marching near a grassy plat, where the other as a cut-worm, hid from view, was cutting the grass until the sward could be rolled up as a carpet. Why this difference? Is it because of excessive numbers? But why does the other species never develop in such excessive numbers? The answer only carries the difficulty one step farther back. Will you answer, that such facts are not uncommon in the history of the animal kingdom? But this brings me no nearer to a solution of the problem. The why—the reason for this—is what I desire.

But let us return to our cabbage-worm, for we shall be sure to find one the gardener has overlooked.

Admonished, doubtless by some peculiar feeling, that the time for some great change in its life has come, it becomes uneasy and seeks some place of retirement. How far it is conscious what this change is to be we know not; but that it is aware something unusual is about to take place is evident from its uneasy movements. Having found a suitable place under some projecting board or rail, it spins a little silken mat on the surface to which to attach its feet; next it spins a strong thread across the middle of its body, attaching it firmly to the plank on each side (calling attention to the figure). These are to serve as supports when it is in a semi-torpid state and its legs shall have disappeared. How it is aware that this is necessary science can only answer by the meaningless word—*instinct*.

Its larval skin now begins to contract in length and in a short time splits open along the head and back, the pupal skin having been formed in the mean time from the inner surface of the larval skin, by peeling off as it were the inner portion of that skin. Casting off the old skin, the semi-torpid and limbless pupa supports itself by the silken loop and little hooklets attached to the mat (pointing to the drawings). Marked changes have been going on and are still going on in the body; the muscles at some points are swelling and expanding, while at others they are diminishing; some segments infolding and contracting, while others are increasing their dimensions. The nervous system is also being materially modified. In fact there is an almost total destruction of the larval system of internal organs, and many of the external appendages disappear.

To supply the material for the new organs, the fatty matter stored up by the larva is broken up into granules, which produce, by the multiplication of cells, the new tissues.

It is upon this fatty matter internal parasites live, and while it does not destroy the larva, yet prevents the development of the perfect insect.

There is an almost complete tearing down of the old body and building up of a new one; and thus is accomplished the seemingly impossible feat proposed by the Hibernian, of erecting on the site of the old one, and of the same materials, a new house without removing the old one.

How different in form now is our insect. Instead of a sixteen-footed, wingless worm, we have a six-footed insect with broad, gaudy wings (pointing to diagram); instead of a mouth with biting jaws, there is an oral apparatus in the form of a long, slender, flexible tube, suited only for sucking nourishment.

What has wrought these wonderful changes? You will doubtless answer, life. But what is life; and how has it performed this strange feat of inimitable workmanship? Was it only a latent force that lay hid in the food gathered from the external world? If so, then we may truly say it was all done by the gardener's cabbage-leaf. As well might you say that cod-fish and potatoes wrote Hiawatha, and that pork and beans were the authors of the Declaration of Independence.

Let us now turn our attention to another insect, in which life, as though desirous of showing its varied power over matter, exhibits still more remarkable feats. In the cabbage-worm, as well as all metabolic insects, the strangest part of their life-history consists in the changes from one form and mode of life to another. In the case now to be adduced we shall see not only more remarkable changes but new features.

If we examine the abdomen of burrowing bees (*Andrena*) during the months of May and June we will probably find, projecting between two contiguous segments, what appears to be the head of an insect. If we can succeed in drawing the body from its concealed position, we shall perceive a singular form, resembling this (calling attention to diagram), which is entirely limbless and without any apparent appendages. This flask-shaped creature, instead of being, as you might suppose, a grub or larva, is in fact a full-grown, perfect insect, a mature female *Stylops*, or

bee-parasite; and, though strange as it may seem, the place in which we found it is its normal position in the perfect state. If we examine this curious creature we shall find that its anatomy contradicts some of the most essential characteristics of the insect class. The abdomen is (as it appears in the figure) a true sac, closed posteriorly, the alimentary canal not extending through the body; the head and thorax are amalgamated as in the crustaceans, and this cephalothorax is the part extruded when in its normal position. The young are hatched from the eggs while yet within the body of the parent, and make their way out through an opening in the cephalothorax, thus reaching at once the external surface of the bee. They are furnished with six legs and two abdominal appendages (as seen on diagram), and move freely and actively upon and among the hairs with which the body of the bee is provided. You might suppose from this fact that they do not pass through the true grub state as do other coleopterous insects or beetles, to which order they belong, but that, like the grasshoppers, they at once take the general form they are to retain. But be not too hasty. The bee returning to its nest necessarily carries them with it; here they leave their host and attack the young bee grubs, and by means of their jaws bore their way into the bodies of these grubs and here for the time take up their abode.

Now a remarkable retrograde process in their life takes place. They undergo a kind of metamorphosis, during which they shed their outer skin, lose their legs and other appendages and become true footless grubs. The two sexes now commence to diverge in form; the female from this time forward changes but little, gradually assuming the semi-larval form first spoken of (represented by the illustration); and about the time the bee is passing into its perfect state it thrusts its head between the abdominal segments, as before stated. The male *Stylops*, on the other hand, undergoes the usual regular transformations, first into a pupa, then into a perfect-winged insect with six feet, and cuts its way out of its host (shown on diagram).

Almost every stage of this singular creature's history is contradictory of what we understand to be the usual laws of insect life. The position chosen by the female as her permanent dwelling-place, partly within and partly without the bee, may be compared to a man taking up his permanent abode across the window-sill of his house. The necessity for the eggs hatching in the body is obvious. The reason why the alimentary canal should be closed posteriorly may be imagined. We can also understand, in part at least, why the singular changes in the larval state take place. If the larvæ were at first footless grubs it would be impossible for them to remain on the body of the bee, hence they are furnished with feet adapted to holding firmly to the hairy covering of their host. When they enter the body of the bee-larva the legs and appendages would not only be useless and cumbersome, but would keep the insect in which they reside in a constant state of irritation.

It appears, therefore, that all these anomalous changes are made necessary in consequence of the unusual position assumed by the female *Stylops*. Why is such an unusual habit adopted by the female? Other

parasites reside in the bodies of insects, even of the same group, without the necessity of this anomalous mode of life; why, then, is it necessary in the life of the *Stylops*? If the male can come forth as a perfect winged insect, why does the female remain a grub? It is possible the reason is to be found in the mode of life of the bee; but as a species has been found infesting a *Homopterous* insect, there would appear to be some other reason. This would appear to be a difficult nut for Sir John Lubbock and other evolutionists to crack.

One more illustration and we will close; but now we leave the insect class and move a little lower down in the scale of animal life.

There is a group of low, degraded animals, usually quite small, known as *Entozoans* or intestinal worms, which, though unpleasant objects of study, present some such strange phases of life that I cannot pass them entirely by in this connection.

In the alimentary canal of certain water-birds is occasionally found a small worm of a peculiar form (shown in the figure), which is securely fastened to the walls by minute hooklets and sucking disks. Similar in color to the membrane to which it is fixed, without appendages, small in size, and not even worm-like in form, it may easily be taken for some kind of an enlargement of the coats of the intestinal canal; and few would imagine at first sight that it was an independent or distinct being.

Like many other species of the group, the two sexes are combined in one individual, hence, in tracing its life, we might reasonably suppose we should have to follow only the one individual. Let us see.

This produces a few—seven or eight—ova; whether these are hatched before they have passed out of the bird, or afterward, is a part of their history not yet clearly settled; but it is known that immediately after the pseudo-larva leaves the egg it is found in the water. It now resembles a club-shaped fleshy mass (as shown in the diagram), and is surrounded by minute ciliæ, by means of which it can move rapidly through the water.

Although thus active and capable of moving at will, it is, as yet, but little more than an egg, the visible external coat being but a kind of cloak or wrapper for the true embryo within. After swimming freely for a short time in this pseudo-larval state, it attaches itself to the body of some mollusk, as a *Paludina*, or water-snail. Now the outer envelope drops off and the true larva, which looks more like a bud (represented by the illustration) than an animal, appears, but still remaining attached to the mollusk. Gradually increasing in length, it assumes the form represented on diagram, reminding one of a Salamander.

When it reaches this stage of its life one of the strangest freaks of nature exhibited in the entire animal kingdom takes place. The larva, instead of advancing towards the perfect state, breaks up, as it were, into fragments, each of which is to become a separate individual with a life of its own. In its body cavity a process of gemmation or budding takes place, giving rise to a number of minute bodies, resembling a head of cat-tail with a part of the stem attached (pointing to diagram). These singular creatures effect their escape by bursting through the cavity-walls of the larval parent, or *Redia*, in which they were developed, causing its death.

Mark well, as we proceed, the steps of progress in the life of our *Entozoan*. First, it is an ovum, or egg; then a club-shaped ciliated pseudo-larva, or larva of the first stage (pointing to illustration); then a *Redia*, or larva of the second stage (calling attention to diagrams); then from this stage, from the one individual are developed numerous *Circariæ*, or larvæ of the third stage (pointing to the drawing). Our single individual has now multiplied itself before it has attained its growth, or performed the cycle of its life-history.

These *Circariæ*, or larvæ of the third stage, swim freely and independently through the water by means of their tails. After enjoying this free life for a time, they penetrate into the body of some mollusk, where they again change form and become *cysts* or bladder-worms, somewhat similar to those which form the measles in the hog; this is their fourth larval stage. Here their development must cease unless they are taken into the stomach of some water-bird. If the mollusk is found and swallowed by some water-bird, the *cyst-worm* which it contains loses the bladder portion and the remaining part, assumes at length the perfect form of the original parent, and thus is completed the cycle of the life-history of the animal. If Nature appeared to be sporting with her power to diversify life-histories in producing the *Stylops*, in the case now before us she seems desirous of astonishing us with an almost wanton display of that power. Such a paradox does she present that our grammar fails to furnish us with appropriate and applicable terms to use in reference thereto. For if we say *it*, this will only apply to a part of the life-history of the creature, for ere its career closes *it* becomes *they* or *them*.

Is it possible to imagine a more remarkable life-history than this? Not only are its varied forms and modes of life calculated to surprise us, but when at one of the intermediate stages the larva multiplies itself so that at the end of one generation one egg has produced several perfect individuals, our ideas of individual life seem to be wholly contradicted. It is the same as though the chick from one egg should become an entire brood of perfect hens.

Verily, truth is stranger than fiction; for neither the Arabian Nights, Tales of a Grandfather or Yule-tide stories present anything stranger than this.

It is a mystery we cannot solve, that life even in the perfect insect or other animal should divide itself, as it often does to enter the new channels represented by the numerous eggs deposited. But when we see a larval form breaking up into living fragments, each to be perfected by a separate individual life, the mystery becomes still more profound.

Life is a strange workman; all around us and within us, ever busy tearing down and building up new forms, and yet forever invisible; equally at home in the huge elephant and the smallest form the microscope can reveal.

Shall we say it is a force? Admit it. But now the problem is only rendered more complex, for it is very difficult, if indeed possible, to give a definition of force. In fact, force is a curious thing any way; and somehow I am always imagining there is something behind it pushing it

on. And perhaps I am about as near right as those philosophers who are so anxious to find nothing there.

An electric or galvanic stream may be extended to an indefinite distance by means of contiguous links. Let us imagine the life of a species to be a single stream of vital force proceeding from the great battery in the hands of Him who sits in the heavens, running through a chain of links which it forms as it proceeds, to cease whenever its connection with its source is cut, and we shall at least have a noble conception of life, whether considered scientific or not.

At the close of the reading the Professor was heartily cheered by the Society and the audience.

REPORT UPON ORNITHOLOGY.

Prof. S. A. FORBES, of the State Normal University, reported from the Committee on Ornithology as follows:

THE FOOD OF BIRDS.

BY S. A. FORBES, DIRECTOR ILL. STATE LAB. OF NAT. HIST.

THE THRUSH FAMILY (*Turdidæ*).

In presenting to you another report on the subject which it has now been made my official duty to investigate, I do it with an increased sense of the magnitude and difficulty of the research, and also as an incentive, with a more positive conviction of its importance.

I wish first to dispose of the question by which one pursuing such work is most commonly confronted, viz.: How is it going to pay?

The careful estimates of three ornithologists and experienced collectors give, as an average of the whole bird-life of Illinois, three birds per acre during the six summer months. That is to say, if all the birds of the year, except the swimmers, were concentrated in the six months, equally distributed throughout them and equally scattered over the State, we would have three birds on every acre of land. It is my own opinion that at least two-thirds of the food of birds consists of insects, and that this insect-food will average, at the lowest reasonable estimate, twenty insects or insects' eggs per day for each individual of these two-thirds, giving a total for the year of 7,200 per acre, or two hundred and fifty billions for the State—a number which, placed one to each square inch of surface, would cover an area of forty thousand acres.

Careful estimates of the average number of insects per square yard in this State give us at farthest ten thousand per acre for our whole area. On this basis, if the operations of the birds were to be suspended, the rate of increase of these insect hosts would be accelerated about seventy per cent., and their numbers, instead of remaining year by year at the present average figure, would be increased over two-thirds each year. Any one familiar with geometrical ratios will understand the inevitable result: In the second year we should find these pests nearly three times

as numerous as now, and, with that astounding acceleration of increase characteristic of geometrical progression, they would multiply until in about twelve years we should have the entire State carpeted with insects, one to the square inch over our whole territory. I have so arranged this computation as to exclude the insoluble question of the relative values of birds and predaceous or parasitic insects, unless we suppose that birds eat an undue *proportion* of beneficial species.

Take another view of this matter. According to the computation of Mr. Walsh, the average damage done by insects in Illinois amounts to twenty millions dollars a year. Large figures certainly; but when we find that this means only about fifty-six cents an acre we begin to see their probability. Few intelligent farmers or gardeners would refuse an offer to insure complete protection, year after year, against insects of all sorts, for twenty-five cents an acre per annum, and we will, therefore, place the damage at one-half the above amount—ten million dollars per annum.

Suppose that, as a consequence of this investigation, we are able to take measures which shall result in the increase, by so much as one per cent., of the efficiency of birds as an insect police, the effect would be a diminution of the above injury to the amount of sixty-six thousand dollars per annum, equivalent to the addition of over one-and-one-half million dollars to the permanent value of our property; or if, as is in fact a most moderate estimate, we should succeed in increasing the efficiency of birds five per cent. we should thereby add eight-and-one-fourth millions dollars to the permanent wealth of the State, provided, as before, that birds do not eat unduly of beneficial species.

These figures will be at once rejected by most naturalists as absurdly low. The young robin of Prof. Treadwell (a bird whose fame has extended over both hemispheres) required not less than sixty earth-worms a day, equivalent to at least two hundred and fifty average insects, to keep it alive. A pair of European jays have been found, Dr. Brewer informs us, to feed their brood half a million caterpillars in a season, and to eat a million of the eggs in a winter.*

Compared with these numbers, my seven thousand two hundred insects a year seem certainly many times too few; and similar criticisms might very probably be made on other items of the estimate. I prefer, however, to put these matters with a moderation which will command general assent, especially as we see that the importance of the subject does not require exaggeration. Of course the individual farmer or gardener could, by intelligent and careful management, if he knew just what to do, increase the value of his own birds far beyond his individual share of the above-mentioned general aggregate.

It is thus made probable that the birds intervene continuously between us and the complete destruction of our most important industries—the

* A young mocking bird (*Mimus polyglottus*), raised from the nest by my nephew, Robert Forbes, ate about 240 red-legged grasshoppers daily—equivalent to at least 480 average insects.

irretrievable financial ruin of nearly our whole population. That so gigantic a natural force as they seem to constitute, almost as necessary to us as the light of the sun or the rains of heaven falling in their season, should not have been carefully investigated long ago, in all its results and relations, is certainly a surprising phenomenon. What should we say of the intelligence and capacity of the mechanical engineers of America, if we should learn that, notwithstanding the enormous waste of force in a locomotive engine, no thorough scientific investigation by competent physicists had ever even been attempted of the laws governing the transmutation of fuel into mechanical work? Let us hope that our agriculturists and horticulturists will require and sustain investigations into the laws and forces of nature relating to their calling as precise and elaborate as those made in the interest of far less important industries. This investigation would well repay its trifling cost, if it should have no other effect than to give us an intelligent acquaintance with the subject; but we already see the way open to recommendations of practical value.

I wish to say beforehand, however, that if any are listening to me with the hope of learning from *this paper* whether we should destroy or cherish any one bird or group of birds, they will certainly be disappointed. I have no positive conclusion to offer. If positive assertions are wanted, a plenty of them are already extant; nearly every work on ornithology abounds in them.

Many papers have been published in this country settling this exceedingly complex and difficult question out of hand, without so much as a glance at a microscope. The time has come for the hesitation and uncertainty of careful and impartial study, and of a cautious balancing of evidence; for the modified and guarded judgment of those who are at least prepared to understand their own ignorance and to realize some of the conditions of the problem.

I will not now enter into the details of the work that has hitherto been done in this country, but will only say that it all seems to me fatally defective as a basis for sound opinion or definite action, for this reason, if for no other, that scarcely an attempt has been made to determine the *relative amounts* of the different elements of the food of each species.

The fact is that birds have their preferences among the objects which they will eat. With several appropriate articles of food around them in equal abundance, they will, for some reason, certainly select some and neglect others. These preferences have, of course, a great deal to do with the value of the species, and often determine the case, as we shall presently see. They can be discovered only by noting the relative amounts of these different elements in the stomachs of all the birds examined and averaging these ratios for each species. I do not know of a single case in which this has been attempted, except in a paper by Mr. Samuels, of New England, on the birds of Massachusetts, and this author has contented himself with giving in percentages the *relative numbers of birds* in which the different elements mentioned were found. If five per cent. of his birds have eaten caterpillars, for example, he concludes that caterpillars constitute five per cent. of the food of all, a

most misleading *non sequitur*, as a little study of the tables of food here given will prove. The caterpillar in a bird's stomach counts, by this method, as much as fifty in the final conclusion. A single leaf-eater taken by one bird will balance fifty lady-bugs eaten by another.

The personal character of my criticism disappears when I confess that I have hitherto followed this method myself, supposing any other impracticable. I have found, however, that a little practice enables one to estimate with a good degree of accuracy the percentages of each kind of food found in each bird's stomach. If this were not so I should be inclined to give up the whole problem as insoluble, as nothing but the most general and uncertain notions of the economical relations of birds could otherwise be obtained. Most frequently those writing upon this subject have jumped to the conclusion that *all insects were injurious*, and that their presence in a bird's food was sufficient evidence that the bird should be preserved. The conclusion reached in this paper will show the falsity of this opinion. Perhaps I shall account for this defect of our knowledge when I say that this is almost purely an *entomological question*, and that it has been thus far studied almost wholly by *ornithologists only*. It is not necessary, therefore, to suspect them of an unconscious bias in favor of the objects of their study to account for the apparent partiality of their judgments or the partisan fervor with which they frequently urge opinions whose foundations certainly will not bear scrutiny.

In computing these ratios I have carefully reviewed all the material previously studied, using the opportunity, of course, to test my former notes and to add the many details which longer practice has enabled me to detect. In preparing these notes, and in summing them up for this report, I have felt compelled to give the fullest particulars possible, and to describe the methods used and the principles on which these are based, so far as they have not been already given in previous papers.

It is a simple thing to satisfy myself on this subject—not very difficult, perhaps, to convince you that the work has been done carefully and in good faith. But if it is to have any real utility, it must carry with it evidence of its accuracy and honesty sufficient to satisfy the general public, and especially sufficient to commend it to the confidence of experts, whose decision will finally determine its repute, and consequently settle the question of its practical worth. If I have given you a good deal of dry detail, this must be my excuse. This paper was intended to embody not only results and opinions, but all the proof upon which they rest; to supply, in truth, the whole body of fact thus far arrived at, so that those indisposed to agree with me can, at least, have the material for conclusions of their own. Every detail of the food of the Thrushes which I have personally noted is contained in the tables which follow this paper. The contents of every stomach examined have been separately bottled in alcohol, labeled and systematically arranged, so that the tangible basis of every statement can at any time be found.

I must briefly allude to some of the difficulties encountered, and to some of the methods used to avoid or surmount them. Of course, the greatest difficulty lay in the fragmentary character of the material to be

studied. All the synopses and descriptions of insects or groups of insects presuppose the presence of a whole specimen. If you will try to fix the germs of a fossil hickory-leaf by using an ordinary manual of botany, you will appreciate the perplexity of the student who attempts to determine by the study of a crushed and mutilated head the number of segments in the abdomen, or to decide whether the *paraglossæ* are connate with the *ligula* when he has nothing but a mandible to go by. The heads of beetles are, however, usually well enough preserved for study, and the mouth-parts are structures of great variety and complexity, and can commonly be made to solve the question of family and often of genera also. I consequently had mounted at the laboratory, for reference, a large number of slides of mouth-parts of all the families of Illinois insects of which we had specimens for dissection. By a careful collection and arrangement of the mouth-characters used in the descriptions of families, I constructed a key to the families or groups of families of beetles, based upon these head-characters only. This has proved very useful in settling doubtful cases.

I soon found that the Thrushes ate more largely of Carabidæ (predacious ground-beetles) than of any other Coleopterous family—these constituting nearly one-third of all the beetles eaten. The determination of their genera, therefore, became unusually important. To this end I dissected and mounted the mouth-parts of all the Illinois genera in our collection, usually several species of a genus, and by an original study of these constructed a set of analytical keys, by whose aid I have found it easy, usually, to classify the Carabidæ. These keys, being at present incomplete, have never been relied upon solely, but have been used with caution merely as clues to the determination. I have now most of the material in hand for the completion of these keys, and shall print them hereafter.

Another serious perplexity arose when the attempt was made to fix the economical values of the different insects encountered, since to do this as well as it ought to be done required a complete command of the whole subject of economical entomology; a command so ready as to enable one to bring to bear upon any genus or species the whole body of our knowledge relating to it. If I had been a thorough specialist in economical entomology, which I am very far from being, I should have hesitated to form exact opinions on these matters without a review of the literatum of my specialty, since we are so likely to give undue prominence to the facts of our own observation, or to those which have most recently come to our knowledge. Under the circumstances such a careful scanning of the literatum of the subject was indispensable, and I therefore commenced, and have well under way, a complete index to all the most important published matter in this department, including the works of Harris, Fitch, Packard, Walsh, Riley, Le Baron and Thomas. This index contains not only references to every fact stated respecting the injury or benefit attributable to any insect or group of insects, but also compact statements of the facts themselves, so that when finished it will form a nearly complete compend of the economical entomology of this

country. A reference to this will show, in brief space, substantially all that is known respecting the economical relations of any insect eaten by birds, and will thus furnish the best possible basis for an estimate of its value. In short, this whole subject was so new that the first step in the work was necessarily the manufacture of the tools. Visible progress is consequently slow in the beginning, but will be much more rapid when everything is well organized.

Another serious obstacle to the fullest success in this matter is the deficiency of our knowledge of entomology. This may appear remarkable to some of you; for there seems to be an impression current that, excepting the answer to a few insoluble problems, we already know about all of entomology that is really worth knowing, and, indeed, a good deal more. I had not been long at work on the food of birds, however, before I discovered that *all* entomology is economical. Only Omniscience itself could form a *perfect* judgment of the relative values of insects. It is not too much to say that there is no fact relating to the name, structure, relations, habits, development and published literature of any species or other group of the insects of the State which has not its bearing upon this question. I find use, therefore, at every turn, for even the most trivial details of the specialist. Now that for days and weeks together we have been compelled in the course of this research to study minutely the smallest details of the mouths of beetles, mounting, drawing, recording the teeth on their mandibles, the hairs on their tongues, the dimples in their chins—finding such knowledge necessary at every turn to reduce to sharp certainty what must otherwise be left in the fog of general estimate and conjecture, nothing could add to the positiveness of my conviction that there is really nothing essentially trivial or useless in science; that every part of it so modifies every other that we can know nothing truly until we know it all; and that the more detailed and accurate is our knowledge, the more definite and valuable will be our reasoned-out conclusions.

Before the food of the separate species of Thrushes is considered, a few words will be necessary respecting the family as a whole. It consists, in this State, of nine species of birds, the Robin, the Cat-bird, the Brown Thrush or Thrasher, the Wood Thrush, the Hermit Thrush, Swainson's Thrush, the Alice Thrush, the Mocking Bird and Wilson's Thrush or the Wren.

The first four of these stay with us, in this latitude, during the summer; the others migrate beyond our borders, except the Mocking Bird, and that only reaches the southern third of the State in any numbers. The first three, the Robin, Cat-bird and Brown Thrush, are by far the best known and most important garden birds; and it is on account of their close relations to the business and labors of the members of this Society, making them more interesting to you than any other birds, that I have selected the family to which they belong for my report at this meeting.

I have now carefully studied the contents of the stomachs of one hundred and forty-nine specimens of the family, shot in various parts of

the State, and in all months, from March to September. Some unexpected and important generalizations have been made, and the outlines of a number of others begin to appear as we study the mass of facts accumulated.

The subject, as we shall see, proves to be much more complex than the statements of other observers had given me any reason to expect, and and I have, therefore, found my material insufficient to determine positively many most interesting questions that have unexpectedly arisen. On most points, consequently, I shall reserve a definite judgment until another season, using every opportunity to collect an abundance of specimens. These I can study now much more rapidly than heretofore, and I shall probably be able to settle, in a general way, most doubtful points respecting the food of this family before your next meeting. I intend also this year to commence a similar critical study of the Starling family (the blackbirds, orioles, and their allies)—a family more especially related to agriculture, but also of interest to horticulturists in some of its members. The food of the Blue-bird I shall also study next season with all possible care. I shall further undertake next year to learn all I possibly can of the food of the young of the various common species, transferring the nests to cages in such a way as to invite the continued care of the old birds, and watching their operations with a field-glass.

This is the proper place to acknowledge my indebtedness to the several persons who in various ways have aided me; to Mr. C. K. Worthen, of Warsaw, who has sent me the stomachs of birds from that place; to Prof. Riley, of the U. S. Entomological Commission, for the determination of the eggs and larvæ of diptera; to Miss Emma A. Smith, of Peoria, to whose services here at the Laboratory I owe most of the slides of insect structures; but especially and particularly to my assistant, Mr. W. H. Garman, to whose ceaseless industry, careful judgment and thorough and unusually accurate knowledge of the entomology of the State I have been a daily and hourly debtor.

I. THE ROBIN (*Turdus migratorius*, L.)

This bird, as familiar to every one as the domestic cat, is the most abundant of the thrushes, and plays so large a part in the economy of the garden as to make the question of its food one of unusual importance. That a species ranging from the Atlantic to the Pacific and from the Mexican plateau to the Arctic circle, apparently at home in all the latitudes and longitudes of this vast and varied country, should be at all select in its tastes is not to be expected. The present question for solution is not, what *will* the robin eat? but, what *does* he eat here, and in what relative proportions? Not, what would his relations to horticulture be in other places and under more or less hypothetical or exceptional circumstances? but, what *are* they in Illinois under average conditions?

I do not profess to be able fully to answer this question. If I supposed that the examination of forty-one stomachs of this bird, however skillfully and critically made, could give me a full knowledge of its food

in any one State, I should only betray my ignorance of the magnitude and complexity of the problem in hand, and my consequent unfitness to solve it. I shall, therefore, offer the data I have collected only as a contribution to the subject, anxious rather to underrate them than to exaggerate their value. We must not forget that the actual facts I have to give you relate only to the contents of the stomachs of forty-one robins, and that the estimates of benefit and injury that I shall read simply express my best judgment of the good or harm done by those forty-one birds at a single meal each. How much of an inference as to the habits of the species we may erect upon this foundation depends upon the fixity or invariableness of the food-habits of this group. If the same species will eat substantially the same food, year after year, in the same situation, then, of course, a good deal may properly be inferred from comparatively few data; but if the food varies widely, either arbitrarily or under slight changes of condition, then we can infer but little. Upon this fundamental question I have two suggestions to make.

First, if several species allied in structure, occupying the same territory at the same time, living side by side, with the same sources of food-supply open to them, are found, on the examination of a limited number of stomachs, to present certain characteristic differences of food, so that the investigator can point out definite peculiarities of the food of each species, and finds these peculiarities reasonably constant, year after year, then we may say unquestionably, without going farther, that there is a fixity of food-habits in this group of birds which will allow us to reason from the data observed. This is especially true if the species are not mutually hostile, if they do not actually fight, so that a stronger or bolder species may exclude the weaker or more timid from certain situations.

Second, if there are any other habits of the species in which there does not seem to be any greater reason for invariableness than in those relating to the food, which are nevertheless found to be substantially unvarying, then we may, with considerable force, argue the probability of a like unvarying character in the habits of alimentation.

Respecting the first of these tests, you will see, when I sum up the food of the family now under consideration and bring the data respecting the various species into comparison with each other, that I have made out certain very well-marked specific differences of food, even among those eating at the same table, that the different species of this group, while agreeing in many particulars in food as they do in structure, present also certain peculiarities, so marked that I can usually determine the species by the contents of three or four stomachs.

For the second test we may properly use the nesting habit. There seems to be no more urgent reason why one species should select from the same store-house different materials for its nest from those used by another closely allied species of nearly the same size and similar general habits, and building in the same locality, than why each should use a similar fixed discrimination in selecting its food. Yet no expert, scarcely a school-boy even, will hesitate a moment between the nest of a robin and that of a cat-bird; and the descriptions of the two given in the books

are so different as to enable any novice to distinguish between them at a glance. In fact, a friend mentions, as I write, two birds whose nests are much more easily distinguished than the birds themselves.

Satisfactory as this argument seems, I do not wish to rest too much upon it, and I will content myself with concluding that there is a fair probability that the stomachs of these forty-one birds give us a correct general idea of the ordinary food of the robin under such conditions as have prevailed in this State during the last three years. When a species, or its nest, or its eggs, may be very well described from two or three specimens, I may reasonably express some confidence in conclusions based upon these forty-one stomachs.

I must, however, make one correction. In one important particular my conclusions may be unfair to the bird. I have taken no account of the food of the young; and the robin is said by many observers to feed its young largely on worms, larvæ and soft-bodied insects. Doubtless a good many earth-worms are taken in this way, but grubs, cut-worms and caterpillars are also said to be used.*

The experiments of Prof. Treadwell, of Cambridge, as to the voracity of young robins have been so often cited that I will only recall the fact that he was compelled to feed his young robins every day at least their own weight of insect-food, or its equivalent in flesh, to keep them from starving to death.

This species is not strictly migratory, but sometimes winters, in considerable numbers, as far north as the White Mountains in New Hampshire. I have not heard of its occurrence in winter in Central or Northern Illinois, as there is at that season no sufficient food to tempt it to brave our prairie winds. On the other hand, it is comparatively rare in Southern Illinois in summer, but abundant there in autumn and winter, so that as far as this State is concerned it is practically a migrant within our limits. In the latitude of Bloomington its advent depends on the forwardness of the season, but it usually appears not far from the first of March, and the last of the species are gone by October 15th or November 1st.

During the month of March the food of the two specimens I examined consisted almost wholly of grasshoppers and some diptera larvæ, pronounced by Prof. C. V. Riley to be those of a long-legged fly, *Bibis albipennis* (Say.), which feeds upon decaying vegetation. Sixty-seven per cent. of the food consisted of these larvæ, and twenty-four per cent. of the grasshoppers. This same larva was found by Prof. Jenks, now of Brown University, to constitute about nine-tenths of the food of the robins examined by him in Massachusetts in February and March, 1858, a fact which indicates a remarkable fixity of food-habits unchanged by

* The parents of the young mocking birds mentioned in the foot-note to p. 121, being allowed to feed their young for a time after the transfer of the nest to a cage, were observed to bring them at first grasshoppers and caterpillars, and a little later pieces of ripe tomato also. The pulp of water-melons, exposed as an experiment, they took with avidity and fed it to the young. It is possible that the amount of "soft food" fed to the young has been exaggerated.

twenty years of time and twelve hundred miles of territory. The grasshoppers were all of the genus *Tettigielia*, abundant in early spring, when other grasshoppers are rare.

While a few grasshoppers more or less may seem a matter of little moment, we should figure to ourselves the results sure to follow if birds were not to keep them down. Many of the services done us by birds are of this unobtrusive kind. They protect us so completely that we are not even aware of the threatened injury, and thus give them no credit for their aid. The only harm done by these birds in this month was the destruction of a few predaceous beetles and soldier-bugs, aggregating about two per cent. of their food.

In April eleven specimens were taken. The food in this month was much more varied, but consisted almost wholly of insects. The most important items were caterpillars, thirty-two per cent.; predaceous ground-beetles, twenty-three per cent.; and scavenger-beetles, twelve-and-one-half per cent.—these three elements thus constituting nearly seventy per cent. of the food. Minor items are, larvæ of *Bibio albipennis*, five per cent.; leaf-chafers, seven per cent.; curculios, three per cent.; æthoptera, six per cent.

An unexpected fact appears here, viz.: that these birds have apparently done very much more harm than good during this month, eating predaceous beetles which would probably have destroyed many more noxious insects than were found in their own stomachs. These beetles were of the genera *Amara*, *Geopinis*, *Agonoderus*, *Anisodactylus* and *Harpalus*, none suspected of doing any serious injury, although *Amara* is said to feed sometimes on vegetable substances. The importance of the caterpillar element should be noted, nearly one-third of the food being made up of it. A number of cut-worms and measuring-worms were recognized, and a few that were apparently Arctians. Both these and the predaceous beetles were eaten quite generally by the birds—the former by ten out of the eleven, the latter by eight, so that the large percentages were not due to the fact that one or two birds had accidentally stuffed themselves with these insects.

But four birds shot in May were examined, and these indicated one important change in the food, the diminution of the number of predaceous beetles and the apparent substitution therefor of adult crane-flies (*Tipulidæ*), which in this month are abundant in their winged form. Caterpillars were eaten in about the same numbers as before (thirty-three per cent.), but the *Carabidæ* are reduced to four per cent., while the crane-flies furnished twenty-four per cent. of the food. One bird had eaten a number of wire-worms and one had eaten one potato-beetle. We will not throw up our hats for the robin on this account, for if it takes forty-one robins to catch one potato-beetle, it would probably take the whole species to raise an acre of potatoes.

Seven per cent. of the food of these birds consisted of herbivorous thousand-legs (*Diplopoda*). Only the above-mentioned four per cent. of the food indicated any injury done. The falling off in the number of scavenger-beetles is also noticeable, these constituting, this month, only one per cent. of the food.

In June five specimens were taken. While we find the ratio of caterpillars about the same (twenty-nine per cent.), the eye runs wonderingly down the June column of the table, past the crane-flies and the predaceous beetles and the dung-beetles and the wire-worms and the curculios and the grasshoppers and the bugs and the spiders and the myriapods, encountering only empty spaces or the most insignificant figures, until one begins to think the birds must have lived on air or the beautiful June weather, reaching finally the very bottom of the list, when the sinister heading "fruits" is found, and opposite this are fifty-five of the missing units. Seventeen per cent. of the food was raspberries and thirty-eight per cent. cherries. Besides the above twenty-nine per cent. of caterpillars, these birds had eaten six per cent. of other injurious insects, making a total of thirty-five per cent. to their credit, against fifty-five per cent. of stolen fruit.

And here we come to the most difficult feature of this whole research.

How shall we balance the different elements of food against each other? Shall we simply measure bulk against bulk, subtracting the thirty-five per cent. of caterpillars, etc., from the fifty-five per cent. of raspberries and cherries, and say that these birds are to be charged with a balance of evil amounting to twenty per cent. of their food? That is to say, is a quart of caterpillars only the fair equivalent of a quart of cherries? Or, to put a more evident case as an example, suppose that the injury done had been the destruction of ichneumon parasites, should we use these percentages without modification, and balance a quart of ichneumons against a quart of caterpillars? The absurdity of this is evident. A quart of ichneumons would destroy bushels of caterpillars. Similarly, if not equally absurd, would be the conclusion that our bird is injurious because it has eaten more fruit than insects. A quart of cherries is not worth more than ten cents on the tree. Does any one suppose that a quart of average caterpillars would do no more than a dime's worth of damage in a summer season? Scatter a pint of canker-worms over an apple-tree, of leaf-rollers in a strawberry field, of green caterpillars on a maple, of army-worms in a meadow, and let them work until they "spin up," and see if a dime will mend the damages?

And then we must remember this most important fact, in this connection: that when a bird eats fruit the injury done stops right there, there are no accumulating consequences; but when it destroys a noxious insect, it checks the increase of the species, it destroys not only the one actual insect, but an indefinitely numerous host of potential ones. The benefit done is so much capital invested at an enormous rate of compound interest.

I believe that this one consideration will prove sufficient to settle the question with respect to many insectivorous birds; and it certainly indicates to my mind that, notwithstanding the apparent balance against them, our robins were very largely beneficial in June. This is especially evident when we recall the fact that in this month the robins chiefly raise their families, so that we have left out of account the vast amount of insect-food fed to their young. Indeed, the search for soft food which

the care of their fledglings is said to require may account for the small number of adult insects now destroyed. The old birds have, perhaps, simply swallowed, once in a while, a mouthful of the food they were gathering for their little ones.

This is the point, however, at which there is introduced into this calculation the element of uncertainty attaching to individual judgment and opinion. Up to this point results should be almost absolutely accurate and certain. Concerning the kinds of food in birds' stomachs and the relative amounts of each kind there is but little chance for error if the investigator is competent and careful. When we come to consider the relative values of different groups of insects, however, or of insects of various sorts on the one hand and certain fruits on the other, we have before us a problem not to be accurately determined in the present state of entomological science, and in fact not *accurately determinable*, no matter how full our knowledge of insect habits may become. While the fruits have a market price, insects are a class of property which has never been put upon the market, and whose nominal value, positive or negative, depends on the individual knowledge, judgment, opinion, prejudice or notion of the holder. In fact, scarcely a single species is so fully known, with regard to its habits, its distribution, its history, its numbers, its rate of increase, its natural enemies and the whole complex net-work of its relations, that even the most intelligent entomologist can more than guess as shrewdly as possible at its economical value stated in standard currency. The means I have taken to insure as nearly correct an idea of this difficult matter as I could have already been described to you; but the practical conclusion is that no bird should be condemned to death because of a *slight* percentage against him. A very *decided* preponderance, one way or the other, alone can justify a positive conclusion respecting the real value of a species.

Taking up the July record, we find the scale trembling in the balance. The caterpillars eaten by the fourteen birds studied in this month have fallen to three-and-one-half per cent. of their food, the injurious beetles to two per cent., the oëthoptera to four-and-one-half per cent., while six-and-one-half per cent. was predaceous beetles, and one per cent. spiders—seven-and-one-half per cent. of beneficial insects against ten per cent. of injurious ones—taking the insect-food alone. But a beneficial insect is far more beneficial than an injurious one is injurious, because each predaceous insect destroys, as a rule, a number of herbivorous ones, so that these fourteen robins undoubtedly did much more harm in destroying their seven-and-a-half per cent. of carnivorous beetles than they did good in eating their ten per cent. of plant-eaters; and when we reach the bottom of the table and find the paper black with the fruit percentages—raspberries, blackberries and currants running up a total of seventy-seven per cent. of the food—even the most devoted friend of the robin must admit that, if these fourteen were fair examples, the robin is a nuisance in July. If his insects were all injurious we could easily condone his offenses in the fruit-field, but his taste for Carabidæ condemns him.

It should be noted that eight of these birds were shot in and around gardens; but I do not think this an unfair ratio, as probably more than half the species are gathered in such situations at this time.

In August his case is somewhat more hopeful. Judging from the five specimens obtained in this month, he returns to his caterpillars (but also remembers his carabidæ), begins his autumn work on grasshoppers, and eats a diminished amount of fruit. Curculios and wire-worms were also eaten to some extent, but not enough to incline the balance very decidedly in favor of the birds. A small margin of profit may, perhaps, be ascribed to his operations in this month.

I found, on collecting the stomachs of these birds, that for one reason and another we had none taken in September and October, and consequently I can only surmise that during these months their habits gradually improve with the disappearance of the cherries, the picking of the grapes and the multiplication of the grasshoppers. Other observers report this to be the case, and my own notes make it seem likely.

Taking, now, the whole record for the six months from April to August inclusive, I find that seventy-eight per cent. of the food was insects and twenty-eight per cent. fruit, spiders and myriapods making the other two per cent. Twelve per cent. were caterpillars and seven per cent. *Harpalinæ*. I may overestimate the value of these predaceous beetles, but to my judgment these seven per cent. would have saved much more than the twelve per cent. of caterpillars would have destroyed.* Then we have six-and-one-half per cent. of injurious beetles (including two-and-one-half per cent. of curculios), eight per cent. of æthoptera and one-and-one-half per cent. of injurious myriapods—sixteen per cent. in all—to offset twenty-eight per cent. of fruit, the other elements about balancing each other. I therefore conclude that these forty-one robins taken together had certainly done, just previous to the time of their demise, fully as much harm as good, as far as we can judge from the contents of their stomachs. Farther than this I do not intend to go at present, except to recall the mitigating considerations that I have already mentioned. Luckily I am not required to render positive judgment until I am satisfied with the evidence.

In fact, the case is a much more difficult one than I supposed when I collected this material, as there has been no suspicion hitherto that the robin ate any unusual number of *Harpalinæ*, previous investigations of this subject not having been definite and detailed enough to detect this fact. It is his apparent preference for these predaceous beetles which threatens to turn the scale against him, and so far complicates the question that no positive conclusion can be reached this season. Temporarily we

*Although most of these caterpillars were indeterminable, by far the larger part of them were feeding on endogenous foliage—presumably grass—a fact easily demonstrated by the presence, in the bird's stomach, of the peculiar similar fragments of leaves escaped from the intestines of the half-digested caterpillars. The appearance of these fragments is very characteristic, and is alone enough to indicate the presence of caterpillars in the food.

may place the robin in the list of moderately useful birds, using every opportunity to increase our knowledge, and for the time being leaving him practically to himself. I propose to examine next season at least a hundred stomachs of the species, to make all the field observations possible, and to learn what I can of the food of the young.

II. THE CAT-BIRD (*Mimus carolinensis*, L.)

This bird, scarcely less abundant than the robin, arrives a little later and makes a rather shorter stay, disappearing from this latitude usually in September. It also occupies a larger territory in the State in mid-summer than the robin, being not at all uncommon in extreme Southern Illinois in July and August. I do not know that it ever winters northward. Its habits and habitat are so like those of the robin that one might reasonably anticipate that, respecting their food, both could be treated as one species; but we shall see proof that there are specific food-characteristics to separate them.

How indefinite and uncertain is our knowledge of the food of this especially notorious species (and a *portion* of birds in general) may be seen by comparing my notes with the statement made^g in the recent and elaborate work of Baird, Brewer and Ridgway:

“The food of the cat-bird is almost exclusively the larvæ of the larger insects. For these it searches both among the bushes and the fallen leaves, as well as the furrows of newly-plowed fields and cultivated gardens. The benefit it thus confers upon the farmer and upon the horticulturist is very great, and can hardly be overestimated.”

My observations of this bird cover the three months of May, June and July, eighteen stomachs having been examined during the first month (one taken April 30th being included in these), nine in the second and ten in the third.

In the stomachs taken in May I found nothing but insects, myriapods and spiders. The principal elements at this time were ants, nineteen per cent.; caterpillars, sixteen per cent.; adult crane-flies, twenty-three per cent., and beetles, nineteen per cent., including seven per cent. of *carabidæ* and six per cent. of *curculionidæ*. The latter were chiefly of the two species *Ithycerus noveboracensis* and *Epicærus vadousus*, injuring fruit-trees by eating the young leaves and gnawing the twigs, but not attacking the fruit. Five per cent. of the food was *cæthoptera*, including one white cricket (*Orcanthus*), four per cent. spiders, and nine per cent. vegetarian thousand-legs (*Diplopoda*).

A large number of the eggs of crane-flies (kindly determined for me by Prof. C. V. Riley) were found in the stomachs of these birds. As they were always found associated with fragments of the adult insects, there is no proof that the cat-bird takes these eggs separately. During this month, notwithstanding the number of *carabidæ* taken, there remains apparently a considerable margin of benefit in favor of the birds.

In June the insect average falls to sixty-four per cent. as against eighty-seven per cent. of the previous month. This loss is, unfortunately,

most evident in the neutral or injurious elements, and amounts to little or nothing in the beneficial—ants being now but ten per cent. of the food, caterpillars eleven per cent. and crane-flies thirteen per cent.; while the carabidæ keep up to six per cent., curculios are reduced to two per cent., spiders and myriapods to one and four per cent. These deficiencies are, of course, made up by the appearance of small-fruits in the diet, averaging twenty per cent. of currants and raspberries. These figures, strictly construed, would indicate a balance against the bird; and, taken by themselves, I don't see how they can even be forced into support of the theory that the cat-bird is any peculiar blessing to the fruit-grower at this time.

In July the bird seems to become thoroughly demoralized. It makes the heart of a friend sick within him to scan the columns of averages. The ants drop to two per cent. of the food, the caterpillars to three per cent., the carabidæ rise to ten per cent., injurious beetles are only one per cent., æthoptera but one per cent., spiders and thousand-legs stand each at four per cent., and small-fruits climb to sixty-three per cent. If all cat-birds ate like this at all seasons of the year we should certainly class them with curculios and potato-beetles, as most grievous pests. As far as these ten birds indicate anything, they seem to me to indicate that the cat-bird in July is, to say the best of him, a blessing pretty thoroughly disguised.

Taking the whole three months together, adjusting and comparing the values of his ten per cent. of ants, ten per cent. of caterpillars, twelve per cent. of crane-flies, eight per cent. of carabidæ, four per cent. of leaf-chafers, three per cent. of curculios, two per cent. of æthoptera, three per cent. of spiders and six per cent. of myriapods, I would estimate that he has, at most, an unexpended balance of about seven per cent. of injurious insects with which to pay for twenty-seven per cent. of fruit.

THE BROWN THRUSH (*Harporhynchus rufus*, Cab.)

The brown thrush is another bird too common to require description. Although it is reported by Baird, Brewer and Ridgway to reside and breed all over the United States east of the Rocky Mountains, it is in this State, like the robin and cat-bird, practically a strict migrant. Mr. Nelson reports its occasional occurrence in Southern Illinois in mid-summer. It reaches Bloomington about as early as the cat-bird, and departs, I think, a little earlier. It is a shyer bird than either of the preceding, and ordinarily frequents the garden less. In the fruit season, however, it partially masters its bashfulness, but even then it is more difficult to detect in the act of thievery than the cat-bird or the robin. The latter has no more conscience than a baby, and will slip a blackberry down his throat, under your very eye, with a touching air of simple innocence; but the brown thrush is sly enough—so sly that I have not found any fruit-grower who could positively assert his guilt. I have had no trouble in establishing his habits, however, and find him no more honest than his fellows. (If I were reading this paper to *birds* I would

not use these words "thievery" and "guilt;" but I am talking, to-night, the language of horticulture).

My observations on this species reveal one novel and unexpected fact regarding its food. While watching its operations in the blackberry field I was struck by the shiftless and dispirited air of the bird, so different from what its inspiring song would lead one to expect, and I thought, "There is a bird which has something to be ashamed of." That it ate blackberries was no sin, according to the code of the thrushes, and when I found large amounts of corn in its stomach, this, although a surprising thing for a thrush, did not strike me as especially significant until I noticed that the grains were always in quite small fragments, and almost always associated with various species of scavenger-beetles. Then I saw, what the appearance and odor of the contents of the stomach often confirmed, that this bird, like the flicker among woodpeckers, was by some means being crowded away from the legitimate life of its family and had fallen so low as to content itself with morsels picked from the excrements of other animals. Even carrion-beetles were not too strong for its palate; and in April these with their larvæ formed eight per cent. of its food, while the dung-beetles made four per cent., and fragments of grain (chiefly corn) twenty-four per cent. Thirty-six per cent. of its food was therefore obtained from these disgusting sources; and yet how silver-clear, how bugle-like in its varied and enlivening cadence is the morning song it pipes from the tallest tree-top by the road side! Perhaps we should respect the philosophy of the bird which enables it to carry so light a heart and cherish so successfully its gift of song in the midst of a life loaded with the most sordid care; or admire the subtle alchemy of an organism which can transmute these base materials into the pure gold of delightful music.

Twenty-eight specimens of this species were examined—eight in April, four in May, nine in June and seven in July.

In April, besides the elements mentioned, there appeared six per cent. of ants, only four per cent. of caterpillars, four per cent. of carabidæ, five per cent. of curculios, eight per cent. of thousand-legs and fifteen per cent. of *Euryomia inda* (a fruit-eating cetonian beetle, which comes out again in the fall). Of *hemiptera* and *athoptera* there were but trifling traces, and none whatever of the crane-flies or the larvæ of *Bibio*, which formed so large a part of the early food of the robin and cat-bird.

In May the food was of about the same character, the scavenger-beetles rising, however, to fifteen per cent. of the whole and the carabidæ to nine per cent.

In June a large part of the food, seventeen per cent., consisted of ants. This large percentage is, perhaps, misleading, as it is chiefly due to the fact that two of the birds taken had eaten an inordinate number of them (sixty and seventy-five per cent), while the others had eaten but very few. Nine per cent. of the food had been grasshoppers, and one per cent. Buprestidæ (boring-beetles), the only case in which I have encountered this family of coleoptera in a thrush's stomach. Caterpillars formed only one per cent. of the food in this month, but

scales of adult lepidoptera appeared in the stomachs of two of the nine birds. The dung-beetles and grain constituted twenty-two per cent. of all these birds had eaten, and strawberries and raspberries eighteen per cent.

In July the average of ants fell again, this time to one per cent., while caterpillars rise to thirteen per cent., one bird having filled itself with them. Carabidæ remain at five per cent., three per cent. of spring-beetles occur, and five per cent. of soldier-bugs. The scavenger insects and fragments of corn disappear, to be replaced by sixty-two per cent. of raspberries and blackberries. Minor details of the food can be learned by reference to the tables.

Turning now to the economical value of this bird, so far as it can be supposed to be indicated by the stomachs of these twenty-eight individuals, I conclude that in April it gains a credit of about twenty-two per cent.; that in May, chiefly through the excess of predaceous beetles, this drops to about six per cent.; that in June it falls away to zero, and in July to minus thirty per cent., thus just about wiping out the credits of the previous months. It is scarcely likely that the brown thrush so far reforms its habits in the grape and apple months as to favorably affect its record for the year. Subject, therefore, to the many reservations I have made respecting the previous species, I should say that the *ordinary* services of this bird do not entitle it to especial protection. What its *extraordinary* services may be is an untouched question which can only be solved by studying its food under extraordinary circumstances. That we should be content with a songster of such charming qualities and one so generous with his melody, as long as he barely pays his way, is a suggestion which will immediately occur to many, but one which I have no present business with in this research.

THE WOOD THRUSH (*Turdus mustelinus*, Gm.)

But eleven individuals of this species were examined: two taken in April, four in May, one in June, three in July and one in September—so few that I will make no attempt to follow the food through the season month by month, but will give only the general results.

These indicate that the food-habits of this bird have few marked peculiarities, but chiefly share the features of those of several of the other species. Eating nearly as many ants as the cat-bird, as many caterpillars as the robin and hermit thrush, it falls below all the other species in the ratio of predaceous beetles, runs above them all in wire-worms and thousand-legs (approached, however, in the latter particular, by the hermit thrush), but eats scarcely any scavenger-beetles. Only nineteen per cent. of its food was fruit, and all but seven per cent. was wild. Although the specimens were too few positively to settle anything, the bird certainly promises well, and I will take pains to learn more about it another year. If its habits should not change with increasing numbers, it would apparently well repay generous encouragement. At present, counting all the wild fruits as tame, I should say that this bird exhibits a balance of about twenty-five per cent. on the right side of its account.

THE HERMIT THRUSH (*Turdus pallasi*, Cab.)

The hermit thrush is strictly a migrant, reported by Mr. Ridgway as a rare winter resident in Southern Illinois, but otherwise appearing in the State only during its passage to and fro. Considering the fact, however, that all these birds pass slowly the whole length of the State, merely keeping pace with the advancing and retreating seasons, and also that the species is a very abundant one in the migrating season, it will be seen that it has great economical significance. There is reason to suppose that these migrants, in traveling north and south, follow, year after year, about the same route—do not vary, that is, far to the east or west; consequently, although we can do nothing to encourage their breeding (since they nest beyond our limits), yet, occupying as we do a State that lies in five-and-one-half degrees of latitude, we can do much to protect the species in its wanderings, or could almost entirely exterminate that part of it passing over our territory.

Of this species we took eighteen specimens, sixteen in April and two in May. I have not thought it worth while to separate these, and consequently give them together. Eighty-seven per cent. of the food was insects proper, four per cent. arachnida, and nine per cent. herbivorous myriapods. More in detail, thirteen per cent. was ants, eighteen per cent. lepidoptera, twelve per cent. carabidæ (including *Dischirius globulosus*, *Platynus*, *Evarthrus*, *Pterostichus*, *Amara*, *Anisodactylus*, *Bradycellus* and *Stenolophus*), five per cent. dung-beetles, two per cent. curculios, two per cent. plant-beetles, nine per cent. (including three per cent. Reduviidæ), eight per cent. grasshoppers and a single lace-wing. A few of the caterpillars were measuring-worms.

The number of carabidæ (twelve per cent. of the food and eaten by two-thirds of the birds) is a very unfortunate feature, as this, with his other depredations, compels us to reckon the account, temporarily at least, so largely to the discredit of this bird as to count him a public enemy. I find that all but four of these birds were shot in extreme Northern Illinois, at Waukegan, Evanston and Blue Island, and that, for some reason or another, probably accidental, the carabidæ were nearly all eaten by these northern specimens.

THE ALICE THRUSH (*Turdus alicie*, Bd.)

The Alice thrush is a bird of frequent occurrence during the migrations. I have eight specimens shot in May, but none from the fall migration. The prominent food characters, as indicated by these specimens, are the presence of seven per cent. of mollusks (small snails and periwinkles), an excessive number of ants (forty-two per cent. represented in the food of every bird), respectable numbers of caterpillars and crane-flies (thirteen and eight per cent. respectively), and the small ratio of predaceous beetles, only two per cent. One individual had filled itself with scavenger-beetles. All had eaten small curculios, but in trifling numbers, the whole amounting to two per cent. of the food.

Consequently little can be alleged to the discredit of this bird, while the figures given speak strongly in its praise. It apparently well deserves what little protection and encouragement we can give it during its brief stay. It breeds far to the north (rare summer stragglers occurring in Northern Illinois, according to Mr. E. W. Wilson), and probably winters wholly beyond our limits. By Dr. Cones this is regarded merely as a variety of Swainson's thrush.

SWAINSON'S THRUSH (*Turdus Swainsoni*, Cab.)

Swainson's thrush is another migrant, of which I have too few specimens for generalization. I have carefully studied six specimens, one taken in April and five in May. These indicate a general resemblance to the food of its near ally (the Alice thrush, just mentioned), but present differences which I give for what they are worth.

There were no mollusks in these stomachs, but many crane-flies (twenty-two per cent.), very many ants (twenty-eight per cent.), too many Harpalidæ (five per cent.), several curculios, and in one stomach a mass of short-horned borers, *Scolytus muticus*, Say.

A glance at a single stomach shot in Kentucky, in August, showed that this bird, probably like all the other migrants of this family, takes wild grapes at least on its return trip from the north.

General Discussion and Summary.—We now come to the last and most interesting step of this investigation in its present form, to a comparison of the different species with each other, and a summary of results for the family as a whole. To this end, I have prepared two tables—one elaborate, giving for each species the totals of the food in all its details, and another brief and compact, presenting the totals only of the most important elements, in which the species have been found to vary most. The full discussion of the former table would inordinately lengthen this paper, and would have little value at present, and I will confine myself to the latter.

We note at once the fact that there are few differences in the *kinds* of food taken by the different species of this family, the occurrence of fragments of grain in the stomachs of the brown thrushes being almost the only notable exception in this respect. When we examine the *percentages*, however, we find peculiarities so numerous and definite that we are able easily to construct a series of specific descriptions of the food almost as well marked as the descriptions of the species themselves. I have also prepared, more as a curiosity than anything else, an analytical table of the species, based upon the food characters, from which I find, on trial, that I can determine the species of any group of half-a-dozen bottles now in our collection. Some of these differences will, probably, disappear (many of them, perhaps) when more specimens are studied (a kind of experience not unknown even to those who describe species); but these tables serve to exhibit, at a glance, the present state of the research.

Running down the column given to the robin, we find but a trace of mollusks, few ants, many caterpillars, crane-flies and predaceous beetles,

few scavenger-beetles, not many hemiptera, many cæthoptera, few thousand-legs, much fruit and no grain. We see that the cat-bird substantially agrees with the robin with respect to mollusks, crane-flies, predaceous beetles, scavenger-beetles, hemiptera, cæthoptera, fruits and grain, but differs by eating many ants, fewer caterpillars and many thousand-legs.

The *brown thrush* and robin agree respecting mollusks, predaceous beetles, hemiptera, cæthoptera, thousand-legs and fruit, but differ notably in the ratios of ants, caterpillars, crane-flies, scavenger-beetles and grain. The brown thrush and the cat-bird, again, vie with each other in their pursuit of ants, predaceous beetles and cæthoptera, and in their love of fruit, and seem to visit mollusks and hemiptera with an equal neglect, but diverge sensibly in their views regarding crane-flies, scavenger-beetles and grain.

The wood thrush is distinguished from the first two chiefly by the much larger number of crane-flies and thousand-legs; and from the brown thrush by the lack of scavenger-beetles and grain. Its apparent choice of mollusks is also remarkable.

The records of the migrants can fairly be compared with those of the residents only during the months when the migrants are here.

The hermit thrush is especially notable as compared with the robin in May (the month when our hermit thrushes were shot) for the large number of ants (thirteen to one), the smaller number of caterpillars (seventeen to thirty-two), the total absence of crane-flies (the robin eating twenty-four per cent. of these in May), the immense number of carabidæ (twelve to four), the predominance of scavenger-beetles (five to one), of hemiptera (nine to nothing), and of cæthoptera (ten to nothing). The ratios of crane-flies, carabidæ and hemiptera are its principal points of distinction from the cat-bird, the latter eating of these in May twenty-three per cent., seven per cent. and none, respectively. With the brown thrush, in this month, it contrasts at every point, these two species apparently complementing each other as nicely as Jack Spratt and his wife.

From the small number of the other migrants examined it is hardly worth while to carry the comparison farther. Enough has been done, in my opinion, to establish a strong probability that allied species differ materially in their food under similar or identical conditions; that, with many tastes in common, each has its peculiarities. All traveling in the same direction, each tends towards a separate point. The relation of these food differences to specific and other distinctions is a tempting and intensely interesting subject, but one which we are not by any means ready to enter upon.

Considering the family as a unit, I have worked out a few general averages showing the main outlines of the effect produced by all the thrushes taken together, supposing that the numbers of the different species taken by us represent approximately the comparative abundance of those species. As no special pains was taken to get one species more than another, and as more of them are specially sought by taxidermists, this is probably a fair presumption.

No thorough discussion of this sort can be attempted, since I have studied no other family with equal care, and can consequently make scarcely any comparisons. I will, therefore, content myself with a few general statements. From the large number of individuals here taken into account, the conclusions given are much less likely to be disturbed hereafter than those relating to species.

The food of the family, taken as a whole, I find to consist of insects, seventy-three per cent.; myriapods, five per cent.; and fruits, twenty per cent.; the remaining two per cent. consisting of mollusks, spiders, etc. The most important insect elements are ants, nine per cent.; caterpillars, fourteen per cent.; carabidæ, seven per cent.; curculios, two-and-one-fourth per cent.; other injurious beetles, six per cent.; and oethoptera, five per cent. One crude comparison of these birds with the others studied is worth making, as an additional evidence that the thrushes are inordinately destructive to carabidæ. Of the one hundred and forty-nine thrushes examined, seventy-one had eaten carabidæ (nearly forty-eight per cent.), while of one hundred and ninety-four other insect-eating birds studied only nine had eaten these predaceous beetles—less than five per cent.

I confess to you, gentlemen, that, taking these figures as our guide, I am unable, with my present knowledge of economical entomology, to attach any great economical value to the Thrush Family. Please notice, however, that I give you this opinion merely as the point towards which my studies are now tending, and not as by any means a final conclusion. It will take a good deal more of tedious and difficult labor on this subject to give any one the right to use a positive "yes" or "no."

Most of all we must learn what these birds do in great emergencies, when the insect hosts arise against us in immense rebellion, and threaten the whole wealth and business of the State. We know that this standing army of birds costs us something in time of peace. We have just learned that it is given to lawless and murderous forays across the border, plundering our own allies mercilessly and weakening them for our defense; but we must not, therefore, commit the folly of condemning our soldiery until we know how they behave in time of war. Doubtless we could well afford them better rations from our fruit-fields if we could repress their foraging on our friends; and, possibly, we may be able finally to enlist a better disciplined army in our service. We may find it worth while to colonize some of the birds of Europe as we do its fishes. But it is not impossible that we may, at some future time, find these thrushes banded together in an invulnerable phalanx for the protection of our farms and gardens against an otherwise overwhelming horde of insects. I would, in short, treat this question with careful conservatism, remembering that he who disturbs the delicate balance of Nature's adjustments is certain to produce many and far-reaching effects which he cannot possibly foresee; and that we should, therefore, venture to assume her prerogative only when the evident good in prospect is sufficient certainly to compensate for the possible evil.

APPENDIX.

Details of the Food.—In presenting the data upon which the foregoing conclusions are based, two methods were available—either to expand and write out the memoranda for each specimen, printing the whole mass, and leaving each to gather such general ideas as he could by reading; or else to throw all the facts into tabular form, showing all the details for each species, together with averages, totals and summaries of all degrees of comprehensiveness, so arranged as to enable the reader to bring every statement made into ready comparison with the facts upon which it rests. The latter method was adopted, and the following tables are the result.

It will be seen that a separate table has been given for each species, and that all the totals for the family are collected in two additional tables—one comparing the records of the species for the whole season, and the other comparing the records of the whole family in different months. Although these tables are unnecessarily elaborate for the matter here presented, it was thought best to adopt, in the beginning, a form which could be used throughout the investigation, however far it may be carried.

Explanation of the Tables.—At the left of each table for a species is a list of all the elements of the food determined, arranged in the form of a synopsis of their scientific classification. Against each of these names appear, in the columns to the right, under the headings for each month, two numbers, the lower of which indicates the number of birds in which the given food-element was found; and the upper the ratio of the amount of this element to the whole amount of food taken by all the birds of the species examined for that month. For example, in the exhibit of the food of the robin, we find in the column for April, against the name *Harpalina*, the two numbers 8 and .23. The lower of these indicates that of the eleven robins examined for this month (see head of column) eight had eaten *Harpalina*. The upper figures (.23) express the ratio of the mass of these *Harpalina* to the whole mass of the food of the eleven robins; *i. e.* counting the latter one hundred per cent., the former will be twenty-three per cent.

These ratios were obtained in the following manner: After a minute examination of the contents of each stomach, a careful estimate was made of the percentage of each element to the whole of the food in the stomach, the material being usually reviewed for the purpose. In summing up for the month the percentages of each element found in all the stomachs were added, and then divided by the whole number of birds taken in that month. The averages for the seasons were found by adding these monthly ratios and dividing by the whole number of months represented by specimens.

A more obvious method of computing the season averages would have been to add the individual ratios for all the birds, and divide by the total number of the latter; and, if the same number of birds had been examined for each month, the result would have been the same as now; but, as many more birds were examined in some months than in others, the effect would have been to give undue weight to the food-record of these months. The column of totals and the column of ratios at the extreme right of the tables relate, of course, to the season as a whole.

The proximate accuracy of these estimates was frequently verified by repeating them, the variations being too slight appreciably to affect conclusions.

Although the birds studied were shot during several years, no account was taken of this fact in discussing results. The number of specimens was too small and their seasonal distribution too irregular to permit any comparison between the records of successive years. For similar reasons, no attempt has been made to compare the food of the same species in different localities. The figures given are consequently to be taken as the average results for several years and for the northern half of the State in general. All reasonable care has been taken to exclude from these tables everything but positive identifications, and a much larger number of probable determinations might have been added. Many specimens, not identifiable at sight, in their mutilated condition, have been laid aside for want of time. The great mass of the matter is certainly not positively recognizable as to species, by any one. A long list of specific names would be, in my opinion, sufficient ground for distrust of the honesty or competence of the investigator. Many additional names will undoubtedly eventually be added, especially among the ants, caterpillars and curculios, few of which I have had time to attempt.

TURDUS MIGRATORIUS, L. (*Robin.*)

	March.	April.	May.	June.	July.	August.	TOTAL.	Ratio of each Element to whole of Food.
Number of Specimens Examined.	2	11	4	5	14	5	41	
KINDS OF FOOD.	Number and Ratios of Specimens in which each Element of Food was found.							
I. MOLLUSCA.....	.01							
Univalve.....	1						1	
.....	1						1	
I. INSECTA.....								
Undetermined.....	.06	.01	.01		.04		.03	
.....	2	1	1	1	1	7		
Imagos.....					1		1	
Larvæ.....		.01				.04	.01	
.....		1				1	2	
Pupæ.....	.06						.01	
.....	2				1		3	
Raptatorial.....			.01					
.....			1				1	
1. <i>Hymenoptera</i>.....	.01	.03	.01	.01			.01	
.....	2	2	3	2	12			
Undetermined.....					1			
a. Apidæ.....								
.....		1						
b. Formicidæ.....	.01	.03	.01	.01			.01	
.....	2	2	3	2	12			
c. Ichneumonidæ.....								
.....					1		1	
2. <i>Lepidoptera</i> (Larvæ).....	.32	.32	.29	.04	.12		.22	
.....	10	4	4	3	2	18		
Undetermined.....	.22	.13	.20	.04	.12		.12	
.....	8	3	3	3	2	19		
a. Bombycidæ.....	.03							
.....	3						3	
Arctiinæ.....	.03							
.....	3						3	
b. Noctuidæ.....	.19	.09						
.....	1	1					2	
Agrotis.....	.19	.09						
.....	1	1					2	
c. Phalænidæ.....	.07						.01	
.....	1						1	
3. <i>Diptera</i>.....	.67	.05	.31	.01	.01		.18	
.....	4	1	3	1	3	12		
Undetermined.....	.03						.01	
.....	2		1	2		5		

TURDUS MIGRATORIUS—*continued.*

KINDS OF FOOD.	March.	April.	May.	June.	July.	August.	TOTAL.	Ratio.
	Larvæ.....	.05	.070102
<i>a.</i> Tipulidæ.....	1	1	.....	1	.....	3	.....	.....
	.....	.24	.....	.....	.....	.....	.....	.04
	.....	2	.....	.....	.....	2	.....	.....
<i>b.</i> Bibionidæ.....	.67	.....	.....	.....	.....	.....	.....	.11
	2	.....	.....	.....	.....	2	.....	.....
<i>Bibio albipennis</i> , Say. (Larvæ).....	.67	.....	.....	.....	.....	.....	.....	.11
	2	.....	.....	.....	.....	2	.....	.....
4. <i>Coleoptera</i>.....	.....	.....	.....	.....	.....	.....	.....	.19
	2	11	3	4	6	4	28	.....
Undetermined.....	.05	.....	.....	.....	.....	.....	.....	.01
	1	.....	.....	.....	2	3	.....	.....
Larvæ.....	.....	.....	.....	.....	.....	.01	.....	.....
	.....	.....	.....	1	.....	1	2	.....
<i>a.</i> Carabidæ.....	.06	.23	.04	.....	.06	.06	.....	.07
	1	8	2	.....	3	3	17	.....
Undetermined.....	.....	.....	.....	.....	.....	.....	.....	.....
	.....	.....	.....	1	.....	1	.....	.....
Larvæ.....	.....	.02	.....	.....	.....	.....	.....	.....
	.....	1	.....	.....	.....	1	.....	.....
Harpalinæ.....	.06	.23	.02	.....	.06	.06	.....	.06
	1	8	1	.....	2	3	15	.....
Undetermined.....	.....	.12	.01	.....	.02	.06	.....	.04
	1	5	1	.....	2	2	11	.....
Larvæ.....	.01	.01	.....	.....	.01	.....	.....	.....
	1	2	.....	.....	2	.....	5	.....
Evarthrus.....	.....	.....	.....	.....	.02	.....	.....	.....
	.....	.....	.....	.....	1	.....	1	.....
Pterostichus.....	.....	.....	.....	.....	.....	.....	.....	.....
	.....	.....	.....	.....	1	.....	1	.....
Amara.....	.01	.....	.....	.....	.....	.....	.....	.....
	1	.....	.....	.....	.....	.....	1	.....
Geopinus incassatus, Dej.....	.05	.....	.....	.....	.....	.....	.....	.01
	1	.....	.....	.....	.....	.....	1	.....
Agonoderus pallipes, Fab.....	.....	.....	.....	.....	.....	.....	.....	.....
	.....	.....	.....	1	1	2	.....	.....
Anisodactylus, sp. ?.....	.....	.....	.....	.....	.01	.....	.....	.....
	.....	.....	.....	.....	1	.....	1	.....
Anisodactylus baltimorensis, Say.....	.02	.....	.....	.....	.....	.....	.....	.....
	2	.....	.....	.....	.....	.....	2	.....
Harpalus.....	.03	.01	.....	.....	.....	.....	.....	.01
	2	1	.....	.....	.....	.....	3	.....
<i>b.</i> Histeridæ.....	.01	.....	.....	.....	.01	.....	.....	.....
	2	.....	.....	.....	1	3	.....	.....
Undetermined.....	.....	.....	.....	.....	.01	.....	.....	.....
	1	.....	.....	.....	1	2	.....	.....
Dendrophilus.....	.....	.....	.....	.....	.....	.....	.....	.....
	1	.....	.....	.....	.....	.....	1	.....
<i>c.</i> Copridæ (Onthophagus).....	.....	.....	.01	.....	.01	.....	.....	.....
	.....	.....	1	.....	1	2	.....	.....

TURDUS MIGRATORIUS—*continued.*

KINDS OF FOOD.	March.	April.	May.	June.	July.	August.	TOTAL.	Ratios.
d. Geotrupidæ (Bolboceras).....				.02				
e. Aphodiidæ .....		.12		.01				.02
Undetermined .....		.01						
Aphodius inquinatus, Hbst.....		.02						
Aphodius fimetarius, Linn.....		.09		.01				.02
f. Melolonthidæ.....		.07	.03					.02
Phyllophaga .....		.07						.01
g. Elateridæ .....			.14	.02	.01	.02		.03
Undetermined.....			.01					
Larvæ .....			.13	.01		.02		.03
Melanotus.....				.01	.01			
Monocrepidius								
h. Curculionidæ.....		.03	.03	.01	.01	.06		.03
Undetermined.....		.02	.03	.01	.01	.06		.02
Epicærus vadosus, Say.....		.01						
i. Chrysomelidæ.....			.03	.01				.01
Undetermined.....			.01					
Gastrophysa polygoni, Linn.....								
Chrysomela 10-lineata, Say.....			.02					
5. Hemiptera (Heteroptera).....	.01	.02						.04
Undetermined.....		.1	.4	.1		.2	.2	.10
Nepa.....							.19	.03
a. Reduviidæ.....						.01		
b. Corisiæ.....						.1	.1	.2
c. Cydnidæ.....	.01	.01						
Undetermined.....		.1	.2		.1		.4	

TURDUS MIGRATORIUS—*continued*.

KINDS OF FOOD.	March.	April.	May.	June.	July.	August.	TOTAL.	Ratios.
Hymenarcys nervosa, Say.....	.01	1					1	
6. Orthoptera.....	.23	.04		.02	.04	.16		.08
Undetermined.....	2	4		1	2	2	11	
Eggs.....		.01					1	
Gryllus abbreviatus, Serv.....					1		1	
Acrididæ.....	.23	.03		.02	.01	.16		.07
Undetermined.....	2	3		1	2	2	10	
Tettigidea, sp.?.....		1					5	.03
Tettigidea lateralis, Say.....	.23			.02				.04
.....	2	1		1			3	
.....		.02					1	
II. ARACHNIDA (Araneidæ), .....	.01				.01			
.....	2				4		6	
III. MYRIAPODA.....	.03	.07						.02
Chilopoda (Geophilus).....	2	3					5	
Chilognatha.....	.02						1	
Polydesmus serratus, Say.....	.01	.07					4	.01
Iulidæ.....	1	3						
Undetermined.....		.03					1	
Iulus.....		1					1	
.....	.01	.05					3	.01
.....	1	2						
.....		.01					1	
.....	1							
.....		.05					2	.01
.....	2						2	
IV. FRUIT.....				.55	.79	.31		.28
Blackberries.....				5	20	3	28	.09
Raspberries.....					.17	.05		.04
Cherries.....				2	1		3	.11
Currants.....					38		.26	.03
Grapes.....				3		2	5	
Undetermined.....					.17			.01
.....					6		6	
.....						.05		.01
.....						1	1	
.....						1	1	
V. VEGETATION (Undetermined).....				.02				
.....				1			1	

MIMUS CAROLINENSIS, LINN. (*Cat-Bird*.)

	May.	June.	July.	TOTAL.	Ratio of each Element to whole of Food.
Number of Specimens Examined.	18	9	10	37	
KINDS OF FOOD.	Ratios and Number of Specimens in which each Element of Food was found.				
I. TOAD.....		.01			
		1		1	
II. INSECTA.....	.87	.64	.18		.56
	18	9	10	37	
Undetermined.....			1	1	
Pupæ.....					
	1			1	
1. <i>Hymenoptera</i>.....	.22	.13	.04		.13
	16	6	7	29	
Undetermined.....				3	
	1	1	1	3	
Fossorial.....	.01				
	1			1	
a. Crabronidæ.....		.01			
	1	1	1	3	
b. Formicidæ.....	.19	.10	.02		.10
	16	5	4	25	
c. Tenthredinidæ.....	.03	.01	.02		.02
	2	1	1	4	
Euura.....					
	1			1	
2. <i>Lepidoptera</i> (Larvæ).....	.16	.11	.03		.10
	10	5	1	16	
Undetermined.....	.16	.11	.03		.10
	10	5	1	16	
3. <i>Diptera</i>.....	.24	.14			.13
	7	4		11	
a. Tipulidæ.....	.23	.13			.12
	6	3		9	
Eggs.....	.01	.01			.01
	3	1		4	
b. Bibionidæ.....					
		1		1	
c. Muscidæ.....	.01				
	1			1	
4. <i>Coleoptera</i>.....	.19	.26	.13		.19
	13	9	8	30	
Undetermined.....	.01				
	2	1	1	3	
Larvæ.....					
			1	1	
a. Cincindelidæ.....					
			1	1	

MIMUS CAROLINENSIS—*continued.*

KINDS OF FOOD.	May.	June.	July.	TOTAL.	Ratios
<i>Circindela lecontei</i> , Hald.			1	1	
<i>b. Carabidæ</i>.....	.07	.06	.10		.08
6	3	6	15		
Undetermined. ....	.01	.01			.01
2	1		3		
Larvæ.....					
1	1	1	3		
Harpatinae (Undetermined).....	.05		.01		.02
3		1	4		
Platynus.....					
1			1		
Evarthrus. ....			.02		.01
2		2			
Pterostichus sayi, Brulle .....			.01		
1		1			
Agonoderus.....		.04			.01
1	1		1		
Anisodactylus baltimorensis, Say.....			.01		
1		1			
Harpalus.....		.01	.05		.02
1	1	2	3		
<i>c. Dytiscidæ</i>					
2			2		
Larvæ.....					
1			1		
Colymbetes biguttulus, Lec.....					
1			1		
<i>d. Hydrophilidæ</i>.....	.03				.01
2			2		
Larvæ.....	.03				.01
1			1		
Hydrobius.....					
1			1		
<i>e. Staphylinidæ</i>					
1			1		
<i>f. Histeridæ</i>					
1			1		
<i>g. Phalacridæ (Olibru-)</i>					
1			1		
<i>h. Nitidulidæ</i>					
1	1		2		
Omosita colon, Linn.....					
1			1		
Pityophagus 4-guttatus, Fab.....					
1	1		1		
<i>i. Heteroceridæ (Heterocerus)</i>					
1			1		
<i>j. Geotrupidæ</i>.....		.04			.01
1	1		1		

MIMUS CAROLINENSIS—*continued.*

KINDS OF FOOD.	May.	June.	July.	TOTAL.	Ratios.
<i>Geotrupes splendidus</i> , Fab.....		.04			.01
<i>k. Copridæ</i> (<i>Onthophagus</i>).....		1		1	
<i>l. Aphodiidæ</i> (<i>Aphodius</i>).....		.01			
		1		1	
<i>m. Melolonthidæ</i>.....		.11			.04
		4		4	
Undetermined.....		.10			.03
		3		3	
Phyllophaga.....		.01			
		1		1	
<i>n. Lampyridæ</i>.....	.01	.01			.01
	2	1		3	
Undetermined.....		.01			
		1		1	
<i>Telephorus bilineatus</i> , Say.....					
	1			1	
<i>Telephorus carolinus</i> , Fab.....	.01				
	1			1	
<i>Tetramera</i> (Undetermined).....			.01		
	2		3	5	
<i>o. Curculionidæ</i>.....	.06	.02			.03
	5	1		6	
Undetermined.....	.01	.02			.01
	1	1		2	
<i>Ithycerus noveboracensis</i> , Forst.....	.01				
	1			1	
<i>Epicærus vadosus</i> , Say.....	.04				.01
	1			1	
<i>p. Chrysomelidæ</i>.....	.02				.01
	1			1	
<i>Gastrophysa polygoni</i> , Linn.....	.02				.01
	1			1	
5 <i>Hemiptera</i>.....		.01			.01
	1	3	1	5	
Eggs.....		1		1	
<i>a. Cydnidæ</i>		1		1	
	1	1		2	
<i>b. Thripidæ</i> (<i>Thrips</i>).....					
			1	1	
<i>c. Mallophaga</i>					
		1		1	
6 <i>Orthoptera</i>.....	.05		.01		.02
	6		1	7	
<i>Diapheromera femoratum</i> , Say (<i>yg.</i>).....					
	1			1	
<i>a. Gryllidæ</i>.....	.02		.01		.01
	1		1	2	
<i>Cecanthus</i>.....	.02				.01
	1			1	

MIMUS CAROLINENSIS—*continued.*

KINDS OF FOOD.	May.	June.	July.	TOTAL.	Ratios.
Gryllus abbreviatus, Serv.....			.01		
			1	1	
b. Acrididæ.....	.03				.01
	4			4	
Undetermined.....	.01				
	2			2	
Tettiginæ.....	.02				.01
	2			2	
Undetermined.....	.01				
	1			1	
Tettix.....	.01				
	1			1	
III. ARACHNIDA.....	.04	.01	.04		.03
	6	2	2	10	
a. Araneidæ.....	.04	.01			.02
	6	2	1	9	
b. Phalangidæ.....			.04		.01
			1	1	
IV. MYRIAPODA.....	.09	.04	.04		.06
	6	1	4	11	
a. Lithobiidæ (Lithobius).....				1	
	1			1	
b. Polydesmidæ.....	.07				.02
	4			4	
Polydesmus.....	.05				.02
	2			2	
Polydesmus serratus, Say.....	.01				
	1			1	
Polydesmus canadensis, Newp.....	.01				
	1			1	
c. Iulidæ.....	.02	.04	.04		.03
	4	1	4	9	
Undetermined.....	.01	.04	.02		.02
	3	1	3	7	
Iulus.....	.01		.02		.01
	1		1	2	
V. FRUIT.....		.30	.71		.34
		4	10	14	
Currants.....		.09	.03		.04
		1	1	2	
Raspberries.....		.11	.05		.05
		2	2	4	
Blackberries.....			.55		.18
			8	8	
Undetermined (wild).....		.10	.08		.06
		1	4	5	

HARPORHYNCHUS RUFUS, L. (*Brown Thrush.*)

	April.	May.	June.	July	TOTAL.	Ratio of each Element to whole of Food.
Number of Specimens Examined.	8	4	9	7	28	
KINDS OF FOOD.	Ratios and Number of Specimens in which each Element of Food was found.					
I. INSECTS.....	.66	.79	.54	.37	.....	.59
Undetermined	8	4	9	7	28	.....
Larvæ .....	.18	.19	.....	.....	.....	.05
Eggs.....	4	1	.....	.....	5	.....
1. <i>Hymenoptera</i>.....	.06	.03	.17	.01	.....	.07
Undetermined.....	5	3	8	4	20	.....
Formicidæ.....	1	.....	1	1	3	.....
2. <i>Lepidoptera</i> .....	.04	.09	.03	.13	.....	.07
Larvæ	2	2	3	3	10	.....
Imagos	2	2	1	3	8	.....
3. <i>Diptera</i> .....	.....	.....	.02	.....	.....	.....
Undetermined .....	.....	.....	2	.....	2	.....
Larvæ .....	.....	.....	1	.....	1	.....
4. <i>Coleoptera</i> .....	.36	.43	.21	.15	.....	.29
Undetermined	7	4	9	7	27	.....
a. Carabidæ .....	.04	.09	.05	.05	.....	.06
Undetermined	5	2	4	4	15	.....
Scarites.....	.01	.....	.....	.....	1	.....
Harpalinæ	1	.....	.01	.....	1	.....
Undetermined .....	.03	.09	.05	.05	.....	.06
Larvæ	4	2	4	4	14	.....
Evarthrus colossus, Lec.....	.02	.08	.02	.02	.....	.03
Undetermined	2	1	3	2	8	.....
Larvæ .....	.....	.....	.....	.01	.....	.....
.....	.....	.....	.....	1	1	.....
.....	.....	.....	.....	.01	.....	.....
.....	.....	.....	.....	1	1	.....

HARPORHYNCHUS RUFUS—*continued.*

KINDS OF FOOD.	April.	May.	June.	July.	TOTAL.	Ratios.
Agonoderus			1		1	
Agonoderus pallipes, Fab .....				.01		
Anisodactylus.....			.01	1	1	
Harpalus.....	.01	.01	.01		6	.01
2	2	2				
b. Silphidæ .....	.08					.02
2					1	
Larvæ .....	.01					
1					1	
Silpha americana, Linn.....	.01					
1					1	
Silpha lapponica, Hbst .....	.06					.01
1					1	
c. Histeridæ.....		.01				
1				1	1	
d. Nitidulidæ .....				.02		
				1	1	
Pityophagus .....				.02		
				1	1	
e. Copridæ.....	.02	.02	.03			.02
2	1	4			7	
Phanaeus carnifex, Linn.....			.02			
			1		1	
Onthophagus, sp.? .....	.01		.02			.01
1		3			4	
Onthophagus latebrosus, Fab....	.01	.02	.01			.01
1	1	1			3	
f. Aphodiidæ .....	.02	.13				.04
2	2				4	
Aphodius fimetarius, L.....			.01			
			1		1	
Aphodius granarius, L.....		1			1	
Aphodius inquinatus, Hb.....	.02					
2	1				3	
Aphodius femoralis, Say.....		.12				.03
		1			1	
g. Cetoniidæ.....	.15					.04
2					2	
Eryomia inda, Linn.....	.15					.04
2					2	
h. Melolonthidæ.....	.15		.07			.05
1		2			3	
Undetermined .....			.07			.02
			2		2	
Phyllophaga .....		.15				.04
		1			1	
i. Buprestidæ .....			.01			
			1		1	

HARPORHYNCHUS RUFUS—*continued.*

KINDS OF FOOD.	April.	May.	June.	July.	TOTAL.	Ratios.
<i>j.</i> Elateridæ .....				.03		.01
Undetermined			2	3	5	
Melanotus.....			1	1	2	.01
Monocrepidius auritus, Hbst.....				2	2	
<i>k.</i> Anthicidæ			1		1	
Tomoderus, sp.?.....				1	1	
<i>l.</i> Tenebrionidæ (Larvæ).....				.01		
<i>m.</i> Brenthidæ.....			.01			
Eupsalis minuta, Drury.....			1		1	
<i>n.</i> Curculionidæ.....	.05	.03	.02	.02		.03
Undetermined.....	3	3	4	3	13	.02
Epicærus vadosus, Say.....	.05	.03		.01		
Epicærus vadosus, Say.....	3	3	2	3	11	.01
<i>o.</i> Chrysomelidæ.....			2	1	3	
Heteraspis pubescens, Mels.....				.01		
Colaspis brunnea, Fab.....			1	1	2	
Chrysomela suturalis, Fab.....				1	1	
5. <i>Hemiptera</i> .....	.01	.01	.02	.05		.02
Undetermined.....	1	1	4	5	11	
<i>a.</i> Aphidæ.....				1	1	
Heteroptera.....				1	1	
Undetermined.....						
<i>b.</i> Reduviidæ.....			1		1	
<i>c.</i> Cydnidæ .....	.01	.01	.02	.04		.02
Undetermined.....	1	1	3	4	9	
<i>d.</i> Membracidæ.....				3	3	
6. <i>Orthoptera</i> .....	.01	.04	.09	.03		.04
Undetermined.....	1	1	4	2	8	
Undetermined.....	.01					
Undetermined.....	1				1	

HARPORHYNCHUS RUFUS—*continued.*

KINDS OF FOOD.	April.	May.	June.	July.	TOTAL.	Ratios.
<i>a.</i> Gryllidæ.....				.02		
				1	1	
<i>b.</i> Acrididæ.....		.04	.09			.03
		1	4		5	
Undetermined.....			.01	.01		
			1	1	2	
Tomonotus sulphureus, Fab.....			.05			.01
			1		1	
Tettiginæ, sp. ?.....		.04				.01
		1			1	
Tettix.....			.01			
			1		1	
Tettigidea.....			.02			
			1		1	
<hr/>						
II. ARACHNIDA.....	.02	.02				.01
	1	1	1		3	
Araneidæ.....	.02	.02			3	.01
	1	1	1		3	
<hr/>						
III. MYRIAPODA.....	.08	.04	.04			.04
	4	3	4		11	
Iulidæ.....	.08	.04	.04			.04
	4	3	4		11	
<hr/>						
IV. FRUITS.....			.23	.63		.22
			8	7	15	
Undetermined.....			.05	.01		.01
			3	1	4	
Strawberries.....			.06			.01
			1		1	
Raspberries.....			.12	.22		.08
			3	2	5	
Blackberries.....				.40		.10
				4	4	
<hr/>						
V. GRAIN (from excrement).....	.24	.14	.19			.14
	5	2	5		12	
Buckwheat.....	.01					
	1				1	
Oats.....	.22	.14	.17			.14
	4	2	4		10	
Corn.....			.02			
			2		2	
Wheat.....	.01					
	1				1	
<hr/>						
VI. SEEDS OF WEEDS.....			1		1	

TURDUS MUSTELINUS, GM. (*Wood Thrush.*)

	April.	May.	June	July	Sept.	Total.	Ratio of each Element to whole of Food.
Number of Specimens Examined.	2	4	1	3	1	11	
KINDS OF FOOD.	Number of Specimens in which each Element of Food was found.						
I. MOLLUSCA.....						2	.02
Univalve.....						2	
<i>Helix labyrinthica</i> , Say.....		1	1			2	
<i>Pupilla fallax</i> , Say.....		1				1	
			1			1	
II. INSECTA.....						11	.65
Undetermined.....						1	.01
Larvæ.....				1		1	.03
1. <i>Hymenoptera</i> (Formicidæ).....				1		1	.08
2. <i>Lepidoptera</i> (Larvæ).....	2	3	1	2		8	.17
3. <i>Diptera</i>	2	2				4	.19
Undetermined.....						6	
<i>a. Tipulidæ</i>					1	1	.13
Eggs.....						5	.03
Imagos.....		2				2	.10
<i>b. Bibionidæ</i>		3	1			4	.06
<i>Bibio albipennis</i> , Say (Larvæ).....			1			1	.06
4. <i>Coleoptera</i>			1			1	.12
Undetermined.....						10	.01
<i>a. Carabidæ</i> (Harpalinæ).....						5	.04
Undetermined.....						4	.03
<i>Pterostichus</i>	1	2	1			4	
<i>Evarthrus</i>	1					1	.01
<i>Anisodactylus</i>				1		1	
	1					1	

TURDUS MUSTELINUS—*continued.*

KINDS OF FOOD.	April.	May.	June.	July.	Sept.	TOTAL.	Ratios.
Harpalus	1					1	
Bradycellus			1			1	
b. Histeridæ.....		2	1			3	.01
c. Melolonthidæ			1			1	.01
d. Elateridæ (Larvæ).....			1			1	.04
e. Curculionidæ.....			1		1	2	.01
5. Hemiptera (Heteroptera).....	1	1				2	
Undetermined.....						2	
Cydnidæ.....			1			1	
6. Orthoptera.....		1				1	.05
Undetermined.....						3	.02
Acrididæ				1		1	.02
Tettix.....				1		1	.01
	1					1	
III. ARACHNIDA .....							.01
Araneidæ						5	.01
	2	1	1		1	5	
IV. MYRIAPODA.....							.11
Chilopoda						6	
Chilognatha	1					1	.11
Polydesmus, sp.? ².....							.05
Polydesmus serratus, Say.....	1	3				4	.01
Iulidæ	1					1	.05
	1	1		1		3	
V. FRUITS.....							.20
Cherries						4	.05
Blackberries.....				1		1	.02
Grapes (wild)				1		1	.09
Undetermined					1	1	.04
			1	1		2	

TURDUS PALLASI, CAB. (*Hermit Thrush.*)

	April.	May.	TOTAL.	Ratio of each Element to whole of Food.
Number of Specimens Examined.	16	2	18	
KINDS OF FOOD.	Number of Specimens in which each Element of Food was found.			
I. INSECTA	16	2	18	.87
Eggs.....		1	1	
Larvæ.....	2		2	.01
1. <i>Hymenoptera</i>	13	2	15	.16
Undetermined.....	4		4	.01
<i>a.</i> Apidæ	1		1	
Agapestemon.....	1		1	
<i>b.</i> Crabronidæ	1		1	.02
<i>c.</i> Formicidæ.....	12	2	14	.13
2. <i>Lepidoptera</i>	12	2	14	.18
Undetermined.....	2		2	.02
Larvæ.....	12	2	14	.07
Undetermined.....	11	2	13	.15
Phalaenidæ.....	2		2	.02
Ellopia?.....	1		1	
3. <i>Diptera</i>	2	1	3	.01
Undetermined.....	1		1	
Larvæ.....	1	1	2	.01
4. <i>Coleoptera</i>	15	1	16	.32
Undetermined.....	2	1	3	.03
Larvæ.....	1		1	
<i>a.</i> Carabidæ.....	11	1	12	.12

TURDUS PALLASI—*continued.*

KINDS OF FOOD.	April.	May.	TOTAL.	Ratios.
Dyschirius globulosus, Say.....	1		1	
Harpalinae.....	11	1	12	.12
Undetermined.....	9	1	10	.11
Platynus.....		1	1	
Evarthrus.....	1		1	.01
Pterostichus.....	1		1	
Amara.....	2		2	
Anisodactylus discoideus? Dej.....	1		1	
Bradycellus.....	2		2	
Stenolophus.....	2		2	
b. Hydrophilidae (Hydrophilus).....	1		1	.04
c. Staphylinidae.....	1		1	
d. Phalacridae (Olibrus).....	1		1	
e. Nitidulidae.....	1		1	
f. Parnidae.....	1		1	
g. Aphodiidae.....	5		5	.05
Aphodius, sp.?.....	2		2	
Aphodius fimetarius, L.....	2		2	.03
Aphodius inquinatus, Hb.....	3		3	.01
h. Melolonthidae.....	2		2	.01
i. Elateridae.....	2	1	3	.01
Undetermined.....	1	1	2	
Larvae.....	1		1	
Melanotus communis, Gyll.....	1		1	.01
j. Anthicidae.....	1		1	

TURDUS PALLASI—*continued.*

KINDS OF FOOD.	April.	May.	TOTAL.	Ratios.
Notoxus monodon, Fab.....			1	
k. Tenebrionidæ (Larvæ).....	1		1	
Meracantha contracta, Beau ..	1		1	
l. Curculionidæ.....	8		8	.02
Undetermined.....	4		4	
Lixus concavus, Say.....		1	1	
Listronotus inæqualipennis, Boh.....	1		1	.01
Centrini.....	2		2	
m. Chrysomelidæ.....	2		2	.02
Chrysomela suturalis, Fab.....	1		1	
Gastrophysa dissimilis, Say	1		1	.01
Plagioderà viridis, Mels	1		1	
5. Hemiptera (Heteroptera).....	12	2	14	.09
Undetermined.....	5		5	
Corixa.....		1	1	
Ruduviidæ.....	5		5	.03
Corisidæ (Undetermined).....	2		2	.01
Cydnidæ	4	1	5	.03
Undetermined	4		4	.01
Podisus spinosus, Dal.....		1	1	
Thyreocoris?		1	1	
6. Orthoptera (Acrididæ).....	9	1	10	.08
Undetermined.....	2		2	
Tettix, sp. ?.....	2		2	.02
Tettix ornata, Say.....		1	1	.01

TURDUS PALLASI—*continued.*

KINDS OF FOOD.	April.	May.	TOTAL.	Ratios
Tettigidea, sp.?				.03
Tettigidea lateralis, Say	4		4	.01
	1		1	
7. Neuroptera				
Chrysopa	1		1	
	1		1	
II. ARACHNIDA				.04
	6	1	7	
a. Araneidæ				.04
	5	1	6	
b. Phalangidæ				
	1		1	
III. MYRIAPODA				.09
Chilognatha				.09
	10	1	11	
Polydesmus				.06
	7		7	
Undetermined				
	3		3	
Polydesmus canadensis, Newp				
	1		1	
Polydesmus serratus, Say				.01
	2		2	
Polydesmus granulatus, Say				.02
	3		3	
Iulidæ				.03
	7		7	
Undetermined				
	7		7	
Iulus				.01
	1		1	
IV. VEGETATION				
	1		1	

TURDUS ALICLÆ, BAIRD. (*Alice Thrush.*)

Number of Specimens Examined.		May.	TOTAL.	Ratio of each Element to whole of Food.
KINDS OF FOOD.		Ratio, and Number of Specimens in which each Element of Food was found.		
I. MOLLUSCA .....		.07	.....	.07
<i>Helix labyrinthica</i> , Say.....		.01	.....	.01
<i>Succinea</i> .....		.06	.....	.06
		2	2	.....
II. INSECTA .....		.90	.....	.90
1. <i>Hymenoptera</i>.....		.47	.....	.47
Apidæ.....		8	8	.....
<i>Andrena</i> ?.....		.02	.....	.02
Pompilides .....		.03	.....	.03
Formicidæ .....		.42	.....	.42
2. <i>Lepidoptera</i> (Larvæ).....		.13	.....	.13
Undetermined.....		.11	.....	.11
<i>Clisiocampa</i>? .....		.02	.....	.02
3. <i>Diptera</i> .....		.10	.....	.10
Larvæ .....		.01	.....	.01
Nemocera.....		1	1	.....
Tipulidæ.....		.08	.....	.08
Adults.....		.04	.....	.04
Eggs.....		.04	.....	.04
Mycetophilidæ .....		.01	.....	.01
4. <i>Coleoptera</i> .....		.17	.....	.17
Carabidæ.....		.02	.....	.02
		5	5	.....

TURDUS ALICIE—*continued.*

KINDS OF FOOD.	May.	TOTAL.	Ratios.
Carabinae.....	1	1	.....
Harpalinae.....	.02	.....	.02
Histeridae.....	4	4	.....
Geotrupidae.....	1	1	.....
Geotrupidae.....	.01	.....	.01
Aphodiidae.....	1	1	.....
Aphodiidae.....	.10	.....	.10
Aphodius, sp.? Aphodius inquinatus, Hb.....	2 1	2 1	..........
Aphodius inquinatus, Hb.....	.10	.....	.10
Aphodius inquinatus, Hb.....	1	1	.....
Tetramera (Undetermined).....	1	1	.....
Curculionidae.....	.02	.....	.02
Curculionidae.....	8	8	.....
Undetermined.....	.02	.....	.02
Conotrachelus anaglypticus, Say.....	7	7	.....
Conotrachelus anaglypticus, Say.....	1	1	.....
Chrysomelidae.....	.01	.....	.01
Chrysomelidae.....	1	1	.....
Chrysomela suturalis, Fab.....	1	1	.....
Chrysomela similis, Rog.....	1	1	.....
5. Orthoptera (Acrididae).....	.03	.....	.03
Orthoptera (Acrididae).....	2	2	.....
Undetermined.....	.01	.....	.01
Tettix.....	1	1	.....
Tettix.....	.02	.....	.02
Tettix.....	1	1	.....
III. ARACHNIDA.....	.01	.....	.01
Arachnida.....	2	2	.....
Araneidae.....	.01	.....	.01
Araneidae.....	2	2	.....
IV. MYRIAPODA.....	.02	.....	.02
Myriapoda.....	3	3	.....
Polydesmus serratus, Say.....	.01	.....	.01
Polydesmus serratus, Say.....	1	1	.....
Iulides.....	.01	.....	.01
Iulides.....	2	2	.....

TURDUS SWAINSONI, CAB. (*Swainson's Thrush.*)

Number of Specimens Examined.	April.	May.	TOTAL.	Ratio of each Element to whole of Food.
	1	5	6	
KINDS OF FOOD.				
Number of Specimens in which each Element of Food was found.				
I. INSECTA.....			6	.98
Larvæ.....		1	1	.06
1. <i>Hymenoptera</i>			4	.31
Undetermined.....		1	1	.03
Formicidæ.....	1	3	4	.28
2. <i>Lepidoptera</i> (Larvæ).....	1	2	3	.22
3. <i>Diptera</i> (Tipulidæ).....	1	1	2	.07
4. <i>Coleoptera</i>			5	.30
a. Harpalinæ.....			2	.05
Undetermined.....			2	.04
Anisodactylus.....	1	1	2	.01
b. Aphodiidæ (Aphodius).....		1	1	
c. Melolonthidæ (Phyllophaga).....	1		1	.06
d. Elateridæ (Larvæ).....		1	1	
e. Cleridæ.....		1	1	
Thanasimus nigripes, Say.....		1	1	
f. Curculionidæ.....		1	1	
g. Scolytidæ.....	1	2	3	.03
Scolytus muticus, Say.....		1	1	.15
5. <i>Hemiptera</i> (Heteroptera).....		1	1	.02
Undetermined.....			1	.02
Phytocoris lineolaris, Beauv.....	1		1	.01
	1		1	

TURDUS SWAINSONI—continued.

KINDS OF FOOD.	April	May	TOTAL	Ratio.
Reduviidae.....	1	.....	1	.....
II. ARACHNIDA.....	.....	.....	1	.01
Araneidae.....	.....	1	1	.01
III. MYRIAPODA.....	1	.....	1	.01

TURDIDÆ. (*Thrush Family*)

KINDS OF FOOD.	Ratios, and number of Specimens in which each Element of Food was found.								Ratio of each Element to whole of Food.
	Robin.	Cat-Bird.	Brown Thrush.	Wood Thrush.	Hermit Thrush.	Alce Thrush.	Swainson's Thrush.	TOTAL.	
Number of Specimens Examined.	41	37	23	11	18	.....	6	149	
I. TOAD.....	.....	.01	.....	.....	.....	.....	.....	.....	.....
.....	.....	1	.....	.....	.....	.....	.....	1	.....
II. MOLLUSCA.....	.....	.....	.....	.03	.....	.07	.....	.....	.01
Univalve (Undetermined).....	.....	1	1	2	.....	4	.....	8	.....
Helix labyrinthica, Say.....	.....	1	1	2	.....	.....	.....	4	.....
Succinea.....	.....	.....	.....	1	.....	2	.....	3	.....
Pupilla fallax, Say.....	.....	.....	.....	.....	.....	.06	.....	.....	.....
.....	.....	.....	.....	.....	.....	2	.....	2	.....
.....	.....	.....	.....	1	.....	.....	.....	1	.....
III. INSECTA.....	.70	.50	.59	.65	.87	.90	.98	.....	.74
Undetermined.....	39	37	28	11	18	8	6	147	.....
Larvæ.....	.03	.....	.05	.01	.....	.....	.....	10	.....
.....	7	1	1	1	.....	.....	.....	.....	.....
.....	.01	.....	.04	.03	.01	.....	.00	.....	.....
.....	2	.....	5	1	2	.....	1	11	.....

TURDIDÆ—continued.

KINDS OF FOOD.	Robin.	Cat-Bird.	Brown Thrush.	Wood Thrush.	Hermit Thrush.	Alice Thrush.	Swainson's Thrush.	TOTAL.	Ratios
<i>c. Phalaenidæ</i>.....	.01				.02				
<i>Ellopiæ</i> ?.....	1				2			3	
3. <i>Diptera</i>.....	.18	.13		.19	.01	.10	.07		
Undetermined.....	.01				1			1	
Larvæ.....	.02	1	1	1				8	
Nemocera (Undetermined).....	3		2		2	1		8	
<i>a. Tipulidæ</i>.....	.04	.12		.13		.08	.07		
Imagos.....	2	9		5		4	2	24	
Eggs.....	.04			.10		.04	.07		
<i>b. Bibionidæ</i> (Undetermined).....	2			4		2	2	10	
Biblio albipennis, Say (Larvæ).....	.01			.03		.04			
<i>c. Mycetophilidæ</i>	4			2		3		9	
<i>d. Muscidæ</i>						1		1	
4. <i>Coleoptera</i>.....	.19	.19	.29	.12	.32	.17	.30		.22
Undetermined.....	.01				.01	.03			
Larvæ.....	3	3	1	1	3			11	
<i>a. Cicindelidæ</i>	2	1			1			4	
<i>Cicindela lecontei</i> , Hald.....		1						1	
<i>b. Carabidæ</i>.....	.07	.08	.06	.04	.12	.02	.05		.07
Undetermined.....	.01								
Larvæ.....	1	3	1					5	
Carabine.....	1							1	
Scarites.....			1		1	1		3	
<i>Dyschirius globulosus</i> , Say.....			1					1	
Harpalinæ.....	.06	.02	.06	.04	.12	.02	.05		
	15	4	14	5	12	4	2	56	

TURDIDÆ—continued.

KINDS OF FOOD.	Robin.	Cat-Bird.	Brown Thrush.	Wood Thrush.	Hermit Thrush.	Alice Thrush.	Swainson's Thrush.	TOTAL.	Ratios.
Undetermined .....	.04	.....	.03	.03	.11	.....	.04	.....	.....
Larvæ.....	11	.....	8	4	10	.....	2	35	.....
Platynus	5	.....	1	.....	.....	.....	.....	6	.....
Evarthrus, sp.? .....	.....	1	.....	.....	1	.....	.....	2	.....
Evarthrus colossus, Lec .....	.....	.01	.....	.01	.01	.....	.....	.....	.....
Pterostichus, sp.?	1	2	.....	1	1	.....	.....	5	.....
Pterostichus colossus, Lec .....	.....	.....	1	.....	.....	.....	.....	1	.....
Pterostichus sayi, Brulle.....	1	.....	.....	1	1	.....	.....	3	.....
Amara.....	.....	1	.....	.....	.....	.....	.....	1	.....
Brachylobus lithophilus, Say.....	1	.....	.....	.....	2	.....	.....	3	.....
Geopinus incrassatus, Dej.....	2	.....	.....	.....	.....	.....	.....	2	.....
Agonoderus, sp.?.....	.01	.....	.....	.....	.....	.....	.....	.....	.....
Agonoderus, Fab.....	1	.....	1	.....	.....	.....	.....	2	.....
Anisodactylus, sp.?.....	1	.....	1	.....	.....	.....	.01	.....	.....
Anisodactylus baltimorensis, Say.....	1	.....	1	1	.....	.....	1	4	.....
Anisodactylus discoideus, Dej.....	2	1	.....	.....	.....	.....	.....	3	.....
Bradycellus .....	.....	.....	.....	.....	1	.....	.....	1	.....
Harpalus.....	.01	.02	.01	.....	1	2	.....	3	.....
Stenolophus	3	3	6	1	.....	.....	.....	13	.....
c. Dytiscidæ.....	.....	.....	.....	.....	2	.....	.....	2	.....
Larvæ.....	.....	2	.....	.....	.....	.....	.....	2	.....
Colymbetes biguttulus, Germ.....	.....	1	.....	.....	.....	.....	.....	1	.....
d. Hydrophilidæ.....	.....	.01	.....	.....	.04	.....	.....	.....	.....
Larvæ.....	.....	1	.....	.....	1	.....	.....	2	.....
Hydrophilu .....	.....	.01	.....	.....	.....	.....	.....	.....	.....
Hydrobiu.....	.....	1	.....	.....	.....	.....	.....	1	.....
.....	.....	1	.....	.....	.....	.....	.....	1	.....

TURDIDÆ—continued.

KINDS OF FOOD	Robin.	Cat-Bird.	Brown Thrush.	Wood Thrush.	Hermit Thrush.	Alice Thrush.	Swainson's Thrush.	TOTAL.	Ratios.
e. Silphidæ.....			.02						
Larvæ.....			1					1	
Silpha americana, L.....			1					1	
Silpha lapponica, Hb.....			.01					1	
f. Saphylinidæ.....			1					1	
g. Histeridæ.....				.01					
Undetermined	3	1	1	3		1		9	
Dendrophilus	1							1	
.....	1							1	
h. Phalacridæ (Olibrus).....					1			2	
i. Nitidulidæ.....					2	1		4	
Undetermined						1		1	
Pityophagus 4-guttatus, Fab.....								2	
j. Parnidæ.....									
.....						1		1	
k. Heteroceridæ.....									
Heterocerus		1						1	
.....		1						1	
l. Geotrupidæ.....			.01			.01			
Undetermined	1	1						3	
Geotrupes splendidus, Fab.....		.01							
.....		1						1	
Bolboceras								1	
.....	1								
m. Copridæ.....			.02						
Phanaeus carnifex, L.....	2	1	7					10	
.....			1					1	
Onthophagus, sp.?.....			.01						
.....	2	1	4					7	
Onthophagus latebrosus, Fab.....			.01						
.....			3					3	
n. Aphodiidæ.....	.02		.04		.05	.10			
.....	8	1	4		5	2	1	21	
Aphodius, sp.?.....	2	1			2	1		6	

TURDIDÆ—continued.

KINDS OF FOOD.	Robin.	Cat-Bird.	Brown Thrush.	Wood Thrush.	Hermit Thrush.	Alice Thrush.	Swainson's Thrush.	TOTAL.	Ratios.
Aphodius fimetarius, L.....	.02				.03				
	3				2			5	
Aphodius granarius, L.....			1					1	
Aphodius inquinatus, Hb.....					.01	.10			
Aphodius femoralis, Say.....	4		3		3	1		11	
			.03						
<i>o.</i> Melonithidæ.....			1					1	
	.02	.04	.05	.01	.01		.06		
Undetermined	2	4	3	1	2		1	13	
Phyllophaga.....		3	2		2			7	
	.01		.04				.06		
<i>p.</i> Cetoniidæ.....	1	1	4				1	7	
			.04						
Euryomia inda, L.....			2					2	
			.04						
<i>q.</i> Buprestidæ.....			2					2	
			.01						
<i>r.</i> Elateridæ.....			1					1	
	.03		.01	.04	.01				
Undetermined	7		5	2	3		1	18	
			.01						
Larvæ.....	2		2		2			6	
	.03								
Melanotus, sp.?.....	5				1		1	7	
Melanotus communis, Gyll.....	2		2					4	
					.01				
Monocrepidius.....					1			1	
	1							1	
Monocrepidius auritus, Hbst....			1					1	
<i>s.</i> Lampyridæ.....		.01							
		3						3	
Undetermined		1						1	
Telephorus bilineatus, Say.....		1						1	
Telephorus carolinus, Fab		1						1	
<i>t.</i> Cleridæ.....							1	1	
							1	1	
Thanasimus nigripes, Say.....							1	1	
<i>u.</i> Tenebrionidæ			1		2			3	
Larvæ.....					1			1	

TURDIDÆ—continued.

KINDS OF FOOD.	Robin.	Cat-Bird.	Brown Thrush.	Wood Thrush.	Hermit Thrush.	Alice Thrush.	Swainson's Thrush.	TOTAL.	Ratio.
Meracantha contracta, Beauv.....					1			1	
77. Anthicidæ.....									
Tomoderus, sp.?.....			1		1			2	
Notoxus monodon, Fab.								1	
79. Carculionidæ.....	.03	.03	.03		.02	.02	.03		.02
Undetermined.....	11	6	13	2	8	8	1	49	
Ithycerus noveboracensis, Forst.	.02	.01	.02			.02			
Epicurus vadosus, Say.....	11	2	11		4	7		35	
Conotrachelus, sp.?.....		1						1	
Conotrachelus anaglypticus, Say		.01	.01						
Lixus concavus, Say.....	1	1	3					5	
Conotrachelus anaglypticus, Say						1		1	
Lixus concavus, Say.....								1	
Listronotus inaequalipennis, Boh.					1			1	
Centrini.....					1			1	
80. Brentidæ.....			.01		2			2	
Eupsalis minuta, Drury.....			1					1	
81. Scolytidæ.....			.01						
Scolytus muticus, Say.....			1					1	
82. Chrysomelidæ.....							.15		
Undetermined.....	.01	.01			.02	.01			
Heteraspis pubescens, Mels....	3	1		2	2	1		9	
Colaspis brunnea, Fab.....	1							1	
Chrysomela suturalis, Fab.....				1				1	
Chrysomela similis, Rog.....				1	1	1		3	
Chrysomela 10-lineata, Say.....						1		1	
Gastrophysa polygoni, L.....	.01								
	1							1	
	1	1						2	

TURDIDÆ—continued.

KINDS OF FOOD.	Robin.	Cat-Bird.	Brown Thrush.	Wood Thrush.	Hermat Thrush.	Alice Thrush.	Swainson's Thrush.	TOTAL.	Ratio.
	Gastrophysa dissimilis, Say.....					.01			
Plagioderia viridis, Mels.....					1			1	
5. Hemiptera.....	.04	.01	.02	.01	.09		.02		.03
Eggs.....	10	5	11	2	14		1	33	
Homoptera.....		1						1	
Aphidæ.....			1					1	
Heteroptera.....	.04			.01	.09		.02		
Undetermined.....	10			2	14		1	28	
Nepa.....	2		1	1	5		1	10	
Corixa.....	.03								
Reduviidæ.....	1							1	
Corisiæ.....	2		1		5		1	9	
Undetermined.....	2				2			4	
Phytocoris lineolaris, Beauv..							.01		
Membraciidæ.....							1	1	
Cydnidæ.....			3					3	
Undetermined.....			.02		.03				.01
Podisus spinosus, Dal.....	5	2	9	1	5			22	
Hymenarcys nervosa, Say....	4				4			8	
Thyreocoris?.....					.01			1	
Thrips.....					1			1	
Mallophaga.....		1						1	
6. Orthoptera.....	.08	.02	.04	.05	.08	.03			.05
Undetermined.....	10	7	8	3	10	2		40	
a. Gryllidæ.....	1		1	1				3	
		.01							
		1	1					2	

TURDIDÆ—*continued.*

KINDS OF FOOD	TURDIDÆ							TOTAL.	Ratios.
	Robin.	Cat-bird.	Brown Thrush.	Wood Thrush.	Hermit Thrush.	Allee Thrush.	Swainson's Thrush.		
<i>Gryllus abbreviatus</i> , Serv.....		.01							
<i>Cecanthus</i>	1	1						2	
<i>Acrididæ</i>.....	.07	.01	.03	.02	.08	.03		1	
Undetermined.....	3	4	5	1	10	2		25	
Eggs.....	.03						.01		
	5	2	2		2	1		12	
<i>Tomonotus sulphureus</i> , Fab.....	1		.01					1	
<i>Tettiginæ</i>			1					1	
	.05	.01	.02	.01	.06	.02			
Undetermined.....	3	2	3	1	10	1		20	
		1	1					2	
<i>Tettix</i> , sp.?.....				.01	.01	.02			
		1	1	1	2	1		6	
<i>Tettix ornata</i> , Say.....					.01				
					1			1	
<i>Tettigidea</i> , sp.?.....	.04				.03				
	3		1		4			8	
<i>Tettigidea lateralis</i> , Say.....					.01				
	1				1			2	
7. <i>Neuroptera</i>									
<i>Chrysopa</i>					1			1	
IV. ARACHNIDA.....		.03	.01	.01	.04	.01	.01		
	6	10	3	4	7	2	1	33	
a. <i>Araneidæ</i>.....		.02	.01	.01	.04	.01	.01		
	6	9	3	4	6	2	1	31	
b. <i>Phalangidæ</i>.....		.01							
		1			1			2	
V. MYRIAPODA.....	.02	.06	.04	.11	.09	.02	.01		.05
	6	11	11	6	11	3	1	49	
<i>Chilopoda</i>		1	1						
Undetermined.....				1				3	
				1				1	
<i>Lithobius</i>		1						1	
<i>Geophilus</i>									
	1							1	
<i>Chilognatha</i>.....	.01	.05	.04	.11	.09	.02			
	6	10	11	6	11	3		47	
<i>Polydesmus</i> , sp.?.....		.02		.05					
		2		4	3			9	

TURDIDÆ—*continued.*

KINDS OF FOOD.	Robin	Cat-Bird.	Brown Thrush.	Wood Thrush.	Hermit Thrush.	Alice Thrush.	Swainson's Thrush.	TOTAL.	Ratios.
	Polydesmus canadensis, Newp..		1			.01			2
Polydesmus serratus, Say	1	1		.01	.01	.01		6	
Polydesmus granulatus, Say					.02			3	
Iulides	1	.03	.04	.05	.04	.01		34	
Undetermined		.02		.05				18	
Iulus	.01	.01			.01			5	
VI. FRUITS	.28	.34	.22	.20				55	.20
Raspberries	.04	.05	.08					12	
Blackberries	.10	.18	.10	.02				25	
Cherries	.11			.05				6	
Currants	.03	.04						8	
Grapes	.01			.01				2	
Strawberries			.01					1	
Undetermined (wild)		.06	.01	.04				12	
VII. GRAIN			.14					12	
Buckwheat			1					1	
Corn			.14					10	
Oats				2				2	
Wheat								1	
VIII. VEGETATION (miscellaneous)	1	1			1			3	

THE VALUE OF BIRDS.*

A PAPER READ BEFORE THE HINGHAM (MASS.) AGRIC. AND HORTIC. SOCIETY, JULY 17, 1869,
BY THOMAS M. BREWER, M. D.

Having accepted, with many misgivings as to my ability to prepare anything worthy of your consideration, an invitation to read a brief paper before the members of our Society, I propose to occupy but a small portion of your time with a subject of vital interest to every tiller of the soil, whether he call himself horticulturist, fruit-culturist, or farmer: THE VALUE OF BIRDS.

I do not propose to treat this subject here to-night from any sentimental point of view. Much as I may be moved in my own feelings by the beauties of song, of plumage, or of character of my friends of the feathered tribes, all these partialities—weaknesses, if you will—I shall endeavor to leave severely on one side, and to consider only the question of their practical economic value to the husbandman.

Not that I shall be able to say of any one of the eight hundred different kinds of birds, which inhabit different parts of the United States, this bird does just this specified proportion of good, or just this certain amount of harm. The man does not live who can approximate, with certainty, such a conclusion, or give you any reliable data for such pretended certainties. No one but a charlatan and pretender, in the present state of our science, will profess to give, by tables of units, the merits or the demerits of even a single species. It is simply impossible. In Europe the case is somewhat different. There, for many years, at a large outlay of money and of time, with the support and encouragement of government, the most thorough investigations and careful aggregation of facts bearing upon the value of birds have been made, with results so complete in many instances as to amount almost to a thorough demonstration. But in this country it is not so. We cannot give you facts, except in broken series. The facts we can supply are valuable, instructive, suggestive. They point strongly to certain conclusions, but they are isolated, incomplete and are not exhaustive. They may warrant us to form opinions, and those opinions may be well or ill formed, according to our more or less favorable opportunities for forming them; but for the present they must be only opinions, and not positive knowledge.

I frankly state to you, thus in advance, the unsatisfactory nature of the ground I am to occupy, and the difficulties of the road I propose with you to travel. I shall therefore not attempt, except in a very general way, and only on general principles, to defend the character of our American birds, singly or collectively. Nor do I propose to consider, except in the way of example, or as an illustration, any particular species.

We are all interested, whether we feel any interest or not—that is, all of us who have any interest in the successful tilling of the soil—in the investigations now being made in Europe, in reference to the ravages of insects, the means of averting them and the value of birds as one of the instruments for checking the frightful destruction of property occasioned by these pests. As the precursor, and necessary preface to the views I propose to submit, let me briefly narrate some of the experiences of the agriculturists on the other side of the water. They are important and suggestive. During the last quarter of a century, for some cause or causes, in France, Germany, and in many portions of Central Europe, there has been a constant, steady and alarming increase of insects. The ravages of the canker-worm in the orchards of New England, of the cotton-worm and the army-worm at the South, and of the grasshoppers at the West, are but slight and unimportant evils in comparison with the wide-spread havoc made in Central Europe by the cockchafer, the night-butterfly and other kinds of insects. It would be well for us of America to study both the phenomena of these insect plagues and the expedients resorted to to abate or prevent them. The laws of Prussia, which hold every man guilty of a misdemeanor and subject to heavy fines if he permit the caterpillar to remain unexterminated in his garden, might to advantage be repeated here. Such a law applied

* The above important and interesting paper, by the eminent Boston ornithologist, although first published ten years ago, has lost none of its value, and is reproduced here with the author's consent.

in Massachusetts, to the canker-worm, and rigidly enforced, would not be long in divesting this scourge of nearly all its terrors, and very possibly would remove it altogether in time.

The causes which have led to the extraordinary increase of insects in Europe are principally twofold; one of these, the great increase of land under tillage with improved instruments of husbandry, has undoubtedly had something to do with the increase of certain kinds. A man who has only a small patch under cultivation finds it hard enough to keep the destructive subterranean caterpillars from his vegetables. How impossible for him who has hundreds or thousands? Then deep plowing turns under and out of the reach of their natural enemies some of the most destructive kinds of larvæ. No one thing has contributed more than this deep plowing to favor the growth and increase of the terrible cockchafer.

The other cause, and a very prominent one, is the decrease of birds. In some cases this decrease of birds and this increase of insects has been cause and effect. The great Frederick of Prussia once nearly exterminated the sparrows in his kingdom, in a fit of royal wrath, because they took agrarian liberties with his fruit; and what was the consequence? The caterpillars, which the sparrows had kept in check, having no one now to prevent their increase, multiplied at such a fearful rate that they swept before them the foliage, and with the foliage all the fruit also. It is said that for two years not a cherry, apple, peach, plum, currant or any kind of fruit could be raised in any portion of the kingdom. Sensible at last of his mistake, this great king, conquered for the first time, in a field where his impotence was but too apparent, yielded to the necessity, and expended more money in re-introducing the sparrow than he had wasted in destroying them, but only after the loss to his subjects of millions of dollars. Shall such a fact as this be dumb to us? Are we, of this country, only to learn the value of birds after we have destroyed our benefactors? But I will not anticipate.

From whatever causes it may be, this fearful increase of destructive insects and the terrible devastations it has caused, destroying alike the vineyard of the wine-grower, the orchards of the cultivator of fruit, the gardens of the horticulturist, and the farms and crops of the agriculturist, has naturally caused the deepest alarm and sense of danger to whole communities. The Governments of France, Switzerland, Prussia, Bavaria and other German States, have sought by various expedients to arrest, if possible, this fearful evil. But thus far all their efforts have been almost as unavailing as would be the attempt to bale out the sea.

Let me give you one striking instance, all the facts of which are well authenticated, and which will serve to teach us several very important lessons as well as afford a remarkable illustration of the enormous amount of destruction that follows the unchecked development of certain kinds of insects. I have spoken of the night-butterfly of Europe, called also the *nonne*, or nun. The miller, as its name implies, is a nocturnal insect, and is, therefore, one not easy to capture. It is immensely productive, and its larvæ feed upon the foliage of forest trees, where, unchecked, they increase very rapidly, completely strip these trees of their foliage, prevent their growth, and in a second season entirely destroy the trees thus twice denuded. Forests thus destroyed are comparatively valueless, and the losses occasioned are at times immense. In the year 1852, the larvæ of this night-butterfly appeared in countless swarms in all the forests of Lithuania, East Prussia, Nassau and Poland, as also in the Swalger districts of the Rothebude forests. Early in the month of July the moths made their first appearance in masses that resembled white clouds. The forests looked as if they were covered with snow. They were comparatively new to these regions, and came to them from the south, where "the forests had been burned." Here and there attempts were made to meet the impending calamity, the terrible meaning of which the proprietors but too well understood. In the single forest of Rothebude, between the 8th of August and the following May, there were collected and destroyed, by computation, one hundred and fifty millions of the eggs of this insect, and fifteen hundred millions of the female moths. At an enormous expenditure, the trunks of the trees were scraped for the eggs, and liberal rewards were paid for both eggs and moths by the proprietors, but all in vain. They were not able to collect much more than half the eggs, and before the 12th of July five hundred acres of pines had been eaten bare and the trees died. In spite of almost superhuman

efforts to arrest them, the butterflies of the next generation were more numerous than before, and their eggs covered entire trunks of the forest trees. Before the end of July all but about three thousand acres in the entire district had been eaten bare and killed, and by the end of June, 1855, over seven thousand acres of pine land had been completely killed, and three thousand more rendered worthless, except for fire-wood. Four-and-a-half millions of cords of wood were cut from these forests; the loss caused by the depreciation of their value was not less than a hundred millions of thalers, or about eighty millions of dollars in gold. Now, what is the lesson this fearful calamity should teach us, as well as those impoverished proprietors? They have, in Europe, birds which, if they had fostered, encouraged and protected, instead of persecuting and destroying them, would have successfully encountered these hosts of insects and destroyed them. Of these, the European jay is the most important. In size, habits and general character it greatly resembles our own blue-jay; in fact, except in their places of abode, and in some slight differences of plumage, the two birds are almost exactly the same in all respects. Both frequent and prefer the forests, both render invaluable services by feeding upon the eggs of caterpillars in the winter, for they are resident and not migratory birds, and by feeding their young with the caterpillars.

It has been ascertained that one pair of jays will feed its young with half a million of caterpillars in a season, and that each bird will destroy, during the winter, eggs that in the following spring would have hatched into at least a million or more of the larvæ. Our blue-jays would do the same if we would let them and not persecute them. Their favorite food is the egg of our apple-tree or tent-caterpillar, and for their young the larvæ of this same insect is also their choice. A pair of blue-jays in an orchard would clear it so effectually of every caterpillar in a single season that not one single insect could be found. This is not mere theory, but absolute fact, demonstrated by the careful investigation of the venerable Dr. Kirtland, of Cleveland. So completely did his carefully protected jay extirpate these pests from the lake shore of that part of Ohio, that absolutely not a single individual specimen could be found for miles around Cleveland. And yet our wisecracks in the State Legislature of Massachusetts, in this very last session, in a law designed to protect our birds, among its other absurdities and inconsistencies, especially dooms the jay, probably the best and most valuable bird we have among us, to destruction, and makes it an outlaw, whose life any vagabond may take with impunity. There are other features in this law which, in view of the ignorance they betray, and its signal shortcoming, are simply disgraceful to its authors, but which I will not now take your time by considering. My chief point is this, that the presence, in their native forests, of only a hundred pairs of European jays would have arrested this great loss, would have effectually aided in the destruction of these insects in a single season, and would have been worth to the proprietors of these forests about a hundred millions of dollars.

I have mentioned the cockchafer as one of the most fearful of the insect pests of Europe. It is the counterpart of our May-beetle, and the grub very closely resembles ours. The European form is, however, worse than that of this country, inasmuch as the beetles are quite as destructive as the larvæ. The destructiveness of the worms are about on a par, only in Europe the large extent of deep culture has tended to their more rapid increase. Yet, we have not much to comfort ourselves with in this respect. In our vicinity, these insects are evidently, for some cause, on the increase. The summer of 1868 witnessed a larger flight than was probably ever seen before of the parent beetle. Our grounds are unusually full of the year-old larvæ, and it will be fortunate for us if the summer of 1871, when they will have reached their full growth, does not develop even a greater amount of injury to grass-lands and crops than was noticed in 1867.

In Europe, as I have said, the destruction caused by these insects is something almost fearful to contemplate. One of these insects, in the larva form, it has been ascertained, eats no less than two pounds of vegetable root matter during the three years in which it is passing from the egg to the chrysalis. A single statement will give you some idea of the enormous quantities in which they are found, and their capacities for mischief. The single canton of Berne, in Switzerland, in area not half the size of Connecticut, in the years 1864 and 1865, paid out 259,000 francs, in bounties for the destruction of these insects. There were collected and destroyed 83,729 Viertel of the

beetles and 67,917 of the worms. A viertel contains about 75,000 beetles and about 200,000 of the worms. The number of insects thus destroyed in this little district was nearly twenty-two hundred millions, enough with only their natural increase to have destroyed the entire crop of that canton. The loss actually occasioned in four small districts, among the Harz mountains, by these insects, in 1866, is shown by official returns to have been more than a million and a half of thalers—the entire crop of that region.

I have sought to give you some idea of the enormous losses occasioned by these insect pests. I wish now to call your attention to some very interesting investigations as to the value of birds as one of the surest means of remedying, and indeed the only effectual means of meeting some of its various forms. The French Government has been especially active, and the investigations that have been carefully and persistently made under its patronage have been of the highest value. M. Florent Prevost has been at the head of the investigations, and has so devoted himself to them as to make them the great mission of his life. I have studied his reports, and give full faith to the general laws and principles which he has deduced from his long-continued investigations, that cover a space of a third of a century. They may all be summed up in this comprehensive and sententious dogma: "No agriculturist can take the life of any bird without doing that which can result only in loss to himself." I believe that in this he is entirely right. Every bird has its mission of good, though we may not now see it. I do not ask or expect you to go so far as this in the present state of our knowledge. It may yet be a long while before we shall be educated to a full knowledge of the value of this standing army, this feathered host of Nature's constabulary, who stand as her great counterpoise between the insect powers of destruction and the fruits of the earth. M. Prevost has demonstrated beyond all dispute that all birds are more or less insectivorous—that those we generally regard as insect-eating birds especially do not, as a general thing, destroy those insects that do us the most harm, and that, for the most part, the birds which render the most effectual services in destroying the most noxious insects are birds against which popular prejudices are the strongest. The sparrows, the starlings and crows are the great destroyers of the cockchafer, as our crows and blackbirds are of the May-beetles, and we are but just finding out that many birds we have deemed to be our enemies are really our best friends.

Another most important law of nature revealed by M. Prevost's investigation is of especial interest. This is, that nearly all birds, during the period of reproduction, whatever may be their natural food at other times, are almost entirely insect-eaters, and that they feed their young almost exclusively with insect food. Then the amount of insect food a young bird will consume in a given time is enormous. Dr. Wyman took from the crop of a young pigeon a mass of canker-worms that was more than twice the weight of the bird itself; and it is shown by Prof. Treadwell, that a young robin will eat, and require too, for his well-being, at least his own weight in insect food. On less than this he cannot live twenty-four hours.

Let us admire the wisdom and goodness of Providence so clearly shown in this universal law of nature, that, in the season when insects most abound and increase, the whole feathered tribe, without any known exceptions of those who inhabit the land, become insect-eaters by preference. And those insects which are most abundant, and which do our crops the most harm, and which man is so powerless to check when they have once got the upper hand, all have their enemies among the resident birds who would be able to keep them in complete subjection if man did not interfere. No insect has so many enemies as our worst pest, the canker-worm. But none of these are permitted by man to have any chance. The purple grackle eats our corn and we have nearly extirpated them. The cherry-bird is an outlaw, and hunted without mercy. Our wild pigeons are too tempting to the epicure to be spared, and our tame doves, who might be made a better substitute, are not sufficiently abundant. Prowling cats destroy a very large proportion of the chipping-sparrows and vireos, and so on, until the canker-worm, between our destruction of its natural enemies and our half-attempts to keep it down, riots in unchecked and ever-increasing destructiveness.

It has been fully demonstrated in Europe that even the most destructive of all their terrible pests, the cockchafer, can be very nearly or quite exterminated by taking pains

to encourage and favor the increase of the starling, a bird about the size, and in character allied with our meadow lark. A well-known Hamburg horticulturist, John Boot, tried the experiment of cultivating the starling, and with complete success. I give his statement in nearly his own words: ten years since the canker-worm (one of the European names of this insect), visited his grounds, destroyed whole inclosures of rhododendrons and coniferæ. His own field suffered also. All artificial means to destroy them failed. He bethought him of the starlings, caused a hundred nest-boxes to be constructed, all of which were occupied by these birds, and in the course of one season the nuisance was abated. Their *modus operandi* is to search for these vermin just as they near the surface of the earth to emerge as beetles. The starling summarily hauls him out, and that is his last of earth. Mr. Boot encouraged the starling to increase, until he had two hundred pairs on his place, and it is now very rarely that he finds one of the worms in his grounds. His observations of ten years and his very careful generalization of these repeated notes lead to these results: The starling is on the wing sixteen of the twenty-four hours, and feed their young twenty times in the day, visiting their nest to carry food six hundred times in all. As the starlings have three broods in the season and rear about twenty young, he estimates that his two hundred pairs of these birds, with their young, would be able to destroy, if there were so many, fifty-seven millions of these worms in a single season.

I have nearly exhausted the limits, but before leaving the subject I will give you a very brief account of the interesting movements and discussions on the subject of bird protection now agitating the cantons of Switzerland.

In March, 1869, the Confederate Council of Switzerland had under discussion the question of special legislation for the protection of birds. The movement was initiated by the Grand Council of the canton of Tessin, praying for a general enactment throughout Switzerland and also an international uniformity of law for the protection of useful birds, their own agriculture being in a suffering condition, owing to the unrestricted slaughter of birds. Before adopting any such international union, the Confederate Council addressed inquiries to the several local governments of each canton with the view to ascertain what local laws were now in force and how far a general uniformity of law was desired. These answers have been carefully preserved and made public. Some points they disclose are not without interest to us who are yet novices in the matter of bird-legislation. All of the great cantons but one, and all but three in all, have their own cantonal laws, but all of these vary in many important respects. In one, Zurich, all *useful* birds are protected, and the magistrates having decided that all birds are useful, the whole feathered tribe are under the protection of the law. In different cantons different birds are outlawed or protected. Ravens, crows, magpies, even starlings, sparrows, linnets, ring-ouzel, and other birds of admitted value, are under the ban in here or there a single canton, and protected in all the others. In some, birds are protected all the year; in others, only during a certain portion. In some a landed proprietor may shoot the birds on his own grounds, and in another he may not. Generally the fine is fifty francs for every offense, but in some it is as low as five francs. A few punish with imprisonment aggravated violation of law. Some punish the parents for the offenses of their children. In several cantons, the value of birds and the sin of destroying them is made by law a required study in their public-school instruction.

The *Bund*, an agricultural journal published in Berne, concludes an able article on the subject of the importance of birds, the enormous losses occasioned by insects, and the incompleteness of Swiss legislation, in the following forcible manner:

“These enormous losses occasioned by insects and the cost of the ineffectual attempts to collect and destroy these vermin can all be obviated, if man will only not destroy the equipoise of nature, and not from wantonness, fastidiousness, prejudice or superstition, or other equally worthless grounds, persecute and exterminate the natural destroyers of insects, mice, etc., but, on the contrary, give them the greatest possible protection, and tender to them nourishment and care during the inclement season. We rejoice that our own cantonal laws for the protection of birds are so generally observed, but it is to be regretted that the spirit of these excellent laws has not been more generally made the subject of instruction in our public schools. We yet more regret that in many respects our legislation is still so incomplete. For instance, when we see that so

valuable a bird as the sparrow, just acclimated at so much expense in America, the crow, the raven, and many other birds of acknowledged utility, still outlawed in individual cantons, when we see that the destruction of all birds is still permitted at certain seasons in some, and that in others only the smaller and least essential singing-birds are protected, while the most useful of all are excluded from the protection of law, we are forced to express an earnest desire that in the cantons where this half legislation still exists a change may soon be made more in conformity to the present stand-point of science."

The prayer this writer utters in regard to the half legislation of Switzerland, I would fain repeat in regard to the half legislation which now does discredit to Massachusetts.

But my time is exhausted and I will trespass upon your patience no longer. I will only add, in conclusion, that the two points I most desire to impress upon you, drawn from the experience of Europe, are, the dangers to us of America arising from the unchecked development of destructive insects on the one hand and the unchecked diminution of their natural preventives, the birds, on the other. The subject in these twofold relations is, I am convinced, well worthy of your gravest consideration. Millions upon millions of dollars may be saved or lost as we of this country are or are not wise in time. We already see in the ever-increasing ravages of the canker-worms, curculios, army-worms, locusts and potato-bugs wide-spread seeds of future, not distant calamities, just as the spray that wets the seaman's cheek warns him of the wave that is gathering its might to overwhelm him.

JONATHAN PERIAM, of Chicago, President of the Horticultural Society of Northern Illinois, invited the members present to attend the annual meeting of that Society, to be held in Elgin, January 27th, 28th and 29th, 1880.

The President then declared the meeting adjourned till to-morrow morning at half-past eight, at the usual place.

THIRD DAY—MORNING.

At the appointed hour on Thursday morning the President called the meeting to order, requesting Rev. G. W. MINIER to open the meeting with prayer, which he did.

THE PRESIDENT.—The first business in order this morning is the election of officers and fixing the place of the annual meeting of 1880.

LOCATION OF MEETING.

Mr. MINIER read the following preamble and resolutions:

WHEREAS: The Horticultural Society of Illinois has had an existence for many years, and much material good has been accomplished, as well as intellectual advancement made; still, we wish for greater good and greater advancements. To attain these ends we offer the following resolutions:

1st Resolved, That this Society shall hereafter hold its sessions in the rooms of the State Board of Agriculture, in the city of Springfield, during the biennial sessions of the Legislature and in the first week of the sessions of the Board of Agriculture.

2d Resolved, That the other annual sessions of this Society shall be holden alternately at the State Normal University at Normal and the State Industrial University at Champaign.

(Signed) A. R. WHITNEY.
ROBERT DOUGLAS.

Dr. HUMPHREY moved the adoption of the first resolution, and fixing the time of the meetings in Springfield to correspond with the meetings of the General Assembly.

THE PRESIDENT.—The Legislature meets the Tuesday after the first Monday in January. We would have to change the time of alternate meetings, so that if the others were not changed we would have two meetings in one year.

Messrs. ROBISON, EARLE, DENNIS and others opposed the resolution on the ground that our attention would be distracted from our work at such a time and place; that the greater expenses in Springfield at such times would deter members from attending; and the meeting of last winter. "the smallest meeting we have ever had," was cited as illustrating this latter point.

Messrs. WIER and J. S. JOHNSON said that at first thought they were in favor of this resolution; but upon more deliberate reflection they thought otherwise, and would vote against it.

Dr. HUMPHREY urged the advantage which the Society would gain in coming in contact with members of the General Assembly, in showing them what we are doing, and thus creating an interest in our work.

To this it was objected that if, as our experience of last winter seemed to indicate, the attendance at our meetings in Springfield should be meager, general interest in our work would be diminished rather than increased by going there.

The motion to adopt the resolution was put and declared lost.

The Secretary then read the second resolution, which met with much favor. It was urged in favor of alternating our meetings between Normal and Champaign that the meetings heretofore held at both these places had been well attended and entirely satisfactory; that both these places of meeting were State institutions of learning, where, in a certain sense, we, as a State Society, are entitled to consideration, and where we may create an interest in horticultural science and art in the minds of the students which would be a lasting benefit to the State. On the other hand it was maintained that the work of our Society is partially a missionary work; that as we meet in different parts of the State from year to year, awakening a deeper interest in horticulture at each place, our influence is thus more diffused and wider in its scope.

A motion to so amend the resolution as to provide for all the annual meetings of the Society to be held alternately at Normal and Champaign was made, which, after quite a lengthy discussion, was, by motion, laid upon the table. The original resolution was also, by vote, laid upon the table.

RESOLUTION ON LIFE MEMBERSHIP.

D. B. WIER, of Lacon, presented the following resolution, which was read by the Secretary:

Resolved, That persons who have been members of this Society for ten years, and have paid their membership dues regularly, shall be life members without payment of farther dues.

After brief discussion the resolution was put to vote and defeated.

DISCUSSION ON LOCATION RESUMED.

A somewhat rambling discussion was indulged in, during which the advantages of different places for holding the next annual meeting were presented.

Mr. ROBISON suggested that the discussion was out of order, and made the following motion:

MR. ROBISON.—*Mr. President*, I move that we now receive invitations for our next meeting, and then proceed to locate it by ballot.

The motion prevailed unanimously.

Mr. MINIER invited the Society to Bloomington, which invitation was supported by remarks from Hon. J. W. Fell, Dr. Schroeder and others.

Mr. DENNIS invited the Society to Warsaw. This invitation was supported by Messrs, Earle, Hammond, Spalding, J. T. Johnson, Minkler and A. H. Gaston.

President BURRILL extended an invitation to meet at Champaign, which was favored by remarks from Dr. Humphrey.

A vote by ballot was then taken, which resulted in twenty-seven (27) votes for Warsaw, nineteen (19) votes for Bloomington and one vote for Alton.

On motion, the vote for Warsaw was declared unanimous.

ELECTION OF OFFICERS FOR 1880.

THE PRESIDENT.—You will now proceed to the Election of Officers.

Parker Earle, of Cobden, Union county; C. N. Dennis, of Hamilton, Hancock county, and G. W. Minier, of Minier, Tazewell county, were severally nominated for the office of President.

Messrs. Dennis and Minier thanked the gentlemen who placed them in nomination and declined in favor of Mr. Earle, whereupon the Secretary was directed by unanimous vote to cast the vote of the Society for Parker Earle for President.

The same unanimity prevailed in the election of the other officers, Mr. Robison casting the vote of the Society for Secretary.

The following officers were then declared unanimously elected :

President—PARKER EARLE, of Cobden.

Vice-President—JAMES T. JOHNSON, of Warsaw.

Secretary—O. B. GALUSHA, of Morris.

Treasurer—S. G. MINKLER, of Oswego.

REPORT UPON ORNITHOLOGY.

G. W. MINIER, of Minier, Tazewell county, from the Committee on Ornithology, reported as follows :

Mr. President, Ladies and Gentlemen :

With the return of our annual conventions we are always glad to greet the laborers in this useful, civilizing and ornamenting art. It is one of the fine arts, and ought to be so considered. Horticulture is not merely ornamental and civilizing ; it is over and above these grand ideas, it is as well among the most useful employments of man. It is not merely agriculture refined ; it is the religion of agriculture.

The Illinois Society has taken hold of it in its most extended sense ; not content with the cultivation of groves, lawns and gardens, you have extended your labors to schools ; the common schools of your State are indebted to you for the introduction of the material sciences ; or, to quote your own words, “those sciences which underlie the arts of agriculture and horticulture.” Of this consummation, so long labored for by Professor Turner, Mr. Pennell and others, and so devoutly wished for by many of us, you may well be proud.

But, my friends, our labors are by no means ended ; there are many rough places to be made smooth, many farms to be beautified, and I trust many firesides to be made happy, through your efforts.

Nor is it inanimate nature alone which pleads. The insect, the quadruped and the bird need your care, and your fostering and discriminating labors, to bring them to the aid of man, and add utility and beauty to our earthly heritage.

You have seen fit to appoint myself and two others to report, that is to write something on Birds, which it is to be hoped may call out a discussion which will be useful to this Society. My associates will doubtless present something worthy of themselves and of the fairy-like creatures, which seem almost possessed of the power to scorn the force of gravity itself, and to lift themselves on joyous wings above us, poor things, which are bound to earth.

But, sir, I wish, in my prosy way, to ask your attention, not so much to the peerless beauty of these inhabitants of the upper deep, as to their usefulness to us, to man, who puts forth the modest (?) claim of being the lord of this lower creation. Perhaps it will not add to our self-conceit to be told that investigation has about demonstrated that, although *birds* can exist without *man*, yet *man* cannot live without birds. The insect world would conquer us; our fields, orchards and forests would be speedily devastated, were it not for our feathered friends. Birds in their multiform varieties are the only creatures which can wage a successful warfare with the world of insects. Nature has imposed upon them a most ravenous appetite, and directed, bent—may I say *sent?*—that appetite towards those innumerable swarms of delving, creeping and flying enemies, which, but for birds, would inevitably bring desolation, famine and death to the family of man.

I am conscious, Mr. President, that these little friends of ours are not all equally desirable, or equally useful, and that some discrimination should be used. If the sentence of death has to be pronounced upon any of them, I plead like Brutus, "Let us carve them like a dish fit for the gods, not hack them like carcasses to be thrown to the hounds."

Even the crows, the *Corvus* family, are not, to use a vile theological phrase, "totally depraved." We must admit they are saucy, and that the blue-jay is the very personification of impudence. We have only a few representatives of this order; the carrion-crow, raven, magpie and jay are about all; and of them I say as Cowper did of England, "With all your faults I love you still."

But I am not going to discriminate. The highest Authority that ever graced our earth has assured us that not a sparrow falls to the ground without the notice of the Power which created him.

My opinion has been asked concerning the English sparrows: Wisely or unwisely they are here, and we must make the best of them; for they have come to stay. They seem to have some portion of that vile ingredient of Saxon blood which makes us all aggressive; they trouble our small native birds much in the same way and degree that our ancestors from that seagirt isle, and we, their children, also, have done and are still doing, to the aborigines of this country, which we proudly call our own.

I have found these sparrows in several of our cities; two of them one day paid a visit to my farm. They may, for aught I know, have been on a bridal tour; at any rate they did not tarry; but, like too many men, returned to the city, forsaking those sylvan haunts "where dwells plain innocence unsullied beauty, patient of labor with a little pleased calm contemplation and poetic ease." Alas! that birds should be no wiser than men. But I must bring this rambling essay to an end.

Meaning no offense to you, gentlemen, permit me to say that I will trust to the judgment of a woman in some things where I fear to trust a man. I asked a lady in the city of Philadelphia what she thought of the English sparrow, flocks of which were in the street before us.

"Why, sir," she replied, "two years ago we could not walk these streets here in sunny days without umbrellas to protect us, not from the

rays of the sun, but from insects and worms, which hung by threads or webs and in festoons from these maple trees. We got the English sparrow, and now we have no insect enemies, but all other birds are fled."

That's a woman's judgment of these birds.

Mr. President, ladies and gentlemen, if my poor opinion will add anything to this honest, wise and just decision, I say let us still have the best specimens of men, women, children and birds from this grand old isle of the ocean.

MR. MINIER.—*Mr. President*, I hold a little bit of paper which I picked up somewhere; it looks as though it had been in possession of a member of the Legislature, and had fallen from his pocket. May I read it?

THE PRESIDENT.—Read.

Permission being given, he read as follows:

Mr. President and Members of the Illinois State Horticultural Society, in convention assembled:

I present the following Bill, which I hope will pass this assembly, and be re-enacted by the State Legislature:

Section 1. *Be it enacted, etc.*, That from and after the passage of this act it shall be unlawful for any tramp, loafer, idler or other gunner to shoot, kill or disturb any bird, snake, toad or other reptile on any lands not belonging to himself in fee simple, without the express permission of the rightful owner or owners of said lands.

Sec. 2. *And be it further enacted*, That it shall be lawful, and it is hereby made the duty of each and every owner of real estate in the State of Illinois, whose premises shall have been trespassed upon by such tramp, loafer, idler or other gunner, to deprive him or them of his or their fire-arms, and club, stone, kick or otherwise expel him or them from his lands or tenements.

Sec. 3. *And be it further enacted*, That unlike all other laws and enactments, said to be for the protection of birds and insect-destroying reptiles, but which are really for the protection of the aforesaid tramps, loafers, idlers and hunters, *this act shall apply to every day in the year—Sundays especially.*

Sec. 4. This act shall be deemed an *emergency*, and shall be in force from and after its passage. (Laughter and applause.)

MR. DENNIS (to Mr. Minier).—Please look at the bottom of the paper and see if Mr. Minier's signature is not there. (Laughter.)

MR. MINIER.—*Mr. President*, the paper has no signature.

MR. WIER.—I hope this report will bring out discussion upon birds as related to insects. I made some radical statements in my paper; but I *know the English sparrow did not eat the worms*, as mentioned by the lady in Mr. Minier's paper.

PROF. THOMAS.—Yet the worms disappeared.

As the Society did not seem desirous to discuss a subject which had been shown by Professor Forbes to be so intricate, the President called for the

REPORT ON GENERAL HORTICULTURE—FOURTH DISTRICT.

HENRY M. DUNLAP, of Champaign, Committee on General Horticulture for the Fourth District, having returned home, had handed his report to the Secretary, who read as follows:

Our experiences as horticulturists in this the Fourth District have been varied, and while I shall attempt to speak generally of the district as a whole, it will be impossible to harmonize our experiences in the different counties on all subjects.

The past year has been one of extremes of weather—a severe cold winter followed by a drouth during the summer and fall, and these extremes have affected the fruit crop somewhat; the cold of the winter killed the peach-buds and many of the trees; the cherry crop was also materially injured by the frosts; the strawberry beds that were uncovered earliest were in some instances entirely barren. The drouth of the summer shortened the crop of small-fruits, especially strawberries and blackberries.

Apples were a large crop, with a larger proportion than usual of winter fruit; the warm weather of October ripened up and rotted at least one-half the crop after it was gathered, and in some cases where not properly cared for the entire crop was lost. Ben Bavis, Willow, Rawles' Janet, Jonathan and Winesap are the most popular varieties in the order named. I have been told that in some sections large crops of Bellflower apples are produced by girdling the trees below the main branches; this is done in the spring by taking out a strip of bark about one-fourth of an inch wide entirely around the tree. Mr. Capps, in his report of Logan county, says that he visited an orchard in which a portion of the trees were girdled and the rest were not; those that were produced a large crop of excellent fruit, while those that were not fruited a small crop of inferior fruit. In my neighborhood a man tried the experiment with a similar result. If there is a way to make our shy bearers, such as Bellflower, Northern Spy, etc., produce good crops we should know it, and if any present have had experience with this treatment of trees I hope they will give us their views on the subject.

Blackberries, with the exception of the Snyder, were killed to the ground; this variety, although setting a full crop of fruit, as a result of the dry weather the berries were small, and in many instances they dried on the canes. In cases where the ground was well mulched the fruit was said to be very fine. Many still cling to the Lawton and Kittatinny as being superior fruit, but they are not hardy and cannot be relied on for annual crops. What we want is a sure bearer; and the Snyder, if well mulched to keep the ground from baking, and the canes cut back severely to keep them from over-production, will give us a crop of excellent fruit every season without fail.

Raspberries were a fair crop, the Turner taking the lead as a red raspberry, and the Gregg looming up as a rival of the Mammoth Cluster, which it closely resembles.

The *Strawberry* crop was cut short by the drouth, and where the vines were uncovered too early were badly injured by the frost. Like all other small-fruits, such as raspberries, blackberries, currants, etc., strawberries should be sufficiently well mulched to keep the ground from becoming hardened by the summer's sun and to keep the weeds down. I have found it to be a great saving of time during the busy season of summer to put about a foot of straw among my currants, gooseberries and raspberries during the winter or early spring; it keeps the weeds down, serves as a mulch and makes it very nice for gathering the fruit.

Peaches were a total failure, and many of the older trees winter-killed. I had one tree standing close to the south side of the house that bore about fifty peaches; I know of one other tree similarly situated that also bore a fair crop of fruit.

Of *Pears* I can say but little. It does not pay to plant them for profit; Flemish Beauty, Beurre d'Anjou, Madeline, Bartlett, Duchess and Sheldon all bore a fair crop in our vicinity. Out of many varieties those I have mentioned have been most free from blight and have borne the best crops.

The Early Richmond *Cherry* produced only a moderate crop, and is the only variety that will pay with us; and they must be grafted on Morello stocks. Most of us had rather cut the sprouts down every season with a brush scythe than have no fruit. Mazzard stocks are worthless, while those on the Mahaleb produce a light crop compared to those on the Morello.

Grapes were the most bountiful crop of all, and the vineyards laden with their beautiful clusters of grapes were a feast for the eye. I use the stake system for training, and consider it the least troublesome and most profitable method when properly followed. Ives and Concord pay the best with us; the former is not a very good table grape, but is productive, and ripens a week earlier than the Concord and brings as much in the market as the latter, which reaches the market a week later.

L. R. BANCROFT, of Livingston county, reports no general damage to fruit-trees and shrubs by the severity of the winter of 1878-79, except to blackberry canes—the Kittatinny being killed to the ground, and Snyder injured on low ground. A drouth in the early part of the season rendered the Snyders on high ground small and a poor crop. He still relies on the Kittatinny as the best for that county, notwithstanding it occasionally fails, as the fruit is large and sells well.

The drouth of May and June nearly ruined the strawberry crop, though Green Prolific, Downers, and in some locations Wilsons, produced fairly, but the berries were inferior. Mr. Bancroft places Green Prolific at the head of the list on account of its thick, heavy foliage, which protects the fruit, its uniform productiveness and the good, even size of the fruit. He places Seneca at the head in the list of black-cap raspberries,

as it is hardier than Doolittle and Mammoth Cluster, a strong grower and always productive, and the fruit of the very best quality. Turner is the only red raspberry grown there and is highly prized.

Concord is the leading grape, though Martha is good and sells well, but the vine is not as productive as Concord. Elvira proves hardy, having stood tied to stakes last winter uninjured.

Apples, though abundant, rotted badly, as everywhere in Central and Northern Illinois, in some instances nearly the whole crop of winter apples had rotted at the date of writing, December 1st.

H. W. DAVIS, of Decatur, in reporting for Macon county gives the same general effect of cold and drouth, and the rotting of apples by the extreme heat of the last of September and first of October. The so-called Iron-clad apple-trees which bloomed early failed to fruit, the blossoms being destroyed by frost; even the Transcendent crab shared this fate and no fruit was produced.

He thinks that we should learn from such experience to take time of blooming into the account in selecting varieties as well as hardiness of tree.

He claims to have discovered the cause of the spur-blight in apple-trees to be the larvæ of an insect which lays its egg in the terminal bud in autumn, as he has discovered the worm at work there early in the season. In confirmation of the theory he says that last December there was an extraordinary sleet which coated the twigs and spurs of trees, lasting for several weeks; and, since there was no spur-blight the past season, he concludes the eggs were destroyed by the sleet.

He cautions orchardists against severe pruning; and trusts that farmers will hereafter look around them and see what varieties of fruit succeed best and plant such freely.

J. B. REEVE reports from Shelbyville, Shelby county, almost identically the same as does Mr. Bancroft in regard to the weather and drouth, the crops of small-fruits and apples. Grapes mildewed considerably, but were a fair crop—the first in four years—the vines having “mildewed” the three previous years, except on river bluffs.

Codling-moth was much more abundant than usual. A friend of his in the city makes the growing of Quinces a specialty.

They are planted on a lot upon which a blacksmith shop stood for twenty years; the bushes grow well and bear well, and the fruit is of the best quality—taking first premiums at the Illinois State fair and the St. Louis fair. The bushes near or on the site of the shop grow best and bear the most and best fruit. He naturally attributes this success to the mixture of iron cinders, coal dust, etc., in the soil. Other bushes grown from cuttings taken from these and planted elsewhere are not productive.

He reports that the European cabbage-worm destroyed nearly all the cabbages in the county; one gardener, however, raised a large crop of fine, large cabbages by the free use of blood guano mixed with plaster sown broadcast occasionally over the patch. It appears to destroy the worms and causes the plants to grow rapidly.

J. G. THOMPSON, of Urbana, writes that the season has been on the whole unfavorable. But few varieties of apple-trees produced good crops; the Red Astrachan and other sorts which ripened early, being less affected by the drouth, were of good quality, but three-fourths of autumn and winter apples rotted. He says that people have planted in too great proportion autumn varieties. Two years ago he planted an orchard of one hundred and ten trees, consisting of ninety Ben Davis and twenty Wine-sap. He thinks there is more money in Ben Davis than any other sort.

Flemish Beauty is considered the most profitable variety of pear, as the tree is hardy and productive and more free from blight than any other; Howell, also, he says does well when the fruit-buds do not swell in autumn so as to expose them to winter-killing.

He considers the Early May (Richmond) cherry the only variety worth planting; this bore a fair crop last season. Another called Late May bore well, but the fruit was very wormy.

He reports strawberries badly damaged, and some plantations entirely destroyed by late frosts.

Raspberries suffered from the extreme cold; and the tips of the canes of black-caps died early in autumn, preventing them from taking root, and asks for the cause.*

The raspberry crop was damaged considerably by the drouth, which was quite severe just before and during the time of ripening.

Blackberries, "except the iron-clad Snyder," were killed to the ground, and even that was somewhat damaged by the severe winter of 1878-79. The Snyder has the fault of overbearing and the canes and laterals should be cut back severely in the spring—thus reducing the number and increasing the size of the berries.

He reports the prospect good for fruit crops in 1880.

The following reports cover considerable ground and are given entire.

REPORT OF LOGAN COUNTY—By C. S. CAPPS, MT. PULASKI.

MR. HENRY M. DUNLAP, Champaign, Ill.—*Dear Sir,*—By card received from Secretary O. B. Galusha I am informed that I am appointed correspondent of the Illinois State Horticultural Society for Logan county for 1879, and am requested to report to you on such matters of interest relating to Horticulture as come under my notice.

For this year I have to report a very unsatisfactory fruit crop in this county. We have had no peaches; the peach-trees were mostly killed by the cold of last winter; a few of the younger trees escaped but did not bear any fruit. Our Alexander early trees bloomed even after the trees were dead, proving, I think, that the blossom-buds were more hardy than the trees.

The apple crop was very light and winter apples are rotting badly; Rawles' Janet has, I think, proved the most satisfactory variety. Willow Twig, White Winter Pearmain, Northern Spy and Domine have also produced pretty well in some orchards. Our favorite varieties are as follows: For *Summer*—Early Harvest, Pomme Royal, Sops of Wine, Red June, Chenango Strawberry, Late Strawberry. For *Fall*—Maiden's Blush,

* This dying of the tips of black-cap canes was quite common in the West and is attributed to the long-continued and intense heat in connection with drouth.—EDITOR.

Porter, Rambo, Fameuse, Fall Pippin, Mother. For *Winter*—Rawles' Janet, Ben Davis, Willow Twig, Newtown Pippin, Milam, Rome Beauty, Grimes' Golden, Ladies' Sweet, Carthouse, White Winter Pearmain and Domine. *Crabs*—Transcendent and Hvslop.

We have lost nearly all our pear-trees by blight; the Seckel has been about the most satisfactory next to the Hosenshenk, which we find most exempt from blight and very productive; it is a very good early sort, of good size. The Duchesse d'Angouleme has done about the best of any as a dwarf; Buerre d'Anjou, Bartlett and Flemish Beauty have yielded good crops some seasons, but this year all have been nearly a total failure.

The curculio has settled the Plum question; there is no use in planting the European varieties of plum here, unless some systematic plan is adopted to "head off the bugs." The Wild Goose, of which we have several trees, did not furnish us a single perfect specimen this year; last year we had a few that were passable, but on the whole I have no very exalted opinion of native varieties of plums.

About the only Cherries we had were the common Morello. The English Morello, which is about twice the size of the common, is, I think, worthy of more attention than it receives.

I consider the Mahaleb the best stock for the cherry. I would not accept a cherry-tree worked on the Mazzard or Morello stock as a present—they are too troublesome in the way of sprouts. I would prefer plums worked on peach for the same reason.

We have fruited the Lieb cherry and think well of it; we would also recommend the Early Richmond, and for some localities the May Duke; the heart or sweet cherries rarely succeed here, but there are a few large old trees in our place which are in good condition and bear good crops.

Quinces and Apricots are very uncertain. We occasionally have good crops, but the trees are short-lived.

Of Grapes the Concord has as usual produced the heaviest crops. Grapes were abundant this year, and were retailing in our markets at two cents per pound. We are pleased with the Ives and Martha, and think that they will become favorite sorts. The Hartford, Perkins and Telegraph have also done very well with us; some of Rogers' Hybrid, if slightly protected in winter, will yield good crops of most excellent fruit. Of these we would recommend Nos. 1, 3, 4, 15 and 41. The Clinton, for cooking, for jelly or for wine, is excellent; and, by the way, I know of nothing which is so good for jelly as grapes. I consider them far superior for this purpose to currants.

The Raspberry crop was very good, especially the Turners; these, planted about four-and-a-half or five feet apart and plowed each way, will prove a most remunerative investment; they are strong growers, requiring no stakes. But four or five canes should be left to each plant, and they might be tied together at the top with a bit of twine or willow and the ends clipped off, which would put them in good shape for cultivating and picking; all sprouts should be treated as weeds. We find the improved black-cap raspberries very profitable to grow for market.

Blackberries were killed to the ground the past winter, consequently we have no crop.

Of Strawberries the crop was light; some very fine specimens of the Monarch of the West were produced in our village, and we think highly of this variety.

Of Potatoes the crop was very light and the tubers very small, owing to the bugs and the dry weather. The Cabbage crop was ruined by the cabbage-worm. If a reward was offered for the capture of the butterfly which causes the cabbage-worm, children might be induced to catch them in nets made of mosquito-bar attached to sticks, or such nets as naturalists use to catch specimens. A concerted effort all over the country might do much to lessen the evil, and unless something is done to save the cabbages I fear we will have to give up sauerkraut or import it from Germany.

A gentleman who has an orchard with a northern exposure, and timber on the west and north, says he never fails to get good crops of apples.

A single row of Norway spruce planted about ten feet apart and a good distance (say twenty feet) from the orchard trees would, I think, be the best shelter that could possibly be planted for an orchard; they would in a few years make a living wall of perpetual green, which would mitigate very materially the force of the wind, which

often does serious injury in blowing off fruit, and perhaps also in rendering ineffective the pollen of the bloom of trees. These evergreen-belts would also be very ornamental and possibly useful some day for the wood they would afford. Evergreens can be bought very cheaply now at our nurseries, so the expense of such a hedge would not be very great.

The writer here gives a lengthy description of Mr. Spalding's experiments in girdling trees to induce fruitfulness, which is omitted, since all the facts given have already been given by Mr. Spalding. He was very favorably impressed as to the utility of thus treating tardy-bearing trees.

He then proceeds:

From my own experience and observation I am convinced that much injury is done to orchards by cutting out large branches; a branch over one inch thick should never be removed, except for the most urgent reasons; for I believe the removal of large branches causes the early decay of most of the orchards in the country. The trees should be trimmed in proper shape while they are young, and forever afterward "severely let alone." Water-sprouts are one result of injudicious pruning—decayed and sickly trees are its legitimate results.

I wish to speak a good word for about the only one of the newer evergreens that succeeds with us; that is the Japan Cypress (*Retinospora aurea plumosa*). It is indeed a little beauty, and seems to stand our winters perfectly. I also saw at Mr. Spalding's an orchard of chestnut-trees quite full of nuts. Chestnut-trees standing singly are apt to produce burrs without nuts, which I think is on account of imperfect fertilization of the bloom, and think there will be no difficulty in growing chestnuts here if several trees are planted in close proximity.

REPORT OF DOUGLAS COUNTY—By W. W. JONES.

Peaches were in full bloom April 27th, but, as the trees were badly injured by severe cold the previous winter, very few ripened, and they were badly stung by the curculio; the young trees recovered, however, and made a good growth the past summer.

To head the list for this county, I would place a seedling, raised by myself, which ripens from the 10th to the 15th of August; the fruit is of good size, with a bright-red cheek, flesh white and of very good quality; tree quite hardy. I would then place, in their order of merit, Large Early York, Heath Cling, Old Mixon free, Smock.

Pears were in full bloom April 29th, and where there were trees of F. Beauty, Clapp's Favorite, Duchess, White Doyenne and Seckel they were loaded heavily with fine fruit in their season. No blight of any consequence occurred during the season. To the before-mentioned list of pears I would add Louise Bonne de Jersey, which does well generally.

May 4th apples were in full bloom, with the exception of Janet, which is eight or ten days later in blooming. The Early Harvest and Red Astrachan were much sweeter the past season than usual; this is true also of nearly all our fruits, and we attribute it to the regularity of the temperature and the rains of the past summer. The apple crop was the largest in yield and finest in quality ever raised in this county.

For this locality I would suggest the following list for planters: Red June, E. Harvest, Red Astrachan, E. Pennock, M. Blush, Snow, Rambo,

Bailey Sweet, Ben Davis, Rome Beauty, Jonathan, Smith's Cider, Wagoner, Winesap and Willow Twig; and on sandy-clay soil, Yellow Bellflower and Hubbardston Nonsuch.

April 3d, at six o'clock A. M., the thermometer indicated 20° above zero; cherry-buds were swollen almost into bloom, and, being in this tender condition, of course were injured; and although they *did* bloom, yet the crop was almost a failure. We have but one variety that is worth planting here, and that is the Early Richmond.

On May 1st, *Strawberries* commenced to bloom, and on the 7th were in full bloom; the first ripe ones were picked for market on the 26th, just twenty-six days from the time of blooming. We never before had so good and full setting of this fruit as we had last spring, but the drouth of the last of May and the first of June cut the crop short one-half; but, as the weather was so fine, the fruit could be put into the market in such fine condition that it brought as good prices as when much larger. All things considered, Wilson is *the* berry for this part of the State. In addition to Wilson, I would plant Sharpless, Crescent Seedling and Jucunda.

The strawberry requires a soil rich enough to grow a good crop of corn or potatoes; it should be plowed in the spring as early as the ground will work well, then harrowed until perfectly level and free from clods. Plants should be set the last of April or the first of May, in rows three-and-a-third feet apart and three feet apart in the rows, laying the runners, as they grow, along the rows, so they may take root. Cultivating may be done with a walking cultivator, setting the shovels so they will leave the ground as level as possible, and using the hoe directly around the plants; continue this cultivation throughout the season. In the fall, as soon as the ground is frozen hard enough to bear a team, the plants should be covered with straw, being careful not to cover so deep as to smother the plants. As soon as the frost is out of the ground in spring, remove the mulch from the plants, letting it lay between the rows, to keep down weeds and also to keep the berries clean. When the crop is gathered, then turn everything under with a good plow; this destroys insects that are injurious to the strawberry and cuts off the means of their increase, and, besides all this, adds fertility to the soil. I have cultivated strawberries, for profit, for over fifteen years, and my experience has taught me that it is cheaper to set out a new patch every spring than to cultivate the old ones, as the fruit will be of better quality and larger size, consequently will command a better price in the market.

Raspberries were a good crop, Mammoth Cluster and Doolittle bearing heavily. The first black-caps bloomed May 23d, and we commenced picking for market in just one month afterward. This crop realized an average of twelve-and-a-half cents per quart. Turner and Brandywine are our best reds, with M. Cluster, Doolittle and Gregg for black-caps.

Lawton *Blackberries* killed to the ground and Kittatinny fruit-buds were destroyed by the cold of last winter, while Snyder went through unscathed.

The Snyder will not pay when we have a full crop of Kittatinny, as it is too small and not as good in quality. There was a little *rust*, on both blackberry and raspberry bushes, the past season, but we pulled up and burned the canes affected as soon as it was discovered.

The Red Dutch and Cherry *Currants* do well here; so also does the Houghton *Gooseberry*.

Grapes were the finest, in yield and quality, that we ever raised in this county; Concord, Clinton and others were in full bloom June 2d; the Willis,* a new seedling of my originating, blooming June 10th; Concord was fully ripe September 15th, although some were gathered September 1st, and put in market. The Willis was fit for table use August 12th. For this part of the State I would plant Concord, Hartford, Ives and Willis, and also the Lady. The rot attacked the grapes when about one-third grown, but in a few days after it rained, when the rot ceased; after twelve days the rot began again, and two days afterward it again rained and again the rot ceased, and thus it continued for four times during the season. In 1878 the rot destroyed our whole crop here, but in the northeast part of the county, where the rains were regular, the crop was good.

Insects, during the past year, have been fewer than I have ever known, with the exception of codling-moths, which were as numerous as ever, but the apple crop was so large that their work was not apparent.

Apples are not keeping well, as they ripened up prematurely in consequence of the excessive hot weather in the fall.

For Sweet-potato culture a sandy-clay soil is preferable, but in very many places on the prairies of Central Illinois this cannot be had, therefore we select the driest ground, which, if not already rich, should be made so by applying stable manure during the latter part of winter; this should be spread evenly over the surface and as soon as the ground can be worked in spring it should be plowed as shallow as possible with a breaking plow; let the ground lay until the proper time for setting the plants, which in latitude 40° varies from May 5th to 15th, then harrow until the surface is thoroughly pulverized, after which cast two furrows together, running the plow four or five inches deep and leaving the rows three-and-a-half feet from center to center. The plants should be set fifteen inches apart along the row. When the earth composing the ridge settles it is only five or six inches to the hard ground beneath, which is unplowed, and which the potatoes in growing will not penetrate, therefore we get short, thick, fine-grained tubers of best quality and but few small ones.

DISCUSSION UPON THE REPORT.

MR. MINIER.—I have tried taking the bark from trees in June to make them bear, but the hogs rubbed against them and they (the trees) died.

* For history of this grape see page 72, vol. 12, Trans. Ill. State Hort. Society.—
EDITOR.

To make the Chickasaw plum-trees bear I have taken a switch to them when in full bloom and destroyed a large part of the blossoms and thus made them do their duty and bear.

A Voice.—Did you ever treat the Miner plum-tree in this way?

MR. MINIER.—No, it comes so near bearing *my name* that I have not taken a switch to it. (Laughter.)

MR. WIER.—I have planted seeds of peaches and they produced trees which withstood the cold and bore fruit. I think, by closely observing and selecting very carefully we may obtain one or more peaches which will be hardy in this latitude.

The Committee on Marketing and Utilizing Fruits were to have reported at this hour, but no reports were ready.

REPORT FROM AUDITING COMMITTEE.

A. C. HAMMOND then presented the following report:

Your Auditing Committee respectfully report that we have examined the accounts and the vouchers of the Secretary and find the same correct; and that there is now due him, on all accounts, the sum of seventy-one dollars and seventy cents, for which sum we recommend that a warrant be drawn on the Treasurer.

We further report that we have examined the statement of sums paid out by the Treasurer and the vouchers therefor, and find them correct; but we find a discrepancy between the amount in the treasury and his statement of receipts—he having more than he has charged to himself, and ask that he have the privilege of correcting this mistake.*

We also find that there is due the Treasurer—two per cent. commission on amounts paid out—the sum of twenty-five dollars and eight cents.

(Signed) A. C. HAMMOND, }
 W. H. MANN, } *Committee.*
 H. C. GRAVES, }

On motion of Mr. Dennis the report was received and the committee requested to correct the error before the Treasurer's report is published.

Also on motion warrants were ordered in favor of the Secretary and Treasurer, as per the recommendations of the committee.

* This one error was at once detected and corrected, which correction has been approved by the committee. See the Treasurer's corrected report on page 6.—SECRETARY.

WEIGHTS AND MEASURES OF FRUITS.

MR. DENNIS.—*Mr. President*, I think you are chairman of a committee chosen at our last annual meeting to report at this meeting upon the weights of fruits.

THE PRESIDENT.—Nothing definite has been accomplished in this matter. So long as we sell apples by the *bushel* we should have a general standard weight for a bushel, or a standard for each of the leading varieties.

Several members spoke of the necessity of a scale of weights, but only Mr. Hammond seemed to have made careful tests.

MR. HAMMOND said: I have made many tests this fall, and find by weighing that they run about as follows: Large Ben Davis, 44 lbs., and from that up to 51 lbs. for smaller ones; Winesap and Janet, 50 lbs.; Fulton and Little Romanite, 51 lbs.; Bellflower the same as Ben Davis, and Rambo, 48 to 49 lbs.; but nearly every variety has a different weight from others.

A Voice.—What did you measure in?

MR. HAMMOND.—In a sealed half-bushel, rounded up as long as the apples would lay on without careful placing.

MR. MINIER.—The time is coming when we shall get rid of the old-fashioned method of measuring; it is so unfair as to appear nonsensical. Let us as a society use all our efforts to establish a sensible system of weights, like the cental system in France, and let us as a society, too, start the ball in motion by selling our products by the pound or hundred pounds.

RE-APPOINTMENT OF COMMITTEE ON WEIGHTS OF FRUITS.

Mr. DENNIS offered the following resolution, which was adopted:

Resolved, That T. J. Burrill be made chairman of Committee on Weights of Fruits, and that he appoint a committee of one from each county to report to said chairman (Burrill), and that he compile the results of their investigations and report them to the next meeting of this Society.

MR. ROBISON.—I found my apples to weigh more than Mr. Hammond's, and also found the smaller and poorer ones to weigh more than good ones; and there is where the difficulty is going to lie; as this is just the opposite to what we find in grain, where the larger and better the kernel the more it weighs. I have fixed the *average* weight of a bushel of sound apples at 50 lbs.

A Voice (to Mr. Hammond).—How much does a barrel hold?

MR. HAMMOND.—Two-and-five-eighths bushels.

MR. MINIER.—I am in hopes that the cental system will come into use, and wish that this Society would recommend it.

THE SECRETARY.—This Society has recommended it, and also that all horticultural products be sold by weight.

The President stated that it was time to hear the reports of Committee on New Fruits.

MR. SPALDING, a member of the committee, said he had prepared no report.

MR. GALUSHA, another member of that committee, being called on, read the following :

REPORT UPON NEW FRUITS.—BY O. B. GALUSHA, MORRIS.

Mr. President,—The increasing interest in the introduction and cultivation of new varieties of different species of fruits which shall be better adapted to withstand the rigors of our winters and scorching heats and drouths of our summers, has induced the Executive Board of this Society to create a committee whose special duty it shall be to look up these new fruits which have been introduced into the State, and ascertain and report upon their characteristics.

Your committee realize that this is an important duty, yet one of the most difficult of satisfactory accomplishment; for the name of the new candidates for favor is ‘legion.’

Nevertheless, we enter upon the task hopefully, trusting that the creation of this committee will open a new era in fruit-culture in Illinois; that the work thus begun will be persevered in by this Society until fresh and wholesome fruits, the product of our own Prairie State, will be found in our markets and upon the tables of rich and poor alike *throughout the entire year*.

This end, *Mr. President*, we believe to be attainable, and for it let us labor.

APPLES.—The great desideratum in fruit-culture—the one which entirely overshadows all others, with us, is the discovery of a variety of apple which shall combine the hardiness and productiveness of the Ben Davis tree with fruit which shall keep fresh until the ripening of the strawberry, and whose flesh and juices shall rival those of the Newtown Pippin. At the same time there is great room for improvement, both in tree and fruit, of varieties ripening from harvest-time till March.

We are happy to be able to report that much progress has already been made—several varieties having been introduced and locally tested which promise well for the future of apple-growing.

Wythe.—“The Wythe is undoubtedly a seedling from Rawles’ Janet, as the tree resembles the Janet tree in appearance—bark, leaf and growth;” it has also the characteristics of that tree in putting out both leaves and blossoms later than other sorts. The fruit is much larger and better in quality than its supposed parent and keeps equally long, *i. e.*, till April

or May. It is more juicy and has a thinner skin than the Janet, and hence greater care is necessary in assorting, as a rotting apple is more likely to affect those in contact with it than is the case with thick-skinned fruit.

This fruit has been placed upon the tables of this Society and commended by our committees on fruits for several successive winters, and is now here in competition for the best variety not in general cultivation. Should it succeed as well upon the prairies as at home upon the Loess and timber lands of Hancock county it will be an advance in the right direction.

Triumph.—Samples of this fruit have also been upon our tables and been favorably noticed by the Society. The tree is a seedling grown from seed by J. W. Ridings, of Grundy county. It has thus far proved quite hardy and productive, having not failed of producing a fair crop since its first fruiting—some eight years since. The fruit is uniformly above medium size, regular, smooth, pale yellow, mostly covered with a rather dull red; flesh rich sub-acid; a good dessert and baking apple, but not sufficiently acid to rank as first-class for cooking. It keeps well into spring and has been kept in fair condition till July. A peculiarity of this seedling tree is that however heavy its crop may be all the fruit is of good size—no small ones can be found.

Salome.—The history of this most excellent new variety was published in vol. 12, page 133, of the reports of this Society, and need not be given here. The original tree stands upon the grounds of Mr. E. C. Hatheway, of LaSalle county; it is entirely hardy, bears large crops of fruit, which is all large and fair, and of excellent quality, having a peculiar, and to nearly all tastes agreeable, slightly spicy flavor; color, yellow, nearly overspread with red. It keeps as long as it is desirable to keep any apples, having been kept in a tight barrel entirely sound for a whole year. A most valuable characteristic of this fruit is that it ripens into fine condition in winter and remains fresh, plump and juicy until summer, retaining its flavor till its final consumption. Is not this "the coming apple" for the prairies of Illinois? A few more years will determine. In the mean time we consider it the duty of Mr. Hatheway to rob the tree of nearly all its blossom buds or young fruit in spring, so as to induce a growth of shoots for grafting; as we understand that it bears so heavily as to produce no wood of sufficient size for cions.

Siberian Apples.—Quite a number of seedling Siberian apples have appeared within a few years, for which the originators claim superior merits. Among these, perhaps the most prominent Illinois seedling is Whitney's No. 20, raised and disseminated by A. R. Whitney, of Franklin Grove. The tree is symmetrical in growth, and the fruit fully up to the Transcendent in size. By some it is preferred to this standard variety.

A new seedling, not yet disseminated, stands in the yard of Mr. Jameson, of this, McLean county, the fruit of which is large, yellow and of a rich flavor. From the single specimen tasted, I judge it to be superior in flavor to Transcendent. The originator says of it, "The average size is one-and-a-half long by one-and-a-quarter inches in diameter,

and the *yellowest* apple I ever saw, with waxen appearance; is more juicy than its parent Siberian; a fine dessert fruit when fully ripe. When cooked, as we serve them—by coring only—the skin is so thin that it dissolves with the fruit; is sweet enough when stewed to need but little sugar; for jelly and apple-butter it is the finest fruit that I ever knew." It ripens middle of August. Mrs. Jameson, who gave me, the last September, the only remaining specimen of the fruit, said she was familiar with Transcendent and Hyslop, and regarded the yellow seedling as decidedly superior to either.

Several seedlings originating with Dr. Andrews, of McHenry county, were brought to notice a few years since, of which one called Chicago and another called Marengo, a winter crab-apple, were highly extolled; but as the entire stock was sold to an Eastern nurseryman we have seen nothing since concerning them, except in the said nurseryman's catalogue.

PLUMS.—There seems to be little, if any, progress making in varieties of plums; the Miner and Wild Goose, of recent introduction, prove so fickle and variable as to disappoint and disgust nearly all who have attempted to obtain fruit from them.

CHERRIES.—Nothing new in the varieties of cherries had appeared in many years worthy of note until Mr. Wier, of Marshall county, through extensive experiments with seedlings of the Early May cherry, produced a few excellent varieties. One of these, which he has named "Northwest," seems, thus far, to combine more excellent qualities than its parent. The tree is very hardy, more symmetrical in growth than Early May, is a regular and abundant bearer of fruit of about the size of the parent, though in shape resembling May Duke, is firmer and richer than E. May.

PEACHES AND PEARS.—I am not aware that there have been any decidedly superior varieties of either peaches or pears lately introduced, except those which have already been discussed, and their merits put upon record by this Society.

The Amsden, Alexander, Beatrice, Early Louise and Early Rivers peaches have all been commended by some. The Alexander and Amsden have become, I think, quite popular as early market sorts.

The Birkitt and Wilkinson's winter pears are commended by those who are familiar with the habits of the trees as hardier or less liable to blight than any of the older sorts; though the quality of the Birkitt fruit is inferior to the average of cultivated varieties.

GRAPES.—Champion, Brighton and Perkins seem to be the most desirable varieties among grapes of recent introduction, being hardy and prolific in vine, and the fruit of good quality. The fruit of the Perkins, however, becomes quite foxy if allowed to become overripe. Martha proves a valuable white grape for the northern portion of the State, though its foxiness is objectionable. Lady has been found too slow and feeble in growth for profitable cultivation; though there are some exceptions to this.

Quite a number of Rogers' Hybrids fully sustain the claims made for them several years since: notably the Goethe (No. 1), Wilder (No. 4),

Merrimac (No. 19), and Agawam (No. 15); all of which sorts are of robust growth, nearly hardy, productive, and the fruit large and of quality from good to very good.

BLACKBERRIES.—The *Snyder* has been sufficiently tested in the north half of the State to enable me to report positively of its superiority to all other varieties in cultivation in this latitude. It has not been known to be seriously damaged by the severe winters until the last winter, when, perhaps, an average of one-third the canes were badly damaged, reducing the crop correspondingly. The fruit, *when ripe*, is fully up to Kittatinny or Lawton in flavor, and of good, though not large size. It produces as heavy crops as can be desired; in fact, its tendency to overbear is its worst fault.

The *Ancient Britain* is highly commended, by L. K. Scofield and others who have grown it, for the extreme northern portion of the State. The fruit is said to be very sweet, though only medium in size, and the canes entirely hardy.

The *Barnard* is also commended for Northern Illinois and Iowa, where it has been fruited, as it withstands the rigors of the coldest winters. I have it on trial, planted last spring, though I have not fruited it as yet.

Taylor is also on trial—canes commended as hardy, and fruit as large and delicious. With me it was damaged more than *Snyder* last winter, though not entirely killed, as were Lawton, Wilson's Early and Kittatinny.

RASPBERRIES.—Many new varieties of red and black Raspberries, and a few of hybrids, have been introduced into the State within a few years. I have tested nearly all these varieties, but have learned but little of their success or failure in other portions of the State, and will, therefore, speak only of my own experience, and will name sorts in each class in the order of their merit *on my own grounds*.

Cuthbert (or Queen of the Market)—for these two are so nearly alike, if not identical, that they have been considered as one where grown side by side—is a new red variety, canes hardy and immensely productive; fruit large, of good quality, bright color and the *firmest red sort* which I have yet fruited. This is at present the most valuable market sort among the red raspberries.

Reliance is also hardy, and bears as heavily as can be desired; the fruit is a little larger than *Turner*, of good quality and of medium firmness for a red berry.

Winant is almost if not quite equal to *Reliance*, and may, after further experience, be placed before it on the list, as with me it is a little firmer than that variety.

Thwack, which originated in Missouri and was introduced into this State three years since, is growing in favor. The canes are the hardest on my grounds—not a terminal bud having been killed during last winter, which was as severe a test of hardiness as I ever knew. They are quite productive, fruit of good size and quality, and almost as firm as that of *Cuthbert*. The canes are short, not exceeding four feet, and require no

pruning, though it is said to produce larger, better fruit by shortening in the growing canes. Like most of the red sorts, this "suckers" profusely, and must be confined to narrow rows and receive rich and good cultivation to develop its excellencies. I look for an increasing popularity for this variety.

Brandywine, though the most abundant of any variety in the markets of the East, has not been generally grown in the West. The canes are hardy, very prolific; fruit good, medium size, fair quality and sufficiently firm for market purposes.

Pride-of-the-Hudson should be left on the Hudson or elsewhere at the East, as the canes cannot endure our extremes of temperature—an utter failure here.

Highland Hardy has not proved as hardy as the varieties commended above, and I shall discontinue its cultivation.

Black Raspberries.—The *Gregg* is a rampant grower, is as hardy as any I have grown and bears large crops. The fruit is a clear black, very large, pulpy, and of a rich, sub-acid flavor. This is unquestionably the largest and best variety of black-cap grown in the State, as its firmness, added to other excellent qualities of cane and fruit, renders it valuable to raise for market purposes.

Miller's Daily grows as strongly as *Gregg*, and I think the canes are nearly or quite as hardy; they bear good crops of large berries, which are juicy and of excellent flavor. It is said to produce a few berries for several months after the fruiting season; but having fruited it but one season I cannot testify upon this point, except that it did not so fruit with me. It may do so when stools are older. It seems to be a decided improvement upon *Doolittle*, both in size and quality.

Hybrid Raspberries.—None of the hybrids which have fruited on my place are fitted to become popular market fruits, though the *New Rochelle*, which fruited abundantly the past season, was the best of all for cooking. The canes are of moderate growth, the fall tips being quite weak as compared with *Miller* and *Gregg*, but the productiveness of the variety is unsurpassed by any black-cap. The fruit is large to very large, very juicy, with a sub-acid flavor exceeding any other fruit of its class. The color is blackish, with a clay-colored bloom. It is the best berry for cooking of any on my grounds. The canes, though damaged by the excessive cold of last winter, were less so than those of *Philadelphia*, *Doolittle* or *McCormick* (*Mammoth Cluster*).

The Ganargua, another hybrid which has been highly commended, is immensely productive; fruit of medium size and not equal to *New Rochelle* in flavor. It must be of better quality on some grounds than on mine, else it could not have been commended by as good authority as it has. But I see no reason for wanting more than one sort of this class, as their color prevents their sale in market.

STRAWBERRIES.—To give a list of all the new varieties which have been tested here, with the characteristics of each, would alone be too much matter for a single report. I will, therefore, endeavor to speak *especially* of those only which have been found worthy of general attention.

Crescent, sent into the State three years since by H. H. Smith, of Connecticut, has proved the most productive of any variety, and, when confined to narrow rows, fertilized by planting a more strongly staminate sort, like Wilson, Charles Downing or Capt. Jack, near it, and receiving even moderately good cultivation, has given the highest satisfaction, but where neglected and left to mat the surface and where not properly fertilized it has disappointed the hopes of the planter in size and firmness of the fruit, and induced a few to cry "humbbug." Grown as it should be, and as it is easy to do, it will produce uniformly immense crops on all sorts of soil on which any varieties can grow, and of fruit of large size, good flavor, glossy and attractive in appearance, and sufficiently firm to carry well sixty miles to market. The blossoms are not generally furnished with sufficient pollen to fertilize the ovaries, and hence it is important to plant strongly staminate sorts in proximity—say one row of others to three of *Crescent*.

Sharpless is a robust plant, has perfect blossoms, produces good crops of very large showy fruit of fair flavor (sub-acid) and sufficiently firm for shipping 100 to 200 miles.

Miner ("Miner's Great Prolific")—so named after the noted and now lamented T. B. Miner, who originated it—is indeed worthy the worthy name it bears. The vines are vigorous and very productive; blossoms perfect, fruit of large size, rich, and as firm as that of the Charles Downing, which is shipped from Alton to Chicago. I look for an increase in the popularity of this variety.

Centennial Favorite should stand next in the list with me. The vines are good growers, healthy, and immensely productive of fruit, generally large (some very large) and of the highest flavor—a combination of sugar, acid and pleasing aroma—making it the most satisfying fruit to eat fresh from the vines that I have known since the days of the "Hooker" and "Burr's New Pine." This, I think, is destined to be extensively planted for home use and for fancy berries. The blossoms are self-fertilizers.

Duchess deserves a place in every garden. The plants are robust, though generally not worthy the name of *vines*—so disinclined are they to form runners—and are literally loaded early in the season with bright round berries of medium quality and firmness and a little above medium size. Blossoms perfect.

Windsor Chief is a rampant grower, a profuse bearer; blossoms not fully self-fertilizing; fruit above medium size, of only fair quality, not sufficiently firm for distant shipment; but it is one of the most profitable varieties for a near or home market.

Cinderella deserves a prominent place with those who cultivate well either for near or moderately remote market. The vines are good growers, very productive, and the fruit of fine size and good quality. A medium early sort.

Captain Jack.—This variety, though of rather recent introduction, has made its way to the head of the list of market sorts with many of our best cultivators. It is strictly a market berry. Like its parent, the

Wilson, it is extremely firm, though it surpasses its parent in size, quality and productiveness. Those who grow the finer sorts, however, will place them upon their own tables in preference to this *captain* of the market sorts. The one defect of this variety is the shortness of its leaf-stalks. The fruit-stems tower above the foliage, giving, when the fruit is ripening, the appearance of a mantle of fruit covering the ground.

Duncan is an early sort, with robust vines, large fruit and an abundance of it, though not as extremely prolific as *Crescent* and *Capt. Jack*. It is "a good honest variety," which will not disappoint those who give it reasonably good culture—a good early market berry.

Black Defiance, an early sweet berry, has given me entire satisfaction, for my anticipations concerning it were not very high. It is well adapted to sandy land, where it forms stools of large size—running but little—and produces plentifully of large, dark-red, sweet fruit. This, like the others named, and not noted, is a self-fertilizer. Were it not for its dark, dull color, it would rank high as a market sort.

Continental has a large, sweet fruit of the firmest texture of any berry I ever grew, ripening rather late. I think it could be safely shipped 1,000 miles by railroad. The berries were not uniformly large, like those of *Cumberland Triumph*, though as the vines were covered with standing water twice in early spring this may have caused the defect. It promises well.

Great American is one of the most fastidious varieties that I ever cultivated. Give it plenty of room, plenty of fertilizing manures, good cultivation, and it will reward you with berries which will make the eyes of an epicure stand out with eagerness. My vines of this variety, treated with liquid manure—a cheap method, by the way, compared to its benefits—gave full pickings of exceedingly large, rich, brilliant fruit, when other sorts—except *Kentucky* were nearly gone. This is a valuable sort for those who can get extra prices for fancy fruit, and are willing to give the *very best* cultivation.

President Lincoln, like the *Continental*, did not have a chance to show its capabilities. The vines are medium growers and bearers; much of the fruit is of immense size, rather irregular in shape, held up well from the ground by its large, tall fruit-stems, and of a good, rather sweet flavor.

Cumberland Triumph has been for some years in cultivation, and its merits have been pretty well discussed; though opinions concerning it are as contradictory as are those regarding the *Crescent*. The foliage is remarkably large and robust, covering the ground and hiding the fruit. The vines, if kept in narrow rows, bear good crops of uniformly large, round, pale, soft berries, which are eagerly sought for in a home or near market—for they cannot be shipped with safety—are rather pleasant in taste, but lack a decided flavor. This is a favorite with many who raise fruit merely because it will sell readily in their immediate neighborhood. For such it is very profitable.

Springdale is another strong-growing sort, with a good record as to its productiveness and the size and firm, excellent quality of its fruit, which ripens rather late. The flowers are pistillate.

Pioneer, one of Mr. Durand's seedlings recently introduced, is a medium grower, with delicate, light-green foliage; fruit of rather large size, medium only in firmness, of good, rather sweet flavor, holding out well in the latter part of the strawberry season. Some growers place it at the head of their lists.

Essex (or Durand's Beauty) is one of the best berries in cultivation—large, brilliant, as though varnished, firm, rich, rather sweet. The vines are quite disinclined to form runners, many of the plants not making an average of one new plant per year; hence the stock of plants of the genuine variety must remain scarce for several years to come. They have proved rather sparse bearers on my grounds, and I will not extend the plantations.

Star of the West is a luxuriant grower, and on good soils an abundant bearer of quite large, sub-acid fruit, firm enough for shipment from 100 to 200 miles by rail. It is more reliable than Monarch of the West, with which it is often compared. Its place (or rank) is not yet fully established. I shall continue its cultivation.

Crystal City has not fruited on my grounds sufficiently to admit of giving its characteristics. All accounts agree that it *ripens earlier* than any variety in general cultivation; that the fruit is of good medium size, of fair, not rich flavor, and of only moderate firmness. It may, however, be shipped 100 miles in good order. It is profitable as an early market sort.

Glendale is highly commended, is a rank grower and fruit said to be very abundant, of a large size, firm, and late. This with Longfellow, Warren, Oceana Chief, Brilliant and others are on trial.

Sterling is an abundant bearer of good fruit above medium size, but so close to the ground as to render it almost impossible to keep the berries clean. I shall discontinue its cultivation.

This long list, it must be borne in mind, contains only the names of "new fruits," or those comparatively new, and no inference should be drawn from it that the older sorts are to be discarded, and will refer to my report upon strawberries for opinions in respect to some of them.

CURRENTS.—The only sort which seems to be any improvement upon older sorts is the Long-bunch Holland, which, though many years old, is comparatively unknown. It is a very robust bush, with broad, tough, persistent foliage, bears abundantly of large, long-bunched, red, acid fruit which holds on the canes longer than any of the other sorts.

Of GOOSEBERRIES I have nothing to report from experience, except that I have not found the Downing productive. Mountain Seedling has not been tried.

A. H. GASTON.—As the Secretary, in this report, has mentioned Mr. Hatheway's Seedling, the Salome, which promises to be of great value to the West, I will call attention, also, to a seedling growing in this county (McLean). The tree is forty years old, hardy and a good bearer, and the fruit said to keep till February and March.

MR. EDWARDS.—I hope Mr. Hatheway will bring out the Salome apple, as I have tested the fruit in June and know its superlative merits.

J. T. JOHNSON, from the committee, read his report :

REPORT ON NEW FRUITS, TREES AND PLANTS.

BY JAMES T. JOHNSON, WARSAW.

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

Realizing, as I do to-day, my own want of ability to make out such a report as I, in my own estimation, could desire, and especially upon a subject of such manifest interest to the great horticultural family of the West, I must confess that duty alone impels me to attempt the arduous task which you in your kindness have imposed upon me.

There is a demand for a new apple. Prof. Swing says that whatever is popularly demanded will come ; so we shall have it.

First, then, allow me to say that I regard him who shall give to the world, not by mere accident, but by earnest, persistent and intelligent effort, a *new and valuable* variety of the *apple*, one which shall at once combine all of the good qualities of our own Ben Davis of Western Illinois, with the addition of such good qualities as we can find in the Jonathan, the Grimes' Golden or the Spitzenburgh, as one of the greatest public benefactors of the age in which he may live (for he may or may not at present dwell among us), as one whose name is worthy to be handed down to posterity along with such illustrious names as those of Franklin and Fulton and Morse. But shall we accomplish this without an earnest effort and without expense, or intelligent investigation? Our answer is, no! And we believe that a great public effort in this direction would be justified by the people of the great State of Illinois, and that for such purposes an experimental orchard should be encouraged by the State. It is a fact, now most generally accepted, that all of our most luscious fruits have been (as Prof. Swing told us upon last evening) in the course of the ages evolved, or rather ameliorated, from the once wild and utterly unpalatable fruits of the forest, and not by mere accident, as a general rule, or by the wanderings of "Johnny Apple Seed," but as the result of careful selections, or from intelligent and skillful hybridization, all of which is now, or should be, generally understood by the intelligent horticulturist ; and it is my wish to impress the fact that it is by such intelligent effort alone that we should hope to produce new, rare or valuable varieties of fruits, trees or plants, and especially of such as will be fully suited to our climate, location and soil.

Then let us endeavor to more fully realize that the same beneficent Creator who has done so much for us in the way of giving us fruits, trees and plants, has also given to us the capacity, and along with it the opportunity, to improve upon those which have been given to us.

In an effort of this kind we may of course expect some disappointments, but we should also faithfully and fully expect that ultimate success will most surely come.

How few, comparatively speaking, ever stop to think what a little effort has often done, and what a little effort may do again. You will pardon me if I should refer to a few incidents of this kind which have come under my own observation.

The now celebrated "Ben Davis" apple was handed, some fifty-three years ago, a small and ordinary seedling tree, as a present from Benjamin Davis, then of the State of Kentucky, to his nephew, Mr. Ben Davis Hill, late of Hancock county, when starting for the then wilderness of Western Illinois. This tree was planted by Mr. Hill a few miles south of the present city of Warsaw, Ill., and from it thousands of trees of this most hardy and productive variety of the apple have since been propagated.

Our fine, large, crisp and juicy "Wythe" has a similar history. Mrs. Samuel Chandler, when about to leave the old homestead in Eastern Ohio, many years ago, took the precaution to carry with her a few seeds of the Rawles' Janet; these she afterward planted on one of the prairies of Wythe township. A few trees were produced, two of which were presented to a relative and neighbor (the late Rodolphus Chandler), one of which became the present popular Wythe apple-tree. However, this excellent and valuable apple remained unnoticed in the orchard for many years, until its real value was discovered by an eminent member of this Society, (A. C. Hammond, Esq., of Warsaw,) who first brought its good qualities into public notice.

Again, a chance seedling came up in the wood-lot of the writer, some ten years ago, and although it was known to be an apple-tree, it was at first neglected, but finally Mr. A. H. Worthen, Jr., a neighbor, planted it in his orchard and cared for it; the result is that delicate-colored and beautiful fruit, the "Worthen Winter Sweet."

Further, it is believed that there are now standing many neglected seedling trees, particularly in the western and southern portions of Illinois, which are worthy of being looked up and more fully tested; and indeed it may be possible that the long-desired apple originated years ago, and only needs looking up and disseminating; the Salome may be that apple.

We have, in Hancock county, a number of promising seedling apples now on trial. We have also originated and fully tested a number of the finest and best seedling peaches in the State, among which is the fine, large, yellow, early, hardy and productive "Felt's Rare-ripe;" the "Yocum," a fine, large, late, yellow peach; also the "Porter," the "Kay," and a number of others equally fine.

Mr. Carrier, of the Warsaw Society, has a very promising new seedling raspberry (most likely a hybrid), which was on exhibition at the Society's June meeting; the specimens indicated a very prolific and choice variety.

A new seedling strawberry, the "Wright," originating in the same locality, is now on trial, with fair prospects.

Among strawberries lately introduced into our county the Russell and the Crescent are both hardy, productive and popular.

Kentucky, Downer's Prolific do well on my own grounds, as also does Col. Cheney, when planted with Wilson or some suitable variety for fertilization (these however are hardly new fruits).

As a new blackberry the Snyder has many friends, who pronounce it best of all. As far as my own observation extends, new grapes, new pears (or old ones either, for that matter), new plums, or new cherries, have received but little attention of late; and having thus far, upon my own part, been too discreet to make many ventures of either time or money in that direction, I shall not now attempt to direct others.

In regard to trees and plants, particularly those for ornamentation, I can only say that new ones are being originated, introduced and brought into notice almost every year, and this is especially true of ornamental and flowering plants, the names and beauties of which can soon be learned by calling on any of our prominent florists and nurserymen.

I trust, Mr. President, that I shall be excused for a short allusion to general horticulture, when I venture the assertion that notwithstanding the hard times and the severe drouth through which we have but just happily passed, that from the influence of our great State and local horticultural societies an immense army of the good citizens of Illinois have recently caught the true spirit of horticulture and planted largely, and in most instances with excellent taste, of the old, as well as the new trees, plants and flowers, thus honoring our Creator, elevating our own tastes and beautifying our homes.

The President announced that an invitation had been extended by President Hewitt, of the University, to the Society to visit the class-rooms of the institution at half-past one o'clock this afternoon.

Objection being made to visiting the school in a body, some discussion was held and the invitation accepted with the modification that members who have not already done so, consider themselves at liberty to visit the several rooms at any time during the afternoon.

REPORT UPON PRESIDENT'S ADDRESS.

Dr. HUMPHREY, chairman of the Committee on President's Address, announced the readiness of the committee to report.

No objection being made, he read as follows:

Your Committee hereby report that the part of the address relating to the mission of the Society—what it has attained and accomplished in stimulating and improving this important branch of industry—commends itself to every citizen of our great Prairie State. The part of the address relating to horticulture as a fine art is especially commended, and we suggest that landscape gardening, farm horticulture, flower culture and rural adornment receive increased attention.

Your Committee doubt the advisability of the taking of abstracts of reports made to the Society, as recommended by the address, but, to insure brevity and comprehensiveness in reports, we suggest that the Secretary be instructed to ask each contributor to make his report as brief as a thorough and careful discussion of his subject will admit.

All of which is respectfully submitted.

(Signed) A. G. HUMPHREY, }
 F. A. BALLER, } *Committee.*
 JAS. W. ROBISON, }

On motion, the report was accepted.

The Society then *adjourned* until two o'clock this afternoon.

THIRD DAY—AFTERNOON.

The Society convened at the regular hour, and the Secretary opened the

QUERY BOX.

As usual the questions were discussed in the order of the reading.

Query No. 1.—What is the best implement for keeping the vineyard free from weeds—plow or hoe? If plow, how deep can we plow without injury to the grape roots? S. N. KING.

MR. ROBISON.—I use both plow and hoe; I plant the vines in squares, six or eight feet apart—rowing both ways, the same as corn—and use a single-shovel plow close to the vines, and a double-shovel plow in the center of spaces. Some roots are cut, but I have perceived no damage to the vines from the little breaking done.

I commence plowing the vineyard before beginning to plow for corn, and keep up the cultivation till July, plowing from four to six inches deep, and using a hoe only to clean out around the vines and kill any weeds the plow may have missed.

Query No. 2.—At what age is it best to seed an apple orchard to grass?

THE SECRETARY.—My experience and observation compel me to say *never*. If an orchard, by the chances of wind blowing seed, etc., gets seeded to grass, I destroy it as soon as possible; hiring men to destroy with spade and hoe what escapes the plow.

Clover seed is the only kind of seed I have ever sowed in an orchard, and not that until the trees have been in bearing several years. What-

ever grows in the orchard, whether clover or weeds, I mow and spread over the ground, leaving it as a mulch and manure. Orchard-grass may be admissible—I have never tried it.

MR. MINIER.—Sow orchard-grass, cut it and let it lie on the ground. This does not make a sod like other grasses, and, consequently, does not rob the soil of moisture as much.

I would not sow it until the trees have been about five years in orchard. In answer to a question, he said the seed can be obtained at the large seed-stores in Chicago.

MR. ROBISON.—I would like to ask the Secretary if he has ever seen an orchard with part in clover and part not seeded.

MR. GALUSHA.—Yes; Esquire Ridings, of Grundy county, has such an orchard, and, as he is present, I would like to hear from him.

MR. RIDINGS.—I have an orchard which is partly seeded to clover, and in that part I find some varieties do better than others; and in the part that is unseeded I find the opposite condition of things often existing; that is to say, that many of the varieties that do best where sowed to clover, do the poorest where in unseeded ground, and *vice versa*. I have now tried sowing clover four years, and have less trouble with clover than anything else.

MR. SPALDING.—Which sorts do best in clover?

MR. RIDINGS.—Keswick Codlin, Sweet June and some other early varieties.

THE SECRETARY.—I believe a portion of your orchard is in grass, is it not?

MR. RIDINGS.—Yes; quite a patch of it, for hogs to run in, and on this part the trees do not bear much. I would keep out grass, but would sow clover in orchard.

MR. WIER.—I consider it a bad plan to seed an orchard down at all; but clover may do on rich soil. Wagoner must have complete and thorough culture, and no grass or clover allowed to grow near it.

MR. DE GARMO.—I have a young orchard just coming into bearing and am trying the plan of sowing a wide strip of clover along the rows of trees and seeding the rest to timothy.

MR. SPALDING.—I have tried seeding, but don't find it to work well; clover, however, has been the best. Some varieties do well in grass on rich, fat prairie land, especially those which are extraordinary fast growers.

DR. HUMPHREY.—Do you mean to say that you sow to grass to prevent rapid growth?

MR. SPALDING.—To throw the trees into fruiting.

A. H. GASTON.—I know orchards that would not fruit until left to themselves and the orchard grew up thick with rag-weed, after which they bore well. I have reason to believe that potatoes are a good crop to grow in the orchard.

MR. ROBISON.—I believe that trees will do better in rag-weed than in grass, although I don't know that I would recommend either; should prefer to *band* the trees to make them bear; banding makes larger leaves, consequently larger fruit. Under no circumstances would I plant potatoes in orchard, for in such case we would be obliged to cultivate too late, thereby inducing late growth in the tree, which we should aim to avoid. Plant corn in the orchard.

Query No. 3.—What are the best two varieties of winter apples to raise for commercial purposes in McLean or adjoining counties?

Several Voices.—Ben Davis and Willow Twig.

MR. WIER.—Jonathan and Willow Twig.

MR. GASTON.—Stark is best in Peoria county.

MR. WIER said three-fourths of the crop of Stark apples were on the ground before picking time. He would plant no more Starks.

MR. GASTON said Stark does well in Ohio, to which the Secretary responded that when Stark was introduced into Illinois with such "a flourish of trumpets" he asked Dr. Warder's advice about planting it largely, and the Doctor said, "Better go a little slow on Stark." The Secretary agreed with Mr. Wier that Jonathan and Willow Twig seem to be the best two sorts of which trees can now be procured; that too many Ben Davis trees have been already planted.

MR. ROBISON stated that he had been informed by Dr. Warder that Stark is not profitable in Ohio. Mr. Wier remarked that it requires a cold soil.

Query No. 4.—Can any member give us any information upon the subject of sugar production from the Amber Cane, which is now agitating the producers of sugar in the Valley of the Mississippi?

(Signed) G. W. MINIER.

This query introduced a discussion of considerable interest, but failed to bring out any important testimony or *definite results* of the enterprise.

MR. De Garmo had made syrup from Amber cane, but did not think it quite equal to that made from the Liberian cane. He thought we will have to *learn how* before good sugar can be made from it, and advised moderation in its culture.

Mr. Wier thought the Amber cane "boom" is principally manufactured by parties who have a patent material to sell for making the syrup

granulate, and that the papers devoting so much space to this subject do it largely in the interest of these parties. Several members testified to having made or used syrup from the Amber cane, but none pronounced it superior to that from some other varieties. A. H. Gaston had succeeded in making the syrup (or a portion of it) granulate. J. S. Johnson had no better success in attempting to make sugar from it than from the older sorts. Mr. Wier stated that a sample of sugar sent him, which was said to have been made from Amber cane juice, proved upon being tested to be *glucose*.

SUPPLEMENTARY REPORT ON FRUITS.

Mr. EARLE presented the following:

Your Committee on the Fruits Exhibited beg leave to make a brief supplementary report.

We find upon reviewing our work of yesterday that there was one entry of Willow Twig apples which escaped our attention, and that we did an exhibitor an injustice. It is our conviction that the peck of Willow shown by Mr. R. De Garmo is on the whole superior in merit to any other in competition, and as we don't feel justified in withdrawing an award already made, we recommend a special award of five dollars to Mr. De Garmo, of Shelby county.

The following is the list of ten varieties receiving the award for Northern Illinois: Jonathan, Winesap, White Pippin, Smith's Cider, Yellow Bellflower, Willow Twig, Rawles' Janet, English Gold. Russet, Domine and Minkler.

The list for Central Illinois for which the first award was made is Jonathan, Winesap, Ben Davis, Rawles' Janet, White Pippin, Rome Beauty, Smith's Cider, Willow Twig, Minkler and Limber Twig.

Those receiving the second award for Central Illinois are, Jonathan, Ben Davis, Winesap, Grimes' Golden, Fulton, Willow Twig, Red Canada, Minkler, Rawles' Janet and Northern Spy.

Your committee wish to use words of warm appreciation of the two beautiful baskets of flowers presented to the Society; the first by Baird & Tuttle, of the Phoenix Nursery; the other, which is especially superb, by Mr. F. A. Baller, of Bloomington; also we find a most beautiful large bouquet, the handiwork and gift of Mr. Gregory, florist, of Bloomington; also a basket of foliage plants, donor's name not known to us.

We have examined with interest a new grape, the Prentiss, sent to the exhibition by Mr. T. S. Hubbard, of Fredonia, N. Y. It is a white grape, fair-sized bunch, thick skin, good, rather sweet flavor, and is well preserved. We have no knowledge of the character of the vine.

We have also found two specimens of Japanese persimmons, contributed by Baird & Tuttle, of Bloomington; these specimens, we are told, were

grown in California. We doubt not that these persimmons would be a delicious addition to our fruits when they can receive sufficient artificial protection.

The report was accepted as the sense of the Society.

DISCUSSION—MISCELLANEOUS.

Dr. Schroeder exhibited a knife, having a stiff hooked blade and an iron shank about six inches long of which the handle is an extension. He showed the manner of cutting asparagus six or eight inches below the surface, remarking, as in his report, that the Germans wanted their asparagus white and nice; and that the green above ground was only fit for goats and rabbits. To this it was remarked that *white* asparagus would not sell as well in Chicago now as well-grown green stalks; so the Illinoisans must be classed by the Doctor among the goats.

DR. SCHRÖEDER.—This comes of education. (Laughter.)

DR. MCGREW.—*Mr. President*, this remark about rabbits reminds me of a plan to prevent them from gnawing the bark from trees; I have done this by tying white rags to the lower branches or so they will come near the ground. I live in Kansas, and have learned that to get good crops of apples there we must allow the trees to branch near the ground; the side branches protect the trunks of the trees when young, but grow more upright than branches do if the trees are trimmed to tall heads, and after the trees get well into bearing the low-headed trees bear very much more fruit than those which are pruned up.

PROF. THOMAS, chairman of the Committee on Entomology, to whom was referred the box of insects taken from the query-box, said that he found in the box some of the larvæ of the imported cabbage-worm and some parasites upon these larvæ, a few of which were still alive; and he would take them home and breed them. He hoped for much relief from the devastations of the worm next year by the parasites which have been found preying upon them. He said: We should be careful, in destroying the larvæ and pupæ of noxious insects, that we do not destroy parasites also, as the parasites increase so rapidly that they will destroy millions of the cabbage-worms in a short time.

The President called for the next business in order, which was a

REPORT UPON GRAPES AND GRAPE CULTURE—BY E. C. HATHEWAY.

It were well, perhaps, to preface this article with the remark—Concord, first, last and all the time, for *money*; as it is now quite indisputable that Concord, in its ability to “stand grief” of all kinds, its

comparative immunity from insect attack, its hardiness, productiveness, etc., should place it as the *standard* for comparison. Yet there are many who do not cultivate altogether for money, therefore other varieties may be selected, either for better quality or to lengthen the season.

Among the earlier class is the Perkins, which with me, next to the Concord, is the most profitable grape I can grow, and I think that with many others it could be made a source of profit where grown in limited quantities. I say limited, as its season must not conflict with the Concord, therefore only such an amount should be grown as will find sale before the Concord is ready. It is as hardy as the hardiest, very productive, and about as early or perhaps a little earlier than Hartford. The fruit should be gathered before overripe, as it gets foxy and is inclined to drop when left on too long.

Of Rogers' Numbers, the 4, or Wilder, in my opinion is by far the best, considering healthiness, hardiness, productiveness and quality. This variety, as well as most of his others, seems to do best when pruned to single or two-eyed spurs on old canes. I would suggest that this plan be also tried on Isabella where this variety has proved refractory or unproductive.

I have observed the Delaware carefully the past season on different soils; on clay it retains its leaves and perfects its fruit, but on light or sandy soils it drops its leaves in August, for which reason I have discarded it, and have dug up the vines; and where the leaves had fallen before the fruit matured I found the roots covered with a mass of excrescences, showing plainly the work of Phylloxera.

Lady has never perfected its fruit with me; the vine makes good growth early in the season, blooms and the fruit sets well, but during the hot weather of July it sheds its leaves and the fruit withers; it again puts forth leaves and makes a considerable growth before cold weather, and seems to ripen up this secondary growth, and to all appearances has recovered from its trouble during the summer. It has now conducted itself in this manner for two years. I have closely examined both roots and stalk, but fail to find any insect affecting it.

A few miles from my place, however, on prairie soil and clay, it has been quite a success, giving good satisfaction.

Hartford does well generally in our locality and is a desirable variety to come in before Concord; on my soil it does not drop its fruit.

Martha does not give good satisfaction, lacks character, is too foxy and very capricious.

Catawba was better this year than for a long time before; it seems to recover from the attack of Phylloxera at stated intervals, say about every third or fourth year, according to my observation, when it will give a good crop and then again fall into a relapse.

Ives is a poor bearer on a light soil in our locality, but on heavy soils does better.

I might thus continue to remark upon different varieties; but what will it avail? As I started out with the remark of "*Concord* first, last and all the time," so will I continue to exclaim that for money—and it is the

Almighty Dollar that the majority of those who labor in the vineyard are after, or else why the labor?—the Concord is not as yet superseded. Many of the newer varieties have been observed by me both on my own grounds and elsewhere, but not sufficiently as yet to remark thereon. I hope to hear the experience of others who have had a more intimate acquaintance with them.

The spring season of 1879 opened from three to four weeks earlier than usual, thereby starting the grape-buds into active growth in time to be severely handled by the frosts of May, and many vineyards were so badly injured that the crop was quite light and the total not more than half an average. Prices in consequence were fair most of the season, and had it not been for the large amount of fall apples which were crowded into our markets at low prices I think the prices of grapes would have been much higher than they were.

Regarding the matter of planting and training, I am satisfied that the trellis consisting of posts set sixteen feet apart, with three wires stretched along them, and the rows seven or eight feet apart, is much the best system of training, for this reason: that by it we utilize the whole space along the row from vine to vine, which would be lost in the system of single-stake training, and which allows us to grow more cane for fruiting and in a more natural manner, at the same time obtaining more and better sun exposure as well as atmospheric circulation, and by this means we get four-fold the quantity of fruit. Some will contend that we will overcrop our vines in this manner. I will answer, that when you wish to fatten your steer or porker you give him the proper amount of proper food; likewise in the vineyard, to produce large crops without injury to the vines, you must see that the vine is provided with proper food and plenty of it.

I would plant vigorous-growing varieties like Concord, Diana and the Rogers' Hybrids eight feet apart in the row; and Delaware, Martha and less vigorous kinds six to seven feet apart, training fan-shape, cutting out old wood annually so as to get young canes as far back towards the base or main stem as possible, *except* such varieties as the Rogers', Isabella, Diana and some others, which should be allowed to grow as *arms* of old wood and the young canes cut back to short spurs of one or two buds.

I have had best success in planting good two-year-old vines, cutting back at time of planting to one cane with three or four buds.

Cultivate with five-toothed cultivator, adjustable and having high standards, and a guide wheel in front, also adjustable for light or deep plowing.

Plow deeply with this implement in the center between the rows and lightly near the vines; an expert man will run the cultivator so closely to the vines that a smart boy with a hoe will finish the work along the rows as fast as he can cultivate.

Never allow weeds to grow in the vineyard under any circumstances if you wish the finest fruit, which will bring the highest price, but make the cultivator, in addition to its other utility, be mowing machine and mulch as well.

Manure, when used, should consist of compost a year or more old; I have observed the best results following the application of a compost consisting of cow manure and old sods or loam in equal parts, adding two bushels air-slaked lime, one peck salt and one bushel ground bone to the wagon load, thoroughly mixing and applying broadcast in spring, and at once plowing in. An occasional dressing of land-plaster is beneficial, as it absorbs moisture, which it retains, and during a drouth gives it slowly back to the soil for the sustenance of the vine. Cob ashes are *very* valuable as a manure for the vineyard, and so also are tobacco stems, which can generally be obtained in most large towns for a trifle; but raw or fresh manure from the stable should not be used, as I am firmly convinced that it will induce mildew and rot.

We are quite free in our locality from a general prevalence of those insects which prey upon the vine or its fruit, but we have one little fellow who is a host in himself if not taken care of at the outset, and that is the "*leaf-hopper.*"

To be sure he does not make much headway on the Concord, Perkins and some others which have thick and very pubescent leaves, but upon Delaware and other thin-leaved varieties they soon leave their marks of record if once allowed to get a foothold.

Previous to the last two years I had a great deal of trouble with this insect, but during these years have got quite rid of him by smudging the vineyard with burning coal tar, on still mornings or evenings, commencing when the first leaves are pretty well grown, and ending after the fruit is nearly full grown. The vapor from the burning tar condenses on the leaves and is retained there for some time, so when *Mr. Hopper* appears he is greatly disgusted and quite discouraged by the odor which greets him and he concludes to "git," which he generally does at once.

I have had much trouble from birds, destroying fruit; but this year I nailed lath to the posts in vineyard and stretched cotton twine along the tops of them, and also crosswise, after which there was little trouble from this source.

Mr. FRED. HAYDEN, of Alton, a member of the same committee, reported the following:

Mr. President and Gentlemen of the Illinois State Horticultural Society:

My report will touch on but few varieties, for the reason that of late years I have confined myself to a few leading grapes, allowing others to test the hundreds of new sorts sent out, claiming to be better or earlier than our old favorites; not that I mean to condemn them all, but I cannot afford to try every new thing brought out, as I follow grape-growing for profit, not from fancy; although it is my favorite fruit, aside from all considerations of its profit.

In the Alton district the past season has given us a splendid crop of Concord, Ives and Catawbas, they being the only varieties grown by us to any extent; nearly all were marketed in Chicago for table grapes at

fair prices. I observed but little rot this season, though have heard some complaints in unfavorable locations; I think, as a rule, we have been exempt from it. When the month of June is dry at Alton we need not fear rot on our southern hill-sides.

The Goethe has proved valuable with me; it ripens its fruit late, but when ripe surpasses in beauty and flavor, to my taste, any variety in my vineyard, and I shall plant more of it.

The Lindley has been fine in every respect, and if it continues as well I shall plant more; the color of the Goethe and Lindley make them very desirable for the table.

Perkins also made a fine show of salable fruit.

Martha was perfect in fruit and foliage, though foxy, of course. I think it will do to plant, to a limited extent, for profit, in our section.

Wilder and Merrimac also proved valuable this season, and, from the size of the berry and bunch, will be desirable for the table; both have borne very well with me for the last five years, and I feel safe in recommending them in good grape locations.

Elvira is also, I think, a safe grape to plant, to a limited extent; it is small in berry and bunch, but the vine is healthy and produces a fair crop of nice fruit.

I have other varieties of less value that I will not mention, but will add something from the experience of others.

The Champion has not proved valuable at Villa Ridge, as I learn from Mr. Ayers; it has not fruited yet at Alton.

Mr. Riehl claims that the Worden is valuable.

Moore's Early and Brighton are on trial, and many hope good results from them.

As for the new process of preventing rot by inclosing the bunches in paper sacks, I have very good evidence that it has a good effect, and that it is possible to do it on a large scale for a comparative small outlay.

DISCUSSION UPON THE REPORT.

MR. MURTFELDT.—I trust that such papers as this will start a revival in grape culture. The cultivation of grapes for the last few years in Missouri has not been remunerative owing to disease and phylloxera, and a depressed market; our best grapes come from Kelley's Island. The Hartford being a little earlier, and a more sour grape, is put upon the market, and by the time the Concord comes into market the people have had enough of sour grapes, and not generally recognizing the difference between them and Hartford they will not buy them. It would be better to dig up all the Hartfords.

MR. WIER.—I grow Ives instead of Hartford, and prefer it.

MR. HATHEWAY said, in answer to a question, that Champion is not valuable with him.

W. A. RAGAN, of Indiana, by request of the President, read a paper on Floriculture, but which was not furnished the Secretary for publication.

DISCUSSION UPON TREE-PLANTING.

The President called for reports from the Committee on Forestry and Ornamental Tree-Planting, but neither member of the committee responded.

The following discussion ensued, as this hour had been devoted to the subject in the programme :

MR. MINIER said : We have no more important subject before this Society than that of Forestry. Some of us are too far advanced in life to expect to reap any pecuniary advantage from this work ourselves—we should have begun it twenty-five years ago—but we may still plant for posterity, for the future prosperity of this great Prairie State. If it takes the Black walnut fifty or even a hundred years to make such great saw-logs as are transported every year it will pay to plant them.

MR. EDWARDS.—We can excuse our friend Robert Douglas, who was on this committee, from reporting, as he has lately buried his companion and a son.

THE SECRETARY.—*Mr. President*, We need a little inspiration upon this important matter. I see before me one who, though he lives here in this beautiful city—which he has made beautiful by planting hundreds and thousands of evergreen and deciduous trees upon its lots, squares and along its streets—has for quite a number of years been associated with other enterprising gentlemen in making extensive timber plantations in our sister State—Iowa. I would be pleased to hear from the Honorable Jesse W. Fell.

MR. FELL.—*Mr. President*, I rise to say that in correspondence with Dr. Warder, and perhaps with your Secretary also, I promised that I would try to prepare a paper to be presented to this meeting, giving the results of our tree-planting in Northwestern Iowa, but the demands upon my time have been so urgent of late that I found it quite impossible to do so; I will try to have a paper ready for your next annual meeting if life and health are spared.

Several of us are associated together in this enterprise; we commenced planting nine years ago, and have planted hundreds of thousands—yes, millions of trees, of which hundreds of thousands are now pushing their way upward, and some of them are thirty-five feet high. We have planted five hundred and ninety-nine acres of land with trees in the vicinity of Larchwood.

The people of Iowa are awake to the subject of forest culture—planting ten acres in that State for every one acre planted in Illinois. Should not the farmers of Illinois also engage in this work more generally than they have yet done?

A. H. GASTON.—If farmers, in planting hedges, would drop Black walnuts along the row at regular intervals these would grow and in time kill out the hedge, which is a nuisance anyway, and then they would make good live posts for stretching wire along, and in time make saw-logs.

MR. GALUSHA.—The fact that this species kills out all other trees and plants near it is the very reason it should *not* be planted in rows; it should be planted in compact plantations where it may be allowed to occupy the entire ground.

PROF. TURNER.—The Black walnut has not been generally appreciated until within recent years. Of late its value has been wonderfully enhanced by its growing scarcity, and at the same time its consumption is increasing, and this fact has caused the country to be ransacked for this kind of timber; and a profitable business it has become to the one who hunts it out, for generally the owner of the land upon which the trees are found is quite ignorant of its real value, and so it is disposed of for a trifling sum, the buyer cutting down the trees and transporting the logs to the large cities, where he sells it for from eighty to one hundred and fifty dollars per thousand feet in the log. The knottier, curlier and crookeder it is, the higher price it will bring. We should learn a lesson or two from this and plant nuts of this valuable timber-tree on lands where they will grow and which may not be our most valuable farming lands, for when a man has a small grove of timber on his farm that timber gives a merchantable value to it, and the cost of producing it is very small as compared to the enhanced value of the premises.

Black walnut grows readily from the seed, and the seed or nut should be planted where it is desired the tree shall grow, as the tree, even if very small, is quite difficult to transplant and make live. I object to this tree as a live fence-post, but would plant it in groves, and not string it around the farm or across the fields; the *why* of it is this: that the Black walnut exerts a baneful influence (for some reason to us unknown) on all kinds of vegetation. It kills grass for quite a distance around and other trees or crops cannot be grown closely to it. I had a pine tree killed the past summer which stood two rods away from a Black walnut; therefore, to plant it around the farm in the manner indicated too much land would be spoiled for tillage. A desirable tree, however, for live fence-posts is

found in the Honey locust, not the thorny kind, but the smooth one; the shade is not heavy, and grass will grow well up to the tree, and the timber it produces resists decay wonderfully; in short, it is very valuable for very many purposes. The tree also is very long-lived, and besides is very tenacious of life if injured. A wound of the severest nature seldom kills it, but almost always heals up rapidly.

MR. MURTFELDT.—The President of the United States in his last message recommends a greater appropriation for the purpose of sustaining forestry, and also that a department be created in that interest. This Society should resolve that Dr. Warder be placed at the head of this department, if it is created.

MR. RIDINGS.—Honey locust is a good tree to grow, and does not injure but a small space around it. I have never discovered that Black walnuts did any injury either. Some trees near my house have been planted twenty-three years, and we have plenty of nuts from them. There is one quite serious objection to the Honey locust, and that is, it makes too much seed, and in the fall the ground is often entirely covered with the pods for quite a large space around.

DONATION OF FRUIT—AN INTERRUPTION.

DR. HUMPHREY made the following motion :

Mr. President,—I move that the apples that are not taken away from the Fruit-exhibition room be donated to Dr. Hewitt for the pupils of the State University.—*Carried.*

DISCUSSION RESUMED.

DR. SCHREDER.—What varieties of trees are recommended?

MR. FELL.—1st, White willow; 2d, Black walnut, as it will ultimately make the most valuable tree; it succeeds as well in Iowa as here. We have planted a good many varieties, and White willow has done the best; larch requires more moisture than is furnished in extreme drouths; White maple does not succeed—it soon dies; Box-elder does well, also Cottonwood, but we don't plant it.

In reply to questions, Mr. Fell said: Our American people don't know the value of the White willow as Europeans do. When the wood is seasoned it will last as long as oak; when the trees are cut down they will grow up quickly again from the stumps. White and Green ash do well, and the timber is valuable; elms do not succeed well.

The evergreens which have succeeded there are arbor vitæ and Scotch pine; the Norway spruce has not done well.

THE SECRETARY.—I have known the White willow so terribly infested with lice (*aphides*) late in the season as to nearly destroy the trees; the twigs and small branches being literally covered with them so that in walking under the trees one was likely to have unwelcome company. Myriads of flying insects swarm among such trees to feed upon the sweet fluid exuded by the *aphides*—filling the air with their humming like that of swarms of honey-bees.

MR. FELL.—I have not seen trees so infested; but there is a black caterpillar that is occasionally found upon the trees.

MR. WIER.—The *Yellow* cottonwood is one of the most desirable trees to plant upon the Western prairies.

NEW FRUITS.

MR. SPALDING.—I desire to say, *Mr. President*, that although I have no paper prepared on "New Fruits," I have a great interest in new fruits, trees, etc., but more especially in the apple. It has been said here that we are obliged to buy our apples for Illinois from some other State; now I think if we go about it *right* we will have no trouble to eventually grow our own apples, and some for shipment. We have varieties of new sorts *here*, which if one-half that has been said about them is true will be immensely valuable.

Very little in general has been done to produce new varieties, but most we have are accidental seedlings. We must grow seedlings from our best keepers, and from these we may expect to get good keeping varieties; it is not necessary that we should wait for a seedling tree to come into bearing to know its value; but we can put cions of promising seedlings into the tops of our bearing trees and soon find out the kind of fruit they will bear.

A. H. GASTON.—I have planted seeds of Mr. Hatheway's *Salome*, and some of the seedlings look like the parent tree.

A PRESENTATION.

PRESIDENT BURRILL.—I hold in my hand a vessel looking like a large shallow pan such as are used for baking pies sometimes; and the bottom is covered with a whitish, pasty, doughy-looking substance, which *looks* as though it is good to eat; but I don't think it is, and would advise the Secretary not to use it for that purpose. It is a *copying* pad, and is a present from Prof. Weber, of the Industrial University, who made it, to our Secretary. Letters are written with aniline ink—a bottle of which

accompanies the gift—the letter is then laid, face downward, upon the pad, and gently pressed so that every portion is in contact with the pad for a few moments, and removed. The ink remaining upon the pad is thus transferred to other sheets, which are successively laid upon it. (Handing it to the Secretary) The Secretary will please accept this from Prof. Weber.

THE SECRETARY, with thanks, acknowledged the receipt of the present, promising not to attempt using it at the *dinner* table. (Laughter.)

He added that he had received a paper from Prof. French, of the Southern Illinois Normal University, upon the dry rot in apples, and asked if it should be read.

Several voices said “read,” whereupon the President announced that the paper would be read.

The Secretary then read as follows:

DRY ROT IN APPLES.

BY G. H. FRENCH, A. M., CARBONDALE, ILL.

Some time during the latter part of August my attention was called to the fact that this disease was destroying large quantities of apples in all our orchards, and the questions were asked, “What is the cause of it?” and, “Is there any remedy?” An examination of the affected fruit showed that the rotten portions consisted of flat, brown patches, varying in size, and with very little moisture in them. The larger patches had in their center numerous black spots, raised a little above the general surface, and burst open in their middle or highest part. The smallest patches lacked these black tubercles, but they were present in those intermediate in size, though not yet opened. I suspected this to be fungus. An examination of these places with the microscope showed that without doubt there was fungus in the rotten places, and that these raised spots were the perithecia or spore-cases of the fungus, bursting open at the summit to liberate the spores, which is their means of propagation.

But I was aware that a fungus might grow in the decayed portion of the apple, its spores finding a lodgment there and growing after decay had commenced; or it might first begin its growth in the sound apple and be the cause of the decay. For this reason I could not, without knowing the species to which this fungus belonged, decide whether I had here the cause, or, as it were, the result of the decay. To settle this I wrote to Prof. Charles Peck, of Albany, N. Y., who may perhaps be regarded as the best mycologist in the United States, and he replied he could not tell without seeing the fruit. Accordingly I sent him some apples in which the rotten places had just begun to form. Upon receipt of the apples he wrote me again, stating that “The rot is caused by a fungus—the *Sphaeropsis malarum*. The spots, as the apples reach me,

have become confluent, and the perithecia are distinct on most of them. The affected apples will communicate the disease to unaffected ones in some instances. I once put an apple bearing this fungus into a drawer with a perfectly sound one; in a short time the sound apple was affected in like manner."

This answers the first question; but to stop here and simply say that the cause of the decay is a fungus, without knowing something of its history and habits, is of but little service to us in finding or applying a remedy. In order to make this life-history more intelligible, I can perhaps do no better than, first, to give a brief outline of the relation they bear to the great mass of plants that go to make up the general vegetation.

All plants are divided into two great divisions: Phenogams and Cryptogams. The first contains all our common plants, such as trees, grasses, etc., which have a regular means of propagation by flowers followed by fruit containing seeds. The fertilization in these is by means of pistils and stamens, and the seed always contains the germ or embryo of the young plant. The growth of the seed is the development of this germ. In Cryptogams there are no flowers producing fruit from which seeds are obtained, but reproduction is effected by means of a minute dust called spores. If the spore has any parallel in the phenogamous plant it is in the incipient flower-bud before it has developed sufficiently to show its distinctive character. While this analogy may not hold good with all the Cryptogams, it is sufficiently true of most of them for our purpose here. In the Phenogam the pistils and stamens are developed in the flower-bud, and fertilization takes place after the flower opens. The result of this fertilization is the germ or young plant sufficiently developed and supplied with food before it leaves the parent plant that it may afterward lead an independent life. This we call a seed. The spore of the Cryptogam is not only lacking anything that can be compared with the germ of the Phenogam, but when it leaves the parent no organs of fertilization can be detected. These are formed after the spore finds a resting place on something suitable and develops its root-like prothallus. After fertilization takes place the growth is of such a nature as to produce a plant similar to the parent. This is true, with some modification, of most of the Cryptogams or flowerless plants.

The most common examples of this group of plants are ferns, mosses, lichens, etc., among the lowest of which are fungi. In the higher orders, such as ferns, there are root, stem and green leaves as in the flowering plants; and here the green tissues digest the crude food the plant takes from the earth and air. In fungi there are no green parts, consequently they do not digest crude food, but take that which has already been rendered organic and assimilate it to their own tissues. For this reason they may develop in the darkness as well as in the sunlight which is so essential for the growth of our higher plants. This enables them to grow in many situations unsuspected until they send out their spore-cases, though their thread-like filaments for some time may have ramified all parts of the tissues of the substance in which they have been vegetating.

The conditions and places where fungi may be found growing are many; as on or in the ground, upon or in decaying animal or vegetable substances, or as parasites upon or within the tissues of living plants or animals. To the first belong mushrooms, toadstools, puff-balls, etc., while mildew on grapes may be mentioned as a parasite on the outside of a plant. Of parasites within plants the one that causes potato rot, rust on blackberry leaves, and the one we have under consideration, are good examples.

While the reproductive organs or spore-cases of fungi live only a short time, the mycelium, or meshes from which these organs arise, may lie dormant for days or even years until proper conditions for further development shall reinvigorate it. As, for example, who has not seen the dry, brown knots that distort the twigs of our red-cedar trees send forth their mass of orange-colored reproductive organs during a rainy day, dry up again as the clouds are replaced by sunshine, and repeat this process year after year, the number of knots increasing as the new spores find suitable places for development on other twigs.

A brief description of the life-history of the fungus-producing potato rot (*Peronospora infestans*) may perhaps best illustrate that which produces dry rot in apples. In the potato fungus the spore falls, we may suppose, upon the stalk of the growing plant. If there is sufficient moisture for its development it sends out its prothallus, or what we may call its rootlets, which penetrate the cells of the epidermis until they reach the intercellular passages in the interior. Here fertilization takes place, after which it sends out its mycelium to all parts of the plant. Spore-cases are developed on the leaves and sometimes on the tubers, but the mycelium in the tubers, unless the surface is broken, may remain dormant till the following season; or the development may be more vigorous and the whole plant succumb to the exhaustive growth of the parasite.

I have not had the time to trace the life-history of the apple-rot fungus, nor have I seen that history as traced by any one else; but from what I have seen I think there is a close analogy between that history and the one just given. As, for instance, we know that when a tree once becomes infected that in successive years it produces apples that at a certain season begin to decay and in the rotting places show unmistakable evidences of the presence of fungus. From this we may suppose that the mycelium permeates the whole tree, living dormant from one year to another, and sending forth the organs of reproduction from the apples as they reach a certain stage of growth. As the disease spreads from the infected tree to those in its immediate vicinity, it is quite probable that the spores fall on the apples, or possibly on the green leaves of the adjoining tree, and grow in a manner similar to the spores of the potato fungus. If this be true, not only the apple but the whole tree would be infected. Like the potato rot, certain varieties are more susceptible to the influence of the disease than others; and the reason seems to be that they present a surface better adapted to the development of the spores than others.

On the subject of remedies I can say but little, and that mostly of a negative character. If my theory of the life-history of the fungus be correct, then I know of no remedy that does not involve the destruction

of the tree, and, of course, this offers little encouragement to the fruit-grower. When a parasitic fungus lives only on the outside of its host, sulphur is a usual remedy, but nothing has been found, so far as I know, that will destroy those that grow on the inside of the supporting plant, or prevent their doing mischief. I did not examine the leaves, and do not know whether the spores are produced from the leaves or from the apples only. If the latter, then to prevent an infected tree from bearing by removing the fruit would prevent the spread of the disease for the time being, and possibly might exhaust the fungus in the tree. If one or two small trees were affected, this would be practicable. It may be that to gather the fruit and feed it to stock, or otherwise use it, as soon as the first appearance of disease is seen, would produce the same result. On the subject of using the apples, I can say that I have used them from infected trees, both those that had begun to decay and those as yet perfectly sound, both cooked and raw, and could not see as any evil effects followed their use. From this, I have good reason to believe that the apples may be used for cider or any other purpose without fear of any injurious results; but in order that such use may serve the purpose of preventing the spread of the disease it should be prompt upon the appearance of the rot. It is probable, too, that leaving the rotten apples on the trees through the winter is another means of propagating the disease, and, therefore, it would be best that all such be removed, not merely from the tree but from the orchard.

Difference of soil has but little influence on the disease, as it is found in trees on dry knolls with thin soil, as well as in lower, richer situations; though I should think a low, moist situation would be more favorable for its spread, as more suited to fungus growth, and such seems to be the case.

On the 12th of September Mr. I. H. Caldwell, Secretary of the Jackson County Horticultural Society, brought me a number of apples, some showing signs of infection, others sound, but evidently from the same trees as the rotting ones. I made several experiments with these, first to see if those that were then sound would after a time show signs of the disease; second, to see what effect lime and sulphur would have upon those already decaying, and upon those then sound. Each lot was in a jar by itself separate from all the others, with no chance of communication, so that each was independent from the others in its results.

Jar No. 1 contained apples showing no signs of disease; these remained unchanged for twenty days, but subsequently decayed, with the black perithecia on various parts of their surface. No lime or sulphur was used with these.

Jar No. 2 contained apples the same as No. 1, but well sprinkled with sulphur, care being taken that all parts be covered. These decayed in from twenty to thirty days, the spots bearing spore-cases as before. This showed that sulphur would not prevent the development of the fungus, nor seemingly delay it even.

Jar No. 3 contained apples already decaying. These were treated with sulphur the same as the preceding; but it did not check the decay, nor did it check the increase of the perithecia.

Jar No. 4 contained apples showing no decay, treated with lime. Decay began in these within fifteen days, and, as before, the rotting places contained spore-cases.

Jar No. 5 contained decaying apples treated with lime, but the results were no better than with the sulphur, as the lime did not check the regular course of the disease.

Further comment seems to be unnecessary, as these experiments show that when the disease is already in the apple neither of these substances will have any effect on it.

By request of the President, Mr. C. W. MURTFELDT, of St. Louis, read the following paper which he had prepared for the occasion :

HAPPINESS IN RURAL LIFE.

BY CHAS. W. MURTFELDT, OF KIRKWOOD, MO.

The palladium of our liberty declares that every man is possessed "of certain inalienable rights, and among these are life, liberty and the pursuit of happiness!" Be not alarmed, my friends; I am not inclined to inflict on you a political harangue, albeit the voice of "*the boom*" is heard in the land, and the Presidential election draweth nigh! Such meetings as the one in progress here furnish neither the occasion nor the matter for political speeches. The well-known quotation indulged in will furnish the subject, or a sort of motto for a few, I hope not unprofitable, reflections.

The Pursuit of Happiness.—Happiness we may fancy is here represented as a coy maiden, and, like Atalanta, fleet of foot. If we wish to possess her we must pursue her. Happy for man that, in a certain sense, there are many ways that lead us to her bowers. She dwells in the palaces of the rich—sometimes. In the homes of men in the humbler walks of life more frequently; yea, often even in the rude hut of the pioneer; in woody mountain or on prairie plain or amid rocky cliffs.

Riches!—Who is rich? That depends very much upon the gauge by which we judge. For instance, the standard of riches of the Astors, the Vanderbilts, the Rothschilds and the Goulds differs greatly from the standard of the Browns, the Joneses and the Smiths, who labor perchance in the shop or at the forge or on the farm or in the nursery. That which the physical man can enjoy differs only in kind and degree. The bread of the rich may be a trifle whiter and their butter may be "gilt edge;" their beef nicely marbled and roasted to a turn by a French cook, etc. But cannot every farmer who produces *all*, have these things equal to the best, enjoy these also? And then he has this in addition and better than many of the rich: these frequently suffer from surfeit, dyspepsia and indigestion, and are troubled with nightmare and ugly dreams, but "the sleep of the laboring man is sweet, whether he eat much or little."

In further explanation, allow me to relate a fact: Wm. B. Astor, the son of John Jacob Astor, for many years known as the richest man in New York and in the United States, made the following remarks to a gentleman who congratulated him on his great possessions. Said he: "I come here

to my office at nine o'clock in the morning and find a small army of carpenters, masons, painters and all kinds of mechanics waiting for orders or instructions, or seeking employment or contracts. To these I must give audience. Next come my collectors with the everlasting rent-rolls and unceasing complaints about tenants unable or unwilling to pay, or of such as have taken 'French leave' and cannot be found. After some hours of figuring and giving orders these are dismissed. Fifteen or perhaps twenty minutes are devoted to lunch; correspondence, bank accounts and other matters take up my time until five o'clock P. M., when I am thoroughly tired out and go home to dinner. Now," said Mr. Astor, "how would you like to do all this just for your board and clothing? Well, that is all I get," and as far as the physical man is concerned he was truthful. My hearers will please bear in mind that the great wealth of the Astors was accumulated in the fur trade, but was very greatly enhanced by being invested in leases of real estate running ninety and nine years, and belonging to the Trinity (Episcopal) Church, New York. By the way, these leases have all now expired, I believe.

Wm. B. Astor in his life-time may have been a very happy man, but if he was he found his happiness in the variety and multiplicity of labor and hard brain-work, the latter being quite as exhausting as the use and exercise of muscle. It is not denied that the Astors, in common with all rich men, have almost unlimited opportunities to do good, to relieve suffering and to encourage worthy industries; but history furnishes us very few data of any great efforts in this direction!

Having considered riches as a fountain of happiness, let us look at another and greatly-sought source, viz.: fame, ambition and power. Men in public life may be happy; but how fickle is fame? To-day on the very pinnacle of power, to-morrow scorned and forgotten. This has even passed into a proverb, "Uneasy lies the head that wears a crown." Position, office and emoluments depending on the will of earthly monarchs, or, as in our own country, on the good-will of the voters (not to mention the power behind the throne), or upon the success of party, are very insecure and uncertain; certainly politicians have their ups and downs, and among them there are the "ins and the outs." Very frequently they have only Hobson's choice, "they will be damned if they do and they will be damned if they don't!" Some men are never so happy as when engaged in word-battle; they are fond of cutting repartee, and hesitate not to use the keen blades of sarcasm and philippics; all such may feel and be happy, but if they are their peculiar kind of happiness has no attraction for me. Has it for you, my hearers? "Man heapeth to himself riches, and he knows not who shall gather them; they take unto themselves wings and fly away." "And the glory of man is as the flower of the field, the wind passeth over it and it is gone forever." How wise and good is Providence in constituting us to differ in our aspirations; if we were all of the same mind in regard to our worldly callings, perhaps none of us would be happy here.

You, for instance, have come to Illinois to pursue happiness in the beautiful and quiet scenes of country life. You have set your

mark high, I hope, and you will be satisfied with nothing short of your ideal. You mean to be, and no doubt will be, the happy possessors of beautiful farms, stocked with the finest and fleetest of horses, with the most thorough-bred and satin-coated cattle, with the heaviest-fleeced and broadest-backed sheep, and with the fattest and most prolific of yellow-legged chickens; you, who are present here to-day, and all your cousins, sisters and aunts, who may not be here, mean also to have chaste and beautiful homesteads. You hope to enjoy the fruits of your orchards, your vines and your berry patches. You mean to cultivate the flowers, shrubs, evergreen and ornamental trees which can be grown in this latitude. I said you mean to have all this; pardon me, I hope you possess this already, or if not, allow me to say that all this is within your reach.

It is quite possible that at these meetings you may receive some hints which will enable you without much expense to add much to your comfort and happiness; I most sincerely hope you may.

The fact is, my friends, that every man, within certain limits, is the architect of his own fortune, and, consequently, the custodian of his own happiness. Allow me briefly to refer to my own experience. Having spent about twenty-five years of my manhood on a farm in Northern Illinois, I can fully enter into the motives which brought you to this place and vicinity, and know the road by which you mean to overtake the coy maiden already referred to. I have found a good deal of hard labor and many disappointments, which are the common lot of our race, but notwithstanding all these, by far the purest joys, the highest aspirations to excel as a farmer and the most unalloyed happiness I have experienced and enjoyed during my life on a farm! Very true it is that all our happiness here is transient, and that sometimes we are tempted to adopt as our own the words of the wise man: "I have builded houses and planted vineyards and orchards, and all is vanity and vexation of spirit."

I have not the disposition nor yet the ability to lecture on this subject, and yet I hope for pardon if my paper has or shall assume somewhat of a lecture spirit. In planning the adornments and utilities of our homes we must and should lose sight of self, in a certain degree. I have no patience with a spirit of a man who says: "I am well stricken in years, my days will be few at longest; why should I trouble myself to plant fruit-trees? I'll never live to see them bear, nor can I hope to pluck and eat of their fruit." Such a spirit is the essence of selfishness. Suppose such a disposition had pervaded our forefathers just before our advent in life, where would we have found the sweet cherries, the rosy-cheeked apples and the luscious pears we enjoyed so much when were boys—yes, do yet. I do—don't you? If, therefore, we wish to do our duty to those near and dear to us, to the community in which we live, and to the State which protects us, we should plant trees and shrubs and flowers, no matter if we ourselves are not permitted to taste of the fruit or to inhale their fragrance.

If we do not, others will; their gain will be our loss. Some years ago, through the kindness of Major Downs, Superintendent of the Central

Branch of the Union Pacific railroad, the members of the Missouri State Board of Agriculture with those of Kansas were permitted to travel from Atchison to Waterville, the then western terminus of the road. On that occasion we were entertained for a little at Blue Rapids, and amongst the first things as worthy of note we were informed that the citizens of that beautiful town had planted in their streets, that same year, *seven thousand* shade trees. Allow me to ask, what have you done in and around your own towns in the way of tree-planting?

In one of the most beautiful and desirable suburbs of St. Louis, where is my present home, we, early last spring, formed a "village improvement society," and at present, with previous efforts, both public and private, we have planted and *growing* on the streets and avenues of Kirkwood about fifteen hundred shade trees, mostly elms and maples, and our lots and yards and gardens are studded all over with evergreens, shade and ornamental trees, and shrubs and flowers, and we think it a good investment. Children growing up under such surroundings, if otherwise well and judiciously trained, can never divest themselves entirely of the influences which surrounded them in their youth, and they will "rise up and call blessed" all that aided and abetted in this labor of love. And so it will be here, my friends, if you do your duty. Will you do it?

What I would say to you, then, on this occasion, is that human happiness is the result of a consciousness that we have done our whole duty to our fellow man; to those near and dear to us, who naturally look to us for protection and care and are dependent upon us for their enjoyments, and to ourselves. In order to have all that is within our reach of this happiness, we must be diligent in making our homes pleasant and cheerful, fit to be the holiest of holies to ourselves and our dear ones, and to the friends we would invite into their holy precincts. Even a hut by the railroad track, if a snowy curtain shades its window and a vine overshadows its portal, a bit of green sward and a few flowers adorn its approaches, and if only a-bit of rag carpet be placed by the bedside, can be the abode of happiness, enjoyment and peace.

I have thought it singular sometimes, and yet it is not really so, that the editors of our dailies or magazines or our essayists should almost with one consent describe the acme of human happiness as being enjoyed in the country. The bliss so much coveted by city people, and by others anxious to reside in the city, consists largely in the tinsel and glitter of fashion and wealth, and in the rush after amusements and the honors of position and worldly fame. To the purer joys of country life, of quiet meditation and of looking through nature up to nature's God, most of the denizens of the crowded cities are strangers!

In conclusion, and in confirmation of what I have just offered for your thoughtful consideration, allow me to quote a paragraph from the *Philadelphia Record*:

Happiness is the grand aim of life, and to secure its fullest blessings we must cultivate the mind and all the graces of the spirit. We always associate leisure, innocence and peace with rural life, combined with the kindred joys which contentment

and competence bring. Almost our first thought of a country home is one of pure air, green earth, gentle breezes laden with the breath of many flowers and whispering pleasure, and where every shade promises cool and sweet repose. The thought of a rural home is full of promises of the fond ideal and of cherished meditation. Every person of sentiment reverts to the country with pleasant anticipations; *it is a feeling inbred in our very natures*. Fields, meadows and groves, singing birds and fragrant flowers, running brooks and grazing herds, are ever the delight of mankind.

Money-making is not one of the incentives of a country residence upon which a practical or a sensible man builds ardent hopes; nor does a man of sound judgment seek a country home upon which to foolishly squander the fortune his industry and his economy have enabled him to accumulate through years of toil and sacrifice and self-denial; but it is the place where he can realize the cherished tastes of cultivated thought, refinement and study—the place where his fond ideals, long anticipated, become the real enjoyments of rational realities—the quiet abode of retirement and domestic ease—the place of rest—the place where the altar is sacred to the affections, and where love radiantly reigns supreme, and peace spreads over the frugal board, and joy is reflected from face to face, making home happy; where freedom and independence proclaim the man king, the woman queen, and their darlings princes and princesses in this rural kingdom. Here the greatest fortune is the wealth of domestic affections and the sweetest sounds the cadences of loving hearts; it is the bower of retirement and *the home* of the family.

Our rural homes should be as beautiful as our purses and tastes will enable us to make them. If our means have provided ample space for a comfortable house, it should be surrounded by lawn and ornamental grounds, planted with fruit and shade trees, shrubs and flowers; a well-appointed garden filled with the choicest vegetables for the use of the family; and if our resources and tastes permit us to keep a horse, we ought by all means to keep a cow, as the care of keeping both will add but little to a man's labor who cares for the grounds and the garden. If the family is large and horses are kept, a good cow will be a comfort and a pleasant feature of the place at but little expense. * * * * * How much of the happiness of rural life depends upon the care bestowed upon the house, the grounds, the garden, the fruit, the flowers, the horse, the cow and the birds by ourselves can only be estimated by him who has bestowed that care and who reaps the pleasure flowing therefrom.

Thus writes the *Record* and advises city people to go about establishing Rural Homes, and all the inducements held out are certainly within reach of every one within the sound of my voice, although I have some doubt whether I am addressing a single retired merchant or banker. If such a one is here, may I be allowed to congratulate him on his happy condition.

Let us sing with Whittier :

Give fools their gold and knaves their power,
 Let fortune's bubbles rise and fall;
 Who sows a field, or trains a flower,
 Or plants a tree, is more than all.

For he who blesses most is blest;
 And God and man shall own his worth
 Who toils to leave at his bequest
 An added beauty to the earth.

And, soon or late, to all that sow
 The time of harvest shall be given;
 The flowers shall bloom, the fruit shall grow,
 If not on earth, at last in heaven!

Allow me to conclude this little offering of mine with the closing sentence of President Marshall P. Wilder's last address to the American Pomological Society:

May the success of the past cheer and stimulate you to greater exertions in the future, and although you may not live to reap the rich harvest which you are now planting, your children and your children's children shall rejoice in the result of your labor long after you shall have passed over the river to those celestial fields

Where the verdure of spring-time forever shall reign,
And the perfume of flowers float o'er the bright plain,
Where the noontide of summer and autumn shall blend
In the harvest of fruits that never shall end.

At the close of the reading some discussion was held relative to a joint meeting with the Iowa State Horticultural Society one or two days during our next annual meeting, which resulted in referring the matter by vote to the Executive Board.

On motion, adjourned to meet in the Assembly Hall at seven o'clock this evening.

THIRD EVENING—CLOSING SESSION.

At seven o'clock on Thursday evening the Society assembled, as per adjournment, in the large Assembly Hall.

J. M. GREGORY, LL. D., Regent of the Illinois State University, was introduced to the Society and the large audience present by President Burrill.

The lecture upon the Parks of Paris, which was the first entertainment of the evening, was illustrated by a large colored map of that city, and to which frequent references were made during the progress of the lecture.

The following is the address:

PARKS OF PARIS.

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

I am aware that this is a practical association, and has done good practical work towards beautifying the homes of the people of this great State. In speaking to you upon the parks of Paris, I believe I shall not be found to depart from the practical aims of the association.

The French people have a genius for decoration. They are dramatic by nature. Life and history are to them but prolonged dramas, and great events show themselves to the French mind as a scenic display. It is

this feature of the French character which gives them such a pre-eminence in the great scene-producing arts of architecture and landscape gardening.

Paris is the master-piece and triumph of French artistic genius. It is the most beautiful city of modern times, and it is doubtful if any of the great capitals of antiquity could vie with it in beauty or art.

It is not in the beauty of particular streets or structures that the boasted beauty of Paris consists. Chicago and some others of our American cities present business blocks and single streets equaling, if not surpassing, any in Paris. It is the general picturesque or scenic arrangement which gives to the French capital its superior claim. Every great avenue seems to have been so arranged as to terminate in some grand monument or public edifice, which closes and completes the vista. No great palace, theater or church is thrown away or robbed of its effect by being hidden from view in the side of some narrow street. A notable instance of the effort of French taste in arranging city scenery is found in the position of the new opera house. This marvel of architectural and sculptural art, costing over ten millions of dollars, fronted upon an oval area by the side of one of the great boulevards; but its magnificence was too great for its position; half its effect was lost by the lack of distance from which it might be seen. To remedy the defect, a broad avenue was broken through one of the densest quarters of Paris, stretching from the front of the Opera to the palace of the Louvre, and now the traveler, looking up this avenue, sees this great monument of architecture in all its grandeur. Many instances may be quoted of this attention to scenic effect in the avenues and public buildings of this great French city.

Come with me to a height near the western extremity of Paris. In the midst of a large circular area stands the *Arc de Triomphe*, the grandest triumphal arch in the world, begun by the first Napoleon and finished by the last. Let us ascend to its summit, one hundred and sixty-two feet above the pavement. From this elevation we look down upon one of the finest city views on this globe. Twelve broad avenues stretching forth from it like the rays of a star—each one lined with its rows of trees, in some cases several rows—appear like lengthened parks. At the foot of the hill to the westward a city gate intercepts but does not interrupt the avenue, which is seen stretching away in the distance till it reaches a bend in the river. Turning our faces eastward, the great city, with the homes of two millions of people, lies before us. Yonder, at the southeast corner, the River Seine enters and sweeps to the northwestward, till near the center of the city it bends to the southwest and passes beyond the walls, curving again to the north and leaving space outside of the walls for the *Bois de Boulogne*, the largest, finest and costliest of the parks of Paris. Near the middle of the part within the city are found two islands, on which the original Paris, the *Lutetia* of the *Parisii*, stood two hundred years before the opening of the Christian era.

Let us follow the line of this eastward avenue, stretching down from the Triumphal Arch, touching as a tangent the northern bank of the river, and serving us as a medial line from which to study the city. This avenue, perhaps the most famous and beautiful on the earth, is called the avenue

of the *Champs Elysees*. From the Triumphal Arch to the great public square, the *Place de la Concorde*, a distance of one-and-a-third miles, it passes between palaces and is bordered by lines of trees. At its middle point it sweeps out into a broad circle with fountains, flower-beds and shrubbery, and from this point to the square is lined on each side with groves and parks and palaces, with concert gardens and other places of amusement, which, when lighted with their myriads of gas-jets, present one of the gayest night scenes in the world.

The *Place de la Concorde*, which we now enter, has at its center the great Egyptian obelisk of Luxor, and on either side a great fountain, called the fountain of the rivers and the fountain of the seas. Around the square, on eight great masses of masonry as pedestals, are the colossal sitting statues of female forms representing the eight chief cities of France. Near where the obelisk stands was erected, in the revolutionary days, the fearful guillotine, under whose sharp axe nearly three thousand heads, including those of Louis XVI. and his queen, Marie Antoinette, rolled to the ground. Continuing on our way, we enter the garden of the Tuileries, another of the parks of Paris. At first this is a grove, nearly half a mile long by nearly a thousand feet in width. The ground is chiefly graveled, to afford place for the children to play and idlers to lounge, and for the military concerts furnished here free to the public two or three times a week. Advancing along the central avenue, we approach the ruins of the once famous and beautiful palace, burned by the Commune, and in its immediate presence we meet again the green sward, nowhere, it seems to me, so green as in Paris, cut with the flower-beds and the patches of "carpet gardening," and interrupted with tastefully-arranged masses of shrubbery, which, with the fountains and basins and statuary, present a scene whose equal in brilliancy and beauty one would look in vain to find elsewhere.

The facade of the Tuileries fronting upon these gardens was one thousand feet in length. Only the end buildings have been restored, but back from these there stretch on either side the lines of palaces which connected the palace of the Tuileries with that of the Louvre, making a vast quadrangle of palaces one-third of a mile in length. Within this quadrangle spreads the square of the *Place du Carrousel*, and at its eastern extremity the *Place Napoleon*, another of the parks of Paris, with its green sward, flower-beds and trees, in the very heart of the palace. Around the eastern front of this quadrangle of palaces we find the gardens of the Louvre, and again the massed banks of flowers, foliage plants, shrubbery, gravel walks and convenient seats, where the white-capped nurses sit to chat and little children play.

If now we were to continue our walk eastward, along the *Rue de Rivoli*, we should pass at frequent intervals other squares and parks, each with its peculiar beauty, but too many to allow description. Across the Seine, on the south, by the palace of the Luxembourg, its flower gardens and parks; still farther on the Garden of Plants, one of the most famous botanical gardens in the world, also with its parks and zoological garden; at the end of our route, passing the barriers, nearly seven miles from our

starting point, we should find ourselves in the *Bois de Vincennes*, another of the great external parks of Paris. Within the eastern ramparts of the city lies the cemetery of *Pere la Chaise*, with its streets of tombs in the older part, but in the newer a park, so shaded and ornamented and beautiful that one almost forgets the tombs in the beauty of the scenery. Not far away to the north lies another of the parks of Paris, the *Buttes Chaumont*, formerly an old quarry, where the filth and rubbish of one of the worst quarters of Paris were thrown, but to-day one of the most remarkable pieces of landscape gardening on the continent.

But let me not consume time with inadequate description of so many parks; let us return to the western extremity of the city, to the *Bois de Boulogne*, just outside the ramparts. This park of twenty-five hundred acres was formerly a sandy waste, the rendezvous of thieves and highway robbers. In 1815 Wellington's army encamped here and cut away nearly all its trees. When the Bourbons returned to power, new trees were planted, but little was done to improve its condition till Napoleon III. came into power. France owes more to the two Bonapartes than to all the Bourbons that ever sat upon its throne. Napoleon III., in his exile, had seen the English parks, and, quitting the stiff geometrical style of the old French landscape gardens, he chose a more natural and pleasing arrangement. At least the men whom he employed were men of better taste.

Near the center of the *Bois* two beautiful lakelets were arranged, with islands crowned with cottages, and the shores lined with groves of pines, or with grassy slopes dotted with great trees, under which the people of Paris come to picnic with their children, and maidens dance on the green sward. These lakes are filled with water brought there by artificial means. And even grottoes, and cascades, with beautiful sheets of water falling like a curtain into the basins below, are arranged with an art that surpasses nature. In passing outward from these lakes you find shaded walks and avenues, valleys and open places, with every variety of scenery.

In one corner of the *Bois de Boulogne* is situated the *Jardin d'Acclimation*, a garden devoted to experiments, with a view to acclimatizing foreign plants, animals and birds. This garden costs annually fifty thousand francs, but the results reached thus far have been but a poor return for the expense. As a botanical and zoological garden, it is a place of much interest, and is constantly visited by crowds of people, although it is one of the few places in Paris in which a fee is charged.

Let us return now from the *Bois de Boulogne* to the *Arc de Triomphe*, through the splendid avenue of the Empress, newly named by the republican officials the avenue of the *Bois de Boulogne*. This avenue, about four hundred and fifty feet in breadth and three-quarters of a mile in length, forms a fitting continuation and link between the *Champs Elysees* and the *Bois de Boulogne*; and in the afternoon, when the rich and gay equipages fill its entire length with riders taking their customary drive to the great park, it is especially brilliant. Its groves and grass-plots make it appear more like a park than a street.

The avenue to the northeast from the *Arc de Triomphe* brings us to one of the smaller, but most famous and beautiful of the parks of Paris. This is the *Parc Monceau*. It includes about ten acres, and formerly belonged to the Duke of Orleans, the father of Louis Philippe. It is difficult to conceive how one can gather more of beauty within ten acres of land than may be found here. It was laid out by Carmontel, who in explaining his plans said, "Nature varies according to climates. Let us attempt by means of illusions to vary also the climates, or rather to cause the climate in which we are to be forgotten. Let us transport into our gardens the scene-changes of the opera. Let us cause to be seen here in reality what the most skillful painters offer there in decorations, from all ages and all places. It may be permitted to avoid the cold monotony produced by pretended and severe precepts, which constrain the imagination. Since everything is to be created, let us use our liberty to please, to animate and to interest. We need gardens where nature presents itself under its most agreeable forms. It is necessary to perpetuate here the charm which one experiences here on entering, to renew it by all means, and to cause to be born in the soul the desire to revisit them every day and to possess them. The true art," he adds, "is that of knowing how to retain the promenaders by the variety of objects presented to them."

And certainly this beautiful park responds well to the ideas of its skillful creator. It is the very gem of landscape gardening. Turn where you will, new views meet the eye, and new objects engage the attention, grottoes and groves, pyramids and temples, lakelets and fountains and statues, shaded lawns, undulating in every variety of curved surface, sloping up to hills whose tops hidden by shrubbery suggest heights impossible to reach, or stretching away under broad shading trees, with flower-beds, parterres, brilliant with foliage plants and gay flowers, bewildering one by the extent of the drives and the walks, till you are ready to believe that a hundred acres, instead of ten, stretch around you.

I cannot properly close these imperfect notices of the Parisian parks without referring again to the avenues and boulevards, old and new, by which the mediæval Paris, with its narrow and crooked streets, the nests of revolution and disease, has been changed into the new Paris, the model for the city builders of both continents. With an arbitrariness which I fear we should count an inexcusable breach of private right, the hammer and the axe went crashing through some of the thickest and most populous parts of the city, till broad avenues were opened, letting in light and air, with personal and political salvation. It is said that the Government paid for all the property used, and reimbursed itself by the sale, at remunerative prices, of the more eligible sites thus secured for building and trade.

The Paris avenue is divided into three nearly equal strips, the center one for the carriage-drive and the others occupied by the sidewalks and the tree plantations, with grass-plots and wayside seats for the weary pedestrians, invalids and nurses with little children. These avenues thus serve the purposes of public parks; and Robinson, an English writer, affirms that the trees planted in the streets of Paris outnumber all those

growing in the parks of London. In other cities the people must often go miles to visit their parks. In Paris you find them within a few blocks. And amid all the glories of this great city of picture galleries, palaces and arts nothing seemed to me more charming than the groups of children seen everywhere playing in safety on the gravel-walks and grass-plots, amid flowers and under shady trees, where the birds answered with their songs to the laughter of the children below. In Paris, if a child is run over in the streets it is the parent that is arrested and not the driver. The city has provided so abundantly its parks and play-grounds that a child has no business to be found playing in the streets.

In the great problem of city building, a problem growing daily more important under our modern civilization, which is gathering so large a proportion of people into these great centers of trade and manufacture and life, Paris, it seems to me, has contributed most of all towards a wise and healthful solution. In the provisions made for education, for instruction in arts, in her free galleries, libraries and schools of design, in the numerous courses of lectures given without charge by the most eminent scholars and orators, in the collections for illustrating the arts in all their departments, in the magnificent sewers and abundant water supply, used without stint, not simply in private houses, but in the daily washing of public streets, and in the innumerable parks scattered everywhere through the city, one finds provisions such as no other city in the world, in ancient or modern times, ever provided for the intelligence, health and happiness of her population.

And now, ladies and gentlemen, permit me to turn to my practical conclusions. I have always honored this Society for the contributions it has made to the fruitfulness of our orchards and the beauty of our grounds; but there is much yet to be done, and I know not to whom to turn if not to the horticulturists of the State, whose talents and whose tastes so fit them for this public service. To you I submit the question. If we will consent to forego somewhat of the expense of our private flower gardens, and the citizens of our towns and villages will contribute more to the planting and beautifying of our public parks and street sides, filling them with parterres of flowers, with beautiful shrubbery and foliage plants, and the fine ornamentation which we seek at so much expense for our private grounds, shall we not be more than repaid by the larger measure of beauty open to each one of us, and by the sight of the poor, and the children of the poor, who will stroll along the nicely-kept walks, sit content under the shadow of the trees and gaze with a great swelling delight upon masses of flowers hitherto unknown to their vision? What if into the villages of our prairie States we could import some of these fashions of Paris, and by the improvement of our public parks could cultivate the taste of our people, and fill with a rarer and purer beauty the general life of the land.

General and hearty applause followed the close of this eloquent address.

The President announced that the next and last regular order of business upon our programme was the report of the Committee upon Meteorology, consisting of Prof. J. H. Tice, of St. Louis, and Prof. J. B. Turner, of Jacksonville, and inquired if these gentlemen had prepared reports.

The Secretary stated that a recent letter from Prof. Tice informed him that the Professor is engaged on a lecturing tour in the West, and would not be able to prepare a paper for this meeting, but would endeavor to prepare and forward a short report in time for publication. He read the letter.

Prof. TURNER, who was present, was then introduced by the President, and said:

Mr. President, Ladies and Gentlemen, I cannot hope to entertain you so soon after listening to the eloquent and inspiring words of the distinguished lecturer who has addressed us this evening. If I may but excite your wonder, and thus secure your attention, it will be all I can hope for. I did not expect to follow Dr. Gregory, or I might have shrunk from the task allotted me.

REPORT UPON METEOROLOGY—BY PROF. J. B. TURNER, JACKSONVILLE.

From the middle of April to the middle of November, a period of about seven months, we were not visited in Morgan county by one single respectable rain; all the streams and multitudes of the wells and reservoirs went wholly dry; a drouth more severe than was even known to that most venerable of men, "the oldest inhabitant." But recounting the past history of the weather in the State is of no use to this Society, or to any one else but experts; every man knows what it has been in his own locality, and in general over the State, far better than any of our reporters can tell him.

The old adage that "all signs fail in a dry time" is most true, and all our so-called scientific causes, theories, predictions and portends sink at last in practice into mere signs, just as likely to fail when applied to any particular locality as are the hereditary symbolic signs of the people. By help of the telegraph we can learn of the existence and approach of the gathering storm across wider areas than our fathers' unassisted eyes and ears could survey; but no man on earth can tell on what day of next week it will either rain or shine over any particular town or county; so that all our practical predictions are of little or no value, as yet, to any of the industrial arts upon the lands.

Upon the seas or lakes the winds alone are the all-important item, and they spread themselves with tolerable uniformity of intensity over the whole area swept by the storms. But in agriculture the rain, and not the wind, is the all-important item; and the great storms, as they pass us, have, for some reason, contracted such a habit of massing and spilling

their contents over the wettest areas of soil, and leaving the driest still unblest, even when the storm-center passes directly over them, that the people of one State or county under a deluge cannot be sure that their friends in a near-by State or county are receiving even a Dives' drop.

Hence our present general announcements, even from the highest authorities, so invaluable to the sailor, are of no practical use to the farmer, except as they lead him personally to observe more closely and successfully the common and ordinary signs of storms, and the periods of their probable approach.

This condition of things is certain to continue until both our sphere and our methods of observation are greatly enlarged and improved.

It is evident that the causes which really determine the changes in the weather are not simple and homogeneous, but exceedingly manifold and various. They are in general Astronomic, Telluric, Oceanic and Aerial in their manifestations.

(1) *Astronomic*, as evolving the greater and lesser periodic cycles, years and seasons, such as the great cycle in the ecliptic of about 22,000 years; of the sun's spots of eleven or twelve years; the reputed seven years of alternating floods and drouths, and our regularly returning seasons, summer and winter, day and night, etc.

(2) *Telluric*, or the earth as affected by the seasons: summer and winter, spring and fall; its forests, denudations, mountains, hills and plains; its snow-lines from time to time; its great areas of greatest wet and greatest drouth, as indicated by the stages of the waters in the great rivers; the antecedent rains or snow-falls over given areas; its changing reciprocal electric condition over given areas, as related to the clouds in the air; its great constant and variable electric circuits, or changes of electrical conditions within itself and upon its surface; its internal and surface heat, over given areas, etc.

(3) *Oceanic*, as supplying water for evaporation, and through its varying temperature and its currents generating or varying the course of storms and changing the temperature of all lands from the Equator to the Poles.

(4) *Aerial*, or the movements, temperature, moisture and pressure of the air.

But we should bear in mind that none of these exhibitions of mere phenomena are real causes, but all alike are only phenomenal effects or the mere antecedents, the mere playthings, of some unseen power or powers, called forces, that lie behind them and eternally invert, control, dandle and play with them, as the viewless winds do with the dust in the air. These unseen causal forces or powers we call heat, light, electricity, magnetism, attraction, etc., according to the phenomena they produce.

Now, whether the causal power or force which we call heat or electricity, or both together, or some other mode of force wholly unknown to us, is the dominant and controlling influence in storms, it seems certain to me that the condition of the earth's surface, as wet or dry, cold or hot, covered with snow or bare, must exert a great influence on these causal

forces and the phenomena they produce, operating at all times as a great heater and a great conductor, intensifying its heating power when dry, and its conducting power when wet, or when denuded of its forests, or widely stripped and strapped with huge iron rails and wires by the hands of men. For we now are beginning to know how great a power even a small wire can convey over indefinite distances.

Without due attention to well known as well as to still unknown facts of this kind, it seems to me impossible to rationally account for the apparent massing and intensifying of storms and drouths within the past century, and the redistribution of rain over the Egyptian deserts in the present and the past, and over our own in these modern days: facts commonly ascribed to cycles of change, but these cycles as well as other things must have some adequate cause.

From this general and imperfect survey it would seem probable, if not certain, that the actions and reactions of the whole vast *cosmos* affect the climatic changes on our globe—all that is done in the physical world by either God or man. And nations and communities of men must heed it or ultimately starve of their own folly, as many before them have done.

It may seem incredible to some that the meteorology of the oceans have been more thoroughly and profoundly studied and charted and made known than that of the lands, through our indefatigable Naval and Marine Service. On land we observe and report on mainly only one of the four great primal sources of influence, namely, the AERIAL, or the movements, density or pressure and moisture of the atmosphere, and that for but a small part of the entire circuit of the globe in any single latitude. Commander Maury's earnest desire and efforts to complete the circuit of observation for our own latitude cannot be too deeply appreciated or too soon consummated; nor can we too soon take under our notice those varying conditions of the earth, as hot or cold, snow-clad or bare, wet or dry, much as sailors do the analogous conditions of the seas, and which all men know do more or less affect the great problems on land. I am aware that the labor implied in any solid and practical advance in this science is prodigious, implying the united effort of the human race to consummate it, and that our progress must be slow at best. True, much has already been done; but until both our sphere and our methods of observation on land are enlarged and improved I see little chance for a science of storms that can be of any great practical use to the farmer and the horticulturist. The leaders of these industries should throw their whole influence in favor of such a consummation.

Still, it must be confessed that meteorology is no worse off in these regards than many of our other so-called sciences; for when we were all just about to get ready to hatch Polliwogs out of Protolasm, and develop them up into first-class poets, philosophers and presidents of republics, along comes Prof. Tyndall, in the last *Fortnightly Review*, and assures us that "Science has not solved, nor is it likely to solve, the problem of the universe; while the connection of body and soul is as insoluble as ever; and that the same ban of exclusion ought to fall upon the theory of evolution." So nothing is now left for us to do but to burn up our

incubators, go about our other business, and allow poets and philosophers to be born in the good old-fashioned way, and continue to elect our presidents by vote instead of hatching them out by science. (Laughter and clapping of hands.)

Since, then, the three scientific questions which have for a quarter of a century more deeply agitated Christendom than all others put together are now, by the very highest authority on either continent, relegated to the limbo of imaginative scientific dogmatism, we may possess our souls in peace, and in spite of ecclesiastic or philosophic pope or priest may rationally believe that we still exist; that we are not merely so many hundred pounds of salt pork and corn dodgers, scientifically digested and combined; that the Infinite Father of all will take the best possible care of each one of us, and that in all worlds alike we shall continue to have some very comfortable sort of weather, whether we come to understand all its laws and causes or not.

At all events we have reached some few facts in Meteorology that are likely to stand forever; which is more than can be said of many of our merely Dogmatic Sciences, or of any of our merely Dogmatic Theologies. (Applause.)

The Professor concluded with a few remarks substantially as follows:

We are well aware that there are frequent great gatherings and marshalings of storms; and from what we know of the order of nature, the relations of antecedents and resultant phenomena, we know that these gatherings and all their consequent effects must be produced by causes or antecedents as powerful, as extended and as continuous as are the storms themselves; for no effect *can* be greater than its cause. Hence the electric theory promulgated by Professor Tice, which attributes all these phenomena to that all-pervading and tremendously powerful form of force which we call electricity, seems nearly or quite sufficient to account for the birth, the movements and the force of storms. But there are many and complex problems in meteorology which are not yet solved, and especially have we or any living being neither learned to predict positively just when and where and with how great or little force a storm will come and affect any State, county or town, nor how to produce, turn aside or prevent a storm.

Yet the time will come when Man can harness the wind and drive the storm. Many years may come and go before this great consummation is reached; yet I believe the intellect of Man is or will, by its increasing development and with the increasing discovery of Nature's laws, become sufficient to so direct the forces which control and produce ordinary local phenomena as to make them subservient to his Will. (Applause.)

CLOSING REMARKS AND FINAL RESOLUTIONS.

President BURRILL, in a few appropriate words, thanked the members of the Society for the courtesy and unexceptionable kindness towards each other and towards himself during the meeting which was about to close.

At the suggestion of President HEWITT the flowers upon the tables were donated to an invalid lady in the city, who, he said, had been a long time ill and was passionately fond of flowers.

The flowers were by vote placed in his hands for this purpose.

J. W. RIDINGS, from the Committee on Final Resolutions, handed the following report to the Secretary, which he read :

To the Illinois State Horticultural Society :

Your Committee on Final Resolutions would respectfully submit the following report :

1st. *Resolved*, That the thanks of this Society are due the Toledo, Peoria & Warsaw; the Chicago & Alton; the Illinois Central, and the Indiana, Bloomington & Western railroad companies for the reduced rates granted members of this Society to enable them to attend its meetings, thereby showing their appreciation of the work in which we are engaged.

2d. That the thanks of this Society are due and are hereby heartily tendered to the Faculty of the State Normal University, for their kindness in granting us the facilities necessary to our comfort and convenience in holding our meetings, and especially to President Hewitt for his most cordial greeting extended to the members of this Society; also to Prof. Forbes, for his kindness in showing and explaining to visiting members the collections in the Natural History department of the institution.

3d. That we hereby cordially tender our thanks to the donors of the beautiful flowers and decorations presented to the Society, and to the citizens of Normal for their kindness and hospitality; also to the proprietors of hotels in Normal and Bloomington, for the reduced rates granted to the members and visitors of the Society.

4th. That we heartily thank the retiring officers of the Society for their courtesy, and the efficient manner in which they have discharged their duties.

5th. That we recognize with pleasure the attendance of so large a number of delegates from sister societies, and would recommend the appointment by the Executive Board of delegates to attend so many of the meetings of other State societies as are to be held this winter.

Your Committee would urge upon all members who may be chosen or appointed to report from their respective counties the necessity of faithfully performing their duties, that we may have a full and complete report from the *entire State* at our next meeting.

H. D. EMERY, }
 J. W. RIDINGS, } *Committee.*
 J. WEBSTER, }

The resolutions were unanimously adopted.

MR. MINKLER.—I now move that this session now close by singing the Doxology—"Praise God, from whom all blessings flow."

Whereupon the Society and audience arose, and, led by Mr. Minkler, gave an appreciative rendering of that grand old choral, "The Old Hundredth."

The President then declared the meeting *adjourned*.

Thus closed the twenty-fourth annual meeting of the Society.

The attendance had been more than usually large; the meeting was characterized, from its opening to its close, by a general interest taken by the members in the papers read and the discussions held, and by a uniform deference from each to the opinions of others, indicative of that fraternal feeling which a true love of horticultural pursuits begets in the hearts and minds of its possessors.

The readers of the proceedings of this meeting will excuse the Secretary for expressing the hope that they may find in them some appropriate food for thought and many valuable suggestions to aid them in the practice of that noble "Art which doth mend nature."

MISCELLANEOUS PAPERS.

The following paper is the one to which reference is made upon page 67:

ASPARAGUS—ITS CULTURE.

BY DR. H. SCHROEDER, BLOOMINGTON.

Mr. President and Members of the Society :

Asparagus belongs to the natural order Liliaceæ. It is one of the most lucrative, and in the old world a most aristocratic vegetable. Little is yet known in America of its great medical properties. People with diseases of the kidneys and bladder should use it as a medicine.

On the table of the kings, the finest hotels, as well as on the table of "better off" people, we find asparagus as one of the finest delicacies, served cooked with a sauce of butter, or milk, or egg-sauce, or as a salad with vinegar, oil and onions.

It is generally believed that India is the home of our asparagus. In the last century we find it as a vegetable in the gardens of the aristocracy in Europe. We find the asparagus also in paintings of our great masters of the fifteen and sixteenth centuries in Italy, but how it was used and served I was unable to learn. Space and time do not allow me to go into more detail about its history.

During the last fifteen years the culture of asparagus has grown to great dimensions. I was astonished four years ago, when I traveled over Europe, when I saw the broad fields and the commerce of this most lucrative vegetable. The largest fields I found in Leibeck, Hamburg, Ulm, Bamberg, Erfurt, Berlin, Brunswick and Wolfenbuttel; also Mecklenburg has taken a big start in its culture. Erfurt is known to raise the giant kind, but Brunswick and Wolfenbuttel have the honor of raising the most delicate asparagus.

If this essay shall be a benefit for our fruit-raisers, gardeners and farmers, I must be allowed to show what other people have done and what we free and enterprising Americans can do in this line.

Please follow me now to the city of Brunswick and Wolfenbuttel, in North Germany. Twenty years ago we could find here and there a small asparagus bed in the gardens. People did not understand the use of it, similar as it was to the tomato in our country; they began to taste it and try it, and soon they found that it was one of the prime vegetables, and at once it became famous. The garden was no longer large enough for its culture, and the fields had to make room for it. Canning factories were started, and the asparagus became an article of every-day use. It became part of the provisions of the ships; it was exported to foreign countries, and the price of the vegetable raised three-fold. Wholesale dealers opened large establishments, and even a stock company, with an immense capital, was started in the city of Brunswick, and its stock is

to-day the most valuable. Four years ago I found in the vicinity of Brunswick 1,500 acres of asparagus, and 1,000 acres near Wolfenbüttele. Wagon load after wagon load goes from morning till night to the cities. The crop begins with the 20th of April and closes on July 24th, consequently there are sixty-six days of yield. The cutting is done by peculiar knives, and begins early in the morning, again at noon, and lastly before night. That is to say, three times a day every acre is gone over. I saw hundreds of men, women and children in the fields to do the work.

Twenty pounds of asparagus, from four to eight inches long, white like snow, is the average product of an acre daily, or 1,320 pounds during the season; or, for the 2,500 acres, 3,300,000 pounds during the season.

I found hundreds of men and women working nearly all day and night in the large canning factories, and at night the post office—God bless the German Government for this alone, that the post office is also the express office, with the cheapest rates in the world, also the telegraph office—is really barricaded with bundles, baskets and boxes for transportation of this vegetable to all parts of the world. Hundreds of miles of fresh asparagus are sent to Austria, Italy, France and England.

Now to the culture of asparagus:

It wants loose sandy soil; the land wants to be subsoiled very deep in the fall; in early spring ditches one foot wide and two-and-one-half feet deep and three feet apart will be made, and good cow or half-rotten horse manure spread three inches deep in the bottom of the ditches covered two inches deep with soil, and the two-year-old plants put one foot to eighteen inches apart and covered three inches with soil. In the fall a little more manure is spread in the ditch and on top of the plants and covered with six inches of soil. The next fall manure is spread again and the land all leveled. During the first and second summer a row of cabbages or sweet potatoes may be grown on the loose soil between the rows.

The third year the asparagus is ready to be cut, but I do not mean the green tops after it has grown six inches out of the ground. This may do for rabbits and goats, but not for a refined palate or stomach; it is the real fruit we want, just when it peeps out of the ground, white, clear and sweet like a pear, and such will stand transportation even to New York or New Orleans. Such asparagus beds or land will be good for twenty-five or thirty years; it needs only a thorough cultivation twice each year. The consumption of asparagus has spread greatly, and if we give our people something superior, as before, there will be a market for thousands of acres in our State and at a good price, and great profit to the gardener and farmer. The time of hominy, corn bread and salt pork has passed away, because of the intelligence of our people. Our taste and palate has become more refined; good vegetables and fruits must go step by step with the American education, and we, the State Horticultural Society, are responsible for it.

May this little essay do some good. This is the wish of
Yours and the "People's Friend,"

DR. H. SCHROEDER.

REPORT OF MCHENRY COUNTY—By J. S. ROGERS, MARENGO.

(Being a part of Report of First District, pages 7-16.)

H. C. GRAVES, Committee.—*Dear Sir*,—I had hoped that the report on the "Status of Horticulture" would have been made by some abler and better-posted person than myself. However, I will endeavor to give you the results of what I have been able to glean from my own observation.

Altogether, the past season has not been an unfavorable one as regards fruit. The trees and plants came out of winter in good condition, and gave promise of good crops; but the cold, dry, backward spring evidently cut short the crop of large fruits; the trees blossomed out well and in good season, but were held in check some ten days or more by cold weather, which caused the blossoms to wither.

Apples were a light crop, and were about ruined by a severe drouth during August and September, by which they were delayed in maturing, and consequently will not keep.

There were no *Pears* or *Plums* worth mentioning in the county.

Cherries of Early Richmond and English Morello varieties bore good crops, more than sufficient to supply the home market, the average price being about two dollars per bushel. The mahaleb and morello stocks are what we use here; the mazzard is a failure in our soil.

Strawberries bore a heavy crop of luscious fruit, the Wilson's Albany, Hovey's Seedling, Chas. Downing and Col. Cheney being the leading varieties.

Raspberries, especially the black-caps and purple-cane, gave good crops, and were in every way a success.

The Concord *Grape* outdid itself, for never was such a heavy crop of such excellent fruit seen here or elsewhere in the county; Rogers' Hybrids Nos. 4, 16 and 23, and also Delaware, Iona, Martha and Isabella, fruited in favored localities.

Currants and *Gooseberries* bore about as usual.

Blackberries were a failure.

Considerable interest is manifested in setting out shade-trees, the Elm and Ash-leaf maple taking the lead. Occasionally some one on the prairie indulges in what is termed a "timber-belt," but which is in reality only a wind-brake, using such trees as can be had the cheapest, as Soft maple, willow, etc., but when once grown he would not dispense with it.

There were no insects in the orchard to any extent, except the canker-worm, and that is easily eradicated: one pound of Paris-green in forty gallons of water, applied with a force-pump, will "fix it," the above amount being sufficient for one hundred good-sized orchard trees. Everybody in this vicinity that is troubled with the pest, and that cares for his orchard, is using this remedy with the best of success.

The Cabbage-worm has ruined all the cabbage in this part of the county, and so far no remedy is found to stop its ravages, it being a new pest here.

VARIETIES OF FRUIT BEST ADAPTED TO THIS SECTION.

Apples.—Golden Russet, R. Janet, B. Davis, Domine, Bethlehemite, Pewaukee, Walbridge, T. Sweet, Winesap, Plumb's Cider, Wagoner, N. Spy, Jonathan, Snow, Maiden's Blush, Lowell, Fall Winesap, Bailey Sweet, St. Lawrence, Haas, Saxton, Fall Orange, Benoni, Astrachan, Duchess, Sops of Wine, C. R. June, Sweet June, Cole's Quince, Tetofsky, Early Joe.

Siberian Crabs.—Transcendent, Hyslop, Whitney's No. 20, Fay's Joe, Brier's Sweet.

Pears.—Flemish Beauty, Bartlett, Buffum.

Plums.—Miner, Wild Goose, Lombard.

Grapes.—Concord, Delaware, Iona.

Raspberries.—(Black-caps) Miami, Doolittle and Davison's Thornless; (Red) Turner, Purple Cane, Philadelphia.

Blackberries.—Snyder, Kittatinny.

Strawberries.—Wilson, Russell's Prolific, Hovey's Seedling, Charles Downing, Col. Cheney.

CABBAGE INSECTS.

(A paper prepared expressly for the Illinois State Horticultural Society, by CYRUS THOMAS, State Entomologist.)

Cabbage (*Brassica oleracea*) is one of the vegetables brought into use at an early day, and although not indispensable, like the potato, is nevertheless an esculent highly esteemed, and has assumed an importance that gives it a prominent position not only in the horticultural catalogue, but also in estimating the production of our country. I have no statistics by which to estimate its value in this country, but when we learn that in London about one hundred millions heads are annually sold, which at but five cents a head would amount to \$5,000,000, we may be prepared to estimate the amount raised in Illinois at a sum worthy of being taken into consideration in estimating the value of our productions.

Just when and where it was first brought into use it is not possible to state now with certainty. A comparatively recent article in *Hardwicke's Science Gossip* says that the plant from which the varieties in use in England originated is to be found along the southeast sea-coast of England. But it is certain that some of the varieties were early in use on the western side of the continent; also that kale or colewort of some kind was long in use in Greece and Rome, as they are frequently mentioned by Greek and Roman writers, and even directions given for their cultivation. It is also certain that various species of *Brassica* are found in different parts of the world.

But it is not my intention at present to enter into the history of this vegetable farther than to call attention to the fact that our species is probably a native of a northern maritime country, although the genus is distributed over the temperate climate of Europe, Asia and Africa.

Naturally of a succulent character, which has been greatly increased by cultivation, it is thereby rendered more than ordinarily liable to the attacks of leaf-eating insects.

What were its original insect enemies we have no means now of ascertaining with any certainty; but it is evident that the change made in it by cultivation and its extension over a large portion of the world has added considerably to the list of its insect foes. As the westward extension of the area of potato cultivation has added to the insect enemies of this vegetable, in this country, so the western and southern extension of the cultivation of cabbage has increased the number of its foes. We may mention as examples, in proof of this statement, the Southern Cabbage-butterfly (*Pieris protodice*) and the Harlequin Cabbage-bug (*Murgantia histrionica*). The latter, in fact, did not commence its attack until this vegetable began to be cultivated in a certain portion of the Gulf region.

As the chief portion of this plant as grown under cultivation consists of its leaves, the attacks of its insect enemies are directed chiefly, and in fact almost entirely, against these. As the leaves constitute the edible portion of the plant, this fact limits the application of topical remedies to such substances as will not endanger life by their poisonous qualities.

The succulent nature and crisp character of the leaves, notwithstanding the hardy character of the plant, tend also to further limit the use of topical applications, especially such as will discolor or injure them.

So far but little has been done towards finding any other remedies than topical applications, but the experience of the past season in our own State has led many to doubt the efficacy not only of any that have been recommended, but of all remedies of this class, so far as counter-acting insects that attack the cabbage are concerned. In fact there is a growing tendency among practical horticulturists to place less and less reliance upon such remedies in any case, except perhaps for such tender-bodied and easily-destroyed insects as plant-lice.

The loss of cabbages the past season, through the operations of the caterpillars of the cabbage-butterflies, is well known to every horticulturist, and as these are now the greatest enemies our cultivators of this esculent have to contend with we will commence our list with them.

As the readers of this paper are fully aware, all butterflies belong to the order LEPIDOPTERA of the Insect class. The genus *Pieris* in which the cabbage-butterflies are to be found, as will be seen by reference to the analytical table in my Second Entomological Report, stands very near the head of the order as the genera therein are usually arranged. The species belonging to this genus may, as a general rule, be distinguished from those of other genera of butterflies by the following characteristics: The perfect insects or butterflies have no tails or prolongations to the hind wings; the ground color of the wings is white or yellowish white; the spots, when present, are dark or black; they are of medium size.

Pieris rapæ, Linn. The European Cabbage-butterfly.

This species, which, from the fact that it has been introduced from Europe, has generally received the name "European Cabbage-butterfly," is usually designated in England the "Small White" or "Turnip Butterfly."

It is beyond all doubt the most injurious cabbage insect with which our gardeners have to contend. As is the case with most of the species which have been introduced from Europe, it is more injurious than any of its native congeners. According to Abbe Provancher, it annually destroys about \$240,000 worth of cabbage in the vicinity of Quebec. A correspondent of the *American Agriculturist* for November, 1870, states that the loss from this insect in the vicinity of New York alone would amount, for that year, to more than a million dollars. As I have no statistics in reference to the cabbage production of our State it is impossible for me to estimate the loss occasioned by this insect the past season, but it must have amounted to fully one-half of the entire crop.

It was introduced into North America about 1857, appearing first at Quebec. In 1864, it had not then extended more than forty miles from that city; but in 1866 it was taken in the northern part of New Hampshire and Vermont, and westward beyond Montreal. By means of the railroads it was soon carried to Boston, New York, and southward to

Philadelphia and Washington. In 1869 it was reported as common in New Jersey, though Dr. Fitch states that it was first seen in Eastern New York in 1870. By 1871 it had traveled as far eastward as Halifax, Nova Scotia, and westward to Central New York. It must have reached Illinois about 1876, making its first appearance in the vicinity of Chicago, although attracting no attention until 1877, so far as I can ascertain, when it was found at Maplewood, west of Chicago, in September, having reached this point in its westward march. In 1878 it made its appearance in injurious numbers as far south in the State as Springfield, and a few specimens were taken at Carbondale. Its general spread over the State during the past season has already been referred to. What point it has reached in its westward march I have not learned, but it is more than probable that by this time it has passed across Iowa.

It was probably introduced into this country in some vessel which discharged its cargo at Quebec. Prof. Riley, in his second report on the Noxious Insects of Missouri, says it was probably introduced in the egg state, on a batch of refuse cabbage leaves which were thrown from some vessel, where, after hatching, the young larvæ managed to find suitable food close by. Dr. Fitch, in commenting on this suggestion, remarks:

The insect does not remain in its egg state the length of time required for such a voyage. The eggs, however, hatching on shipboard, the worms from them would readily sustain themselves on the leaves, and on reaching port, where fresh vegetables could be obtained, the few wilted and decaying cabbages remaining would be thrown away, with some of these worms lurking among the leaves, whereby their race was probably started on our continent.

As this species has been known in Europe from time immemorial, it is a matter of surprise that it was not introduced at an earlier day. But this is to be accounted for by the fact that it was necessary a combination of a number of favorable circumstances should take place before it would be successfully transferred from one continent to another.

Dr. Fitch mentions a somewhat singular fact observed at its introduction into the section of New York in which he resides:

During the fore part of the year 1870 our white butterfly (*Pieris oleracea*) made its appearance in the usual manner. One or more of them might be seen almost every day of August. Four white butterflies were hovering about and alighting around me in my garden, when one of them was noticed, with much surprise, as having a round black spot near the middle of its fore wings. Conjecturing it to be the spotted variety of our white butterfly, and anxious to secure the specimens, I hastened to obtain a net for its capture; but on being approached, to my great regret, it flew wildly away. Next day, however, two similar specimens were noticed and captured, and on examination were discovered to be the European *Pieris rapæ*. And on the following days these spotted butterflies occurred more and more common, whilst our white butterfly immediately vanished, not one of them being seen either in the gardens or the meadows.

A somewhat similar result has attended their appearance in my immediate neighborhood.

Our native species—*Pieris protodice*—is usually very abundant during the summer and early part of the fall. Last fall, as before stated, a few specimens of the European species were observed, the native species

being quite abundant; but the present season, during which the former has been very abundant, the latter is seldom seen. It would appear from this that the aggressive foreigner, as the Caucasian among the races of men, is destined to drive from the field the aborigines.

The butterfly, or perfect insect, which varies slightly in the two sexes, may be briefly described as follows:

The general color a dull creamy white, often showing a yellowish cast; the body black above and on the sides; head greenish yellow; under side of the body yellow; antennæ varied with black and white, the club at the end dusky, except at the extreme tip, which is brown; the legs white; the wings of both sexes are of a creamy white above (but marked with black dots, as hereafter noted, beneath), the anterior pair white, except the tips, which are yellow, the posterior pair yellow; on the upper side the tips of the fore wings are marked with a triangular black space; the base of both wings where they join the body are powdered with blue-black. The males have the anterior wings each marked above with a single round black dot near the center; the under side has a corresponding black dot, also a smaller one immediately behind it, near the posterior margin, is generally present. The upper side of the posterior wings usually has a black or dusky dot or mark on the anterior margin near the apex; under side without any spot. The female differs only in having two black dots on each of the anterior wings, which are usually larger than those in the males, which are reproduced on the under side; the base of the anterior wings is more widely sprinkled with the dusky shading. The hind wings have the outer margin regularly rounded; abdomen slender.

Length of body, about .75 inch; wings expand from 1.50 to 2 inches, usually about 1.75 inch.

I add here Dr. Fitch's lengthy description of the species as observed by him in New York:

The head is coated over with straight white and black hairs of different lengths, the black one less numerous on the under side. The eyes are large, protuberant and hemispherical; in the living specimen, grayish-green, with four rows of movable black spots, the central spot being of a deeper or coal-black color; in the dead specimen, dull brown and without spots. The antennæ are 0.40 long, and composed of thirty joints, which are shorter at each end than in the middle. They are slender and thread-like, with the tips enlarged into a knob of an elongated, egg-shaped form, with the larger end outward. Their colors are prettily arranged in new and unrubbed specimens, the outer and under sides being white; on the upper side a continuous black line; on the inner side a row of long, oval, dark-brown spots, one on each joint, extending from its base nearly to the tip; these spots separated from the black line above a slender white line, which is widened towards the apex of each joint, and there sends down a transverse band connecting this white line with the white under side. The knob is flattened or spoon-shaped and black on the concave inner side, being sprinkled with black scales, which sometimes form bands of this color; the tips pale yellow. The thorax is black and clothed with soft hairs of a white or bluish-white color. The abdomen is black and covered with white appressed scales, less dense upon the back; its under side white and coated with white scales. The legs are covered with white scales, and the under side of the thighs with white hairs, and there is frequently a black stripe on the thighs and one or two slender black lines on the shafts and feet. The wings are white and at their bases dusted more or less with black scales. The fore wings frequently have black

scales sprinkled along their outer or costal border its whole length. At their tips is a large triangular grayish-black spot, which is longer on the outer than on the hind side, and on its inner side straightish, frequently with a concavity towards its inner end. In the female this spot is larger, but effaced on its inner end, whereby it has more of a squarish than a triangular form. Slightly beyond the center of these wings is a large black dot or round spot, and between this and the inner edge, in the female, is a second spot, which is usually smaller and less regular in form, with its edges more indefinite. And in this sex is frequently a faint gray streak on the inner border of these wings, extending from opposite the inner spot forward towards the base. The hind wings in both sexes have a black spot on the outer margin a little back of the middle, which is smaller than those on the upper wings, and its edges indefinite. On the under side the fore wings are white and sprinkled with black scales at the base and along the outer border sometimes to the middle. Along the inner side of the rib vein towards the base is a broad stain of yellow, more distinct in the females. The tips are pale yellow, and in both sexes there are two black spots, corresponding with those on the upper side in the females, but commonly smaller. The hind wings are pale yellow, and dusted over with small black scales, which are more numerous towards the base; the outer edge is bright yellow near the base, and no vestiges of the black spot of the upper side are here visible in either sex.

Curtis's description of the species, as observed in England, is as follows:

The *male* is white, the superior wings have black tips dusted with white, and the inferior wings have a black spot on the upper edge; the *female* is similar, but has two large black spots likewise beyond the center of the superior wings; under side of same white, the apex yellow, and two black spots beyond the middle, the lower one sometimes nearly obliterated; inferior wings yellow, freckled with black; length of male, eight lines; expanse, about two inches; the female is larger, and sometimes of a duller color; but I possess a male, taken near Oldham, in Lancashire, which has all the wings of a bright-yellow color.

The female butterfly deposits her eggs singly here and there, usually upon the under side of the leaves, not in clusters as do some other species of the same generic group; but she does not confine herself to this part of the leaf, as the edge and upper side are often selected, especially when the insects are abundant. To the natural eye they appear like little pale, yellowish-green grains, being so small that they pass unnoticed unless the attention is turned especially towards them. If examined by a magnifying glass they will be found to be conical, or shaped like the old-fashioned sugar loaf, the larger end or base of which is flat, being glued to the leaf; the apex is also cut squarely off. Their surface is glossy and beautifully fretted with alternating minute ribs and furrows; the ribs, of which there are usually about twelve, run lengthwise, with intervening furrows; it is also striated transversely with very fine impressed lines regularly placed. The length is rather less than one-twentieth of an inch, the thickness about one-fourth the length.

The time required for the eggs to hatch varies somewhat, but is usually about six or seven days. The little pale-yellow, glossy caterpillar, which is less than one-tenth of an inch long when it first escapes through the opening it has gnawed in the shell, not satisfied with release from its prison, as the first act of its free life devours the shell. This habit appears to have been first noticed by Harold, and is mentioned by West-

wood, Curtis, Fitch and others. Dr. Fitch describes this operation fully, as observed by him, as follows :

The first act of the worm is to eat the shell of the egg from which it has been hatched. It first gnaws an opening on one side from the top nearly to the base, and then very slowly nibbles the sides of this opening and the base of the shell, until it is so cleanly consumed that no indication of the spot where it was placed remains. In the instance observed the worm was occupied five hours in eating its shell. When this is accomplished it remains at rest for a few hours.

His further observations in reference to the habits of the young caterpillar are so clearly stated and so interesting that I make no apology for introducing them here :

Its second act is to weave a mat or carpet to give it a more secure foothold upon the leaf. Applying its mouth to the surface of the leaf and moving it from side to side, it spins therefrom a thread of silk of most extreme fineness, which it fastens to the surface, crossing it in every direction, until it forms a thin film, which to the eye appears like a small glossy spot very visible in a particular reflection of the light, looking as though the leaf had been slightly touched with varnish. If nothing occurs to drive it therefrom, this spot becomes its residence for a few days. And wherever it takes up its abode subsequently it constructs a similar mat, into the threads of which it can catch the minute hooks of its feet, to render its standing more secure than it is upon the naked surface of the leaves.

It next begins to feed upon the leaf, some six or twelve hours after it has finished eating the egg-shell. At some point slightly outside of the edge of the mat on which it is standing it eats a round hole, the size of a small pin head, into which it gradually sinks its head deeper and deeper, until it passes through the parenchyma of the leaf to the skin of its upper surface.

As yet it is so small that the eye only perceives it to be a minute cylindrical pale-yellow worm, usually lying straight and motionless on the leaf. But as it feeds on the green pulp of the leaf its body acquires a green color and slowly increases in size, growing about one-thirtieth of an inch daily.

Foreign authors state that in getting its growth this cabbage-worm molts or casts its skin "several times." I can say with perfect confidence, it is only three times that it molts. When it first comes from the shell it is extremely soft and its skin admits of much distention before it constricts the worm to such a degree that it requires to throw it off. It is not till it has grown to double its first size, and is 0.12 to 0.15 long that it casts off its skin the first time. It then feeds and grows till it has again doubled its size and is 0.25 to 0.30 long, when it molts a second time. It again doubles its size and becomes about 0.50 long, when it makes its third molt; and the skin which it then acquires it retains till it reaches maturity, throwing it off only when changing into its pupa form. This is the uniform habit of these worms, as I have observed in a number of instances. The only aberrations I have noticed in these moltings are, that one of them is sometimes deferred till the worm is much larger; yet this does not appear to affect the other moltings of the same worm, for these occur as usual. Thus in one instance the second molting did not take place until the worm was 0.38 long; yet the third occurred when it was 0.53. In another instance the second molting took place when the worm was 0.30 long; yet the third was deferred until it was 0.64.

The almost uniform color is pale green; the full grown larva is a little over an inch in length and about one-sixth of an inch in diameter. Dr. Fitch says they are quite uniformly an inch and one-tenth in length, but as a general rule I have found them in Southern Illinois oftener nearly an inch and one-fourth in length. The constrictions between the segments are not very distinct, but the body appears rather to be divided into

numerous little rings, of which I find about six to the segment. They are covered everywhere with fine short whitish hairs; interspersed among these are minute black conical tubercles or elevated points. By examining closely with a pocket magnifier it will be seen that these black points are arranged in rows along the transverse ridges into which the segments, as before stated, are divided, the intervening transverse impressed lines being smooth and without hairs or tubercles. The head is rather small and is also hairy; the body tapers very slightly towards each extremity; there are six true legs—eight abdominal and two anal fleshy prolegs. The general color, which is nearly uniform throughout, is often described as pea-green. While this is sufficiently correct for general purposes, yet if we examine them closely we find the green has a slightly bluish cast, more apparent on the under side, which is paler than the dorsal surface. There is usually a narrow yellow line along the middle of the back, but this is sometimes partly obliterated, and one now (Nov. 24) before me and alive shows scarcely any sign of it, a mere trace being visible on the first and second segments, and this so faint as to be seen only with a glass under certain reflection of light. On each side near the lower margin there is a row of bright yellow dots, one on each segment a little behind the stomata or breathing pore.

When young their skin is somewhat glossy and shining, but when they reach maturity the surface assumes a velvety appearance, given it by the numerous minute pimples and short hairs with which it is covered.

The following descriptions by others are introduced here for the purpose of enabling examiners hereafter to determine questions as to local varieties.

Curtis, in his "*Farm Insects*," briefly describes it as follows:

The eggs are not unlike those of *P. brassicae* in form and sculpture, but the caterpillars are totally different, being green, and so densely covered with minute hairs as to be velvety. They have a yellowish stripe down the back and another along each side, the venter being of a pale, brighter green; they are often more than an inch long, and about as thick as a crow quill.

His figure shows distinctly the lateral stripe.

Goreau's description, in his "*Insectes Nuisibles*," is evidently copied entire from Curtis.

Boisduval, in "*Entomologie Horticole*," describes it very briefly, but mentions three longitudinal yellow lines, one along the back and one along each side just above the feet.

Stephens, in "*British Entomology*," describes the caterpillar as "green, with a pale line on the back, and a whitish line, often punctured with yellow, on each side."

But the most complete description is that given by Dr. Fitch in his Thirteenth Report, as follows:

When examined with a magnifying glass, the surface of these worms is found to be everywhere bearded with fine, short, whitish hairs, those upon the back shorter, and the young worms black and interspersed with small stiff bristles. These hairs arise from numerous minute, black, elevated points, with which the surface is everywhere

studded, the larger points being arranged in transverse rows, a row upon each of the elevated ridges into which the segments are divided by impressed, slender, transverse lines. In addition to these black points, a few pale dots or minute warts are more or less perceptible, one appearing on each side of the middle of the back on the second elevated ridge of each segment, another lower down on each side upon the fifth ridge, and some others below these. But on each of the first three rings these pale dots are arranged in a single transverse row, on the first elevated ridge three dots on each side placed equidistant from each other. Along the middle of the back is a pale yellow line, which is sometimes very faint, or visible only on the anterior rings. Low down on each side is a row of dots of a brighter yellow color than the line on the back, one on each segment, placed a little back of the breathing pore. The breathing pores are small, broad, oval, dull white, inclosed in a black ring which is bordered with yellow, this border being more broad on the fore side, and sometimes wanting on the hind side. The head is spheroidal, and as broad as the neck, green, and clothed with hairs. The legs and prolegs have the same green color as the body.

Instead of commencing at the margin of the leaf and eating inward, as is the habit of many leaf-eating insects, it riddles it with holes, gradually enlarging these where the worms are numerous, until all that portion between the veins is consumed. Although they will commence operations on either the upper or the under side of the leaf, yet my observations lead me to believe they prefer commencing on the upper side. Although they bore into the incipient heads, yet I did not find this habit so general as I supposed from what I had read in reference to them; in fact I seldom found them making their way into well-formed, compact heads. When the heads are forming, and they commence work on the outer clasping leaf, this appears to have the effect to cause it to partially open or withdraw from the head, which enables the worm to work more freely. This also has a tendency to prevent the cabbage from heading.

Notwithstanding the butterfly appears to be aggressive in its nature, in this country at least, driving away by its simple presence, or in some other way, our native congeneric species, the larva, on the other hand, is of a quiet and peaceful disposition, avoiding intrusion upon each other and upon other insects. It is with much hesitancy it passes from its leaf to another; and Dr. Fitch noticed that if an aphid was located on a leaf near where the worm was feeding, the latter would, without encroaching upon or in any way molesting, leave untouched a portion of the leaf a half an inch or more in extent around the aphid. I have observed an aphid walking freely over one of them without it making any effort to disturb or cast it off.

Although apparently so tender and delicate in its organization, it is exceedingly tenacious of life; acrid substances which will readily destroy many other caterpillars appear to have but little or no effect upon it. I have noticed them eating away though covered with pulverized lime; Dr. Fitch has observed the same thing with reference to white hellebore, and yet this will readily destroy the currant-worm or saw-fly larva. The same author also states that on one occasion he found one frozen in a cake of ice, which, after being thawed out, revived and completed its transformations. How it is possible for an insect apparently so tender, and composed almost entirely of fluids, to survive under such a degree of cold, is

a difficult problem to decide. Cabbage is capable of surviving very severe cold, and hence we presume is a native of a northern climate; it is therefore possible that it communicated this property to the worm which feeds upon it.

When it has completed its growth, admonished doubtless by some peculiar feeling that it is about to undergo a change, it becomes uneasy and commences running to and fro seeking some place of retirement where it may safely pass the pupa or chrysalis state. For this purpose it selects, if it can be found, some place above ground, and that is somewhat protected, as the under side or margin of a rail, board or projecting substance, apparently preferring dry, woody substance. I have observed them climbing the sides of a two-story house to the eaves before content with the position. Having found a place that is satisfactory, the first act of the caterpillar is to spin a little mat on the surface, in which it can fix the hooklets of its feet as a means of support. It next spins a strong silken cord across the middle of its body, fastening it firmly on each side to the plank or rail on which it is placed. Soon after this operation is through the worm commences contracting in length, especially its anterior portion; the color also changes from the bright green to a dull or dirty yellowish-green, approaching more and more to the dull gray of the pupa. The outer skin during this time is loosened from the pupal skin within, which by this time is completely formed; it now gives way to the pressure of the insect within and splits open along the head and front part of the back. The pupa proper now appears, and having relieved itself of the old larval skin, assumes the chrysalid form of the species.

The pupæ vary in color not only according to age, but after they have fully completed their pupal growth; almost every color from a dull yellowish-green to an ash-gray may be encountered. A light gray with numerous black points appears to be the most common; those which are parasitized are paler than those that are living. The length varies from about .70 to .80 of an inch; a perfect one now before me measures exactly .75 inch, the precise measurement given by Dr. Fitch as the usual length. The angles in the thoracic region are sharp and somewhat laminated, the two anterior lateral ones presenting a single prominence, the posterior ones two prominences; the anterior end is armed with a short spine which projects forward.

The length of time that the summer brood remains in the pupa state varies considerably. Dr. Fitch gives the length of time which six specimens of the summer brood remained in this state, partly from his own observations and partly quoted from the statement of Joseph L'Admiral, as follows:

ENTERED PUPA STATE.	BUTTERFLY APPEARED.	LENGTH OF PUPA STATE.
July 8.....	July 19.....	11 days.
“ 20.....	August 5.....	16 “
August 19.....	“ 26.....	7 “
“ 22.....	September 2.....	11 “
“ 29.....	“ 7.....	9 “
September 4.....	“ 23.....	19 “

Professor French informs me that those he reared remained in the pupa state generally from six to eight days.

My observations differ somewhat from either of these, showing the time to be shorter. A number of full-grown worms, about twenty, were collected July 17, which were about to enter the pupa state; by the evening of the next day all were chrysalids. On the 22d of the same month, five days afterward, a few butterflies made their appearance; the 23d, a large portion appeared, and in a day or two more all not parasitized had completed their transformations. It would appear from this that the pupa state is considerably shorter in the latitude of Southern Illinois than in that of New York.

As the insect winters in the pupa state, the chrysalids of the full-grown brood are not, as a matter of course, transformed into butterflies until the following season—from March to May, according to the latitude and season. The fact that one of Dr. Fitch's specimens entered the pupa state August 21st, and the butterfly did not come out until December 8th, and one of L'Admiral's, which pupated September 5th, did not come out until the 28th of May following, shows that in the same section some may be double-brooded while others may be but single-brooded; or in more southern latitudes some double-brooded and others three brooded.

Miss Smith, in her address delivered before the Wisconsin Horticultural Society at Green Bay, states that "the butterflies" (of this species) are generally supposed to hibernate during the winter months. (?) I presume that she intended to convey the idea by this language that it is generally supposed this insect hibernates in the perfect or butterfly state; so far I have been unable to find any authority for this statement, as all the writers who describe the habits of this or the congeneric species state directly or indirectly that they hibernate in the pupa or chrysalis state. This has been known in Europe from the days of Harold, and in America the same fact has been observed from the time of its discovery to the present.

This species is generally understood to be two-brooded. The perfect insect was taken here last spring early in March and there are a few worms now (Nov. 26) on the cabbages. The butterflies have been more or less numerous all summer, but they appeared to be most abundant at three periods: the spring broods in March and April; the July brood and September brood. Hence, I feel quite certain that we have had three broods in the southern extremity of the State this year.

Natural Agencies which assist in its destruction.—Fortunately for the gardener this and the other species of cabbage-butterflies are subject to the attacks of certain parasites which aid very materially in their destruction. Curtis in his "*Farm Insects*" describes and figures several species of parasites which prey upon the three species of cabbage-butterflies found in England, and shows how thoroughly they keep in check these troublesome worms. These are chiefly minute ichneumon-flies of the Chalcid group, some of which deposit their eggs in the eggs of the butterflies; another punctures the caterpillars and deposits its eggs in its body, while

another places its eggs on the outside of the chrysalis, so that when hatched the little grubs can work their way into the interior. The last of these, the *Pteromalus puparum* of Linnæus, is found also to be a native of this country; and since the advent of the European cabbage-butterfly, which we are now describing (*Pieris rapæ*) has manifested its disposition by attacking the chrysalis. It was not known that this chalcid was a native of this country, but when observed was supposed to be an importation which had been brought over from the Eastern continent with its host, until Dr. Packard, by comparison of specimens found here and in England, ascertained they belong to the same species.

This little Hymenopterous insect, rather less than one-tenth of an inch long, is wasp-like in form, with four delicate, transparent wings, very slightly reflecting the prismatic colors, the anterior pair with a single short, dull-yellowish nerve; the head very short and broad; the body of the female is a blackish-green, that of the male somewhat pale-green.

The following more exact description is by Dr. Packard:

Description.—The male of the *Pteromalus* is a beautiful, pale-green fly, with the body finely punctured and emitting metallic tints; the abdomen or hind body is flat in dried specimens with a deep crease along the middle of the upper side, and it is much lighter in color, and with more decided metallic reflections than the rest of the body. The antennæ are honey-yellow, with narrow black wings. The legs are pale honey-yellow. It is .08 inch to a tenth in length.

The body of the female, which would be thought at first to be an entirely different kind of an insect, is much stouter, broader, with a broad, oval abdomen, ending in a very short ovipositor, while the under side of the body near the base has a large, conical projection. It is much duller green than the male, and the body is more closely punctured. The scutellum of the metathorax is regularly convex, not keeled in both sexes. The antennæ are brown, and the legs brown, becoming pale towards the ends, the ends of the femora being pale; tibiæ pale brown in the middle, much paler at each end, while the tarsi are whitish, though the tip of the last joint is dark. It is from a line to a line and a third in length. The larva is a little white maggot about a sixth (.17) of an inch in length. The body consists of thirteen segments, exclusive of the head, and is cylindrical, tapering rapidly towards the head, while the end of the body is acutely pointed. The chrysalis is whitish, the limbs being folded along the under side of the body, the antennæ reaching to the end of the wings; the second pair of legs reaching half way between the end of the wings and the end of the abdomen; while the tips of the third pair of feet reach half way between the second pair of feet and the end of the abdomen. It is from a line to a line and a third in length.

The female deposits her eggs upon the outside of the chrysalis of the butterfly as soon as the caterpillar has cast off its skin, when it is soft, tender and exhausted by the severe change which it has undergone. These eggs soon hatch, and the little grubs at once eat their way into the body of the chrysalis, the interior of which at this time is in an almost liquid state. The number of these maggots which live in one chrysalis is often very great, sometimes amounting, according to Curtis, to as many as two or three hundreds, but according to my observations, which appear to agree with those of Dr. Packard, the more usual number is from ten to thirty. They appear to consume the entire interior, filling it up with their bodies and entire exuvæ.

In the pupa shells which I have opened, some of which are now before me, I find that all the parasites have not escaped, but in each there

are more or less dead. As these have passed from the pupa state it is evident they have not been attacked by a second parasite. The question then arises, Have they failed to perfect their organization and to acquire sufficient strength to cut their way out for want of sufficient food?

Judging from Mr. Curtis's observations this would seem to be impossible, but we must bear in mind the fact that his statements apply to the larger chrysalis of *Pieris brassicæ*.

These little parasites, as may be inferred from what has been stated, undergo their transformations in the body of the chrysalid or pupa; the perfect flies coming out of the summer brood in about two weeks; but those in the fall brood do not make their appearance until the following spring.

Their multiplication is so rapid that when they make their appearance early in the season where the butterflies prevail it will be found that the larger portion of the fall pupæ are parasitized. Dr. Packard states that out of one hundred and ten chrysalids handed him by Mr. Putnam, in September (1876), all but two were infested. The infested specimens I have examined were obtained chiefly in the northern part of the State, and selected because they were parasitized, hence I am unable to state the proportion. Although the parasite has made its appearance in my immediate section, it came too late to affect any but the last brood of the past season.

The infested chrysalids of the butterfly may easily be distinguished by the livid and otherwise discolored and diseased appearance of the body.

I do not know that these parasites select any particular point of the chrysalis shell at which to make their escape, but in those I have observed the place of exit appears to have been generally at or near the point where the abdomen joins the thorax.

In Europe there is a small chalcid species, *Microgaster glomeratus*, Linn. which attacks the caterpillar, depositing thirty or more eggs in its body; the maggots hatched from these feed internally upon the worm, weakening it, but not destroying its life, until they are ready to transform into pupæ; then it dies, and they, yet in the larval state, make their way through the skin and spin little elongate-oval silken cocoons, in masses, beneath and around it.

Although this species, so far as I am aware, has not yet been observed infesting these cabbage-worms in this country, yet cocoons somewhat similar to those made by it have been found about the caterpillars of *P. rapæ*. I insert here a description of it copied from Curtis:

It is black and thickly punctured; the horns are thread-like, longer than the body in the male, shorter in the female, and composed of eighteen joints or upward; the eyes are lateral, with three little eyes or ocelli upon the crown; the abdomen is shorter than the thorax, depressed, linear, smooth and shining; the basal segment is a little narrowed, with the edges on the sides dirty white; ovipositor concealed beneath the abdomen; the four wings are very transparent, iridescent, with a distinct pitchy-colored stigma on the superior; the nervures lighter, the areolet open externally; legs bright ochreous, hinder thighs black on the upper edge, darkest at the apex, tips of their shanks and tarsi brownish, the apex only of the four anterior brown; length, a little more than one line; expanse, $2\frac{3}{4}$ lines.

According to this author the little cocoons are bright yellow. I have found this season, upon the cabbages where the worms had been at work, similar little cocoons, except that instead of being bright yellow they are of a creamy white; but I have not yet seen the perfect insect.

Mr. Provancher, of Quebec, was the first to call attention to another parasitic fly, which belongs to the same group as and resembles the common house-fly. This is a species of *Tachina*, and the maggot which resides in the body of the cabbage-worm, living on the fatty portions, is, according to Dr. Packard, flattened and sub-cylindrical, with both ends of it rounded much alike, the mouth parts partly aborted, there being only two retractile horny mandibles by which the fatty portions of its host are eaten.

There are other Ichneumon-flies which I am inclined to think are at least occasionally parasitic upon the worm, as I have noticed them frequently about them and on the cabbages where the worms were at work—one apparently a microgaster and another supposed to be a *Pimpla*. Some fifty or sixty cabbages in my garden were devoted to the worms the past season for the purpose of experimenting with them; on some the worms were quite numerous up to November, now it is almost impossible to find a chrysalis, while those bred in cases have long since passed into the pupa state and most to the perfect insect. The question therefore arises, what has become of the worms on the cabbages? Have they been transformed into butterflies by the warm weather? or have they been destroyed by parasites and other enemies?

A few butterflies were seen as late as the first part of November, but not after all the worms had disappeared. Dr. Fitch noticed a spider, which he names the "Cabbage-spider" (*Theridion brassicæ*), feeding on the young caterpillars.

This is about one-fifth of an inch long, of a waxy, white color, with two black parallel lines along the middle of the front part of the body; the legs long and slender.

He also mentions and describes another species, the "Underleaf-spider" (*Theridion hypophyllum*), about the same size as the preceding, with the front part of the body and thighs a bright cherry red; its globular abdomen black and shining.

We may add also as natural enemies insect-eating birds and domestic fowls; the latter especially are efficient aids, as will be found by allowing a hen or two with flocks of chickens the range of the cabbage-patch, a plan I carried out in 1878, but neglected to do in 1879.

Artificial Remedies.—Old Vincent Kollar, in his work on "*Injurious Insects*," says:

The best way to destroy them is picking off and killing the caterpillars as well as the pupæ, as far as it is possible; the latter are found attached to adjacent trees, hedges and walls.

Curtis, in his "*Farm Insects*," says:

There are several methods of reducing their numbers and checking their increase; the best is to look in the winter for the chrysalids, which are concealed under the ledges of walls, palings, doors, window sills, on bushes, in hedges, on the trunks of trees, etc.,

and crush them, but on no account to destroy the dark-brown colored ones, which are full of the parasitic *Pteromali*. As the spring advances a ring or bag net may be used to catch the butterflies; and when the caterpillars are large enough to be seen, hand picking is neither difficult nor laborious; when they attack the seed crops shaking the stems might prove useful, provided troops of ducks were to follow and pick up the caterpillars; or dusting the plants with hellebore powder, fresh and genuine, would be worth a trial, as it is very effective in some instances.

Boisduval, in his "*Entomologie Horticole*," gives but one method, that of catching the butterflies with the insect nets.

Duponchel, in his *Iconograph of Caterpillars*, says the most efficacious way of destroying them will be for the gardeners to employ the children in capturing for slaughter all the white butterflies which are seen flying around their cabbages, as these are mostly females seeking places to lay their eggs; and that by slaying one female before she begins to lay, we destroy an entire generation of caterpillars. He also recommends searching for and destroying the eggs and pupæ.

Dr. Fitch also recommends employing children to capture the butterflies, and placing pieces of boards between the rows of cabbages, elevated two or three inches above the ground, as places for the worms to pupate, when the pupæ can from time to time be collected and destroyed. He also suggests searching the cabbage leaves over, and cutting asunder all the worms found with a pair of scissors. He thinks topical applications of poisonous substances, such as hellebore, etc., of no practical value.

Prof. Riley repeats the recommendation to capture the butterflies, and also recommends trapping the pupæ by placing boards between the cabbage rows. He adds that the "saponaceous compounds of cresylic acid are effectual, and without objection as to poisonous qualities."

Subsequent experiments have shown that most, if not all, the topical remedies proposed fall far short of affording any substantial relief from the depredations of this pest. Of these I tried, the past season, salt, brine, powdered lime, ashes, lye and elder decoction. Lime and brine had the least effect, the worms eating away apparently without inconvenience when coated over with lime; ashes had very little more effect. A lye made by putting fresh and strong ashes in water and using it at once proved more effectual than anything else I tried. Salt, where it could be made to reach them, was more effective than the brine. Elder decoction, which in the hands of some other experimenters proved of value, was tried too late to give it a fair test. Others have used a decoction of dog-fennel as they thought with favorable results; and others dilute carbolic acid. Hot water has long been recommended. In one instance within my knowledge, powdered black pepper was tried, and for a time did check the worms, and the cabbages, as I afterward observed, generally formed good heads.

Although the list of materials used is a rather long one, yet we are not prepared to say there is no topical application that will destroy the worms without materially injuring the cabbage. The fact that the species has long been injurious in Europe without such substance being discovered, it is true, renders the likelihood of such discovery very doubtful,

and therefore we should seek some other means of counteracting the pest. I tried the experiment of catching the butterflies, and am satisfied that children from ten to fourteen years of age can soon be taught to do this with ease.

The butterfly moves heavily and rather slowly, alighting specially on cruciferous flowers. A small bed of radishes here and there, if allowed to run to seed, will attract them, and they may then be caught without running among the cabbages, which is one objection to this method of relief. For this purpose a circular ring of heavy wire, about twelve or thirteen inches in diameter, with the ends of the wire fixed in a tin socket for the handle, and a sack of mosquito bar or very thin open muslin about as long as twice the diameter of the ring, with a handle four or five feet long, will answer the purpose very well.

The butterflies are most numerous in the hot part of the day, when it is clear and the sun is shining brightly.

I have never heard the question asked, Where do the butterflies rest at night? Nor does it appear that any attention has been paid to the subject. I presume they scatter and find resting-places on the bushes, trees, shrubbery, etc., as other species, as it is scarcely probable they would congregate. Still, it is barely possible, though not at all probable, that a solution of this question may afford a means of diminishing their numbers.

My experience does not give promise of much aid from the attempt to destroy the pupæ. I have not tried placing boards among the cabbages for this purpose; theoretically the plan appears to be a good one, but there may be practical reasons why it will not succeed. It is worthy of being thoroughly tested. But if left to hunt places in which to pupate, the gardener is likely to learn that he cannot find one in a hundred; at least such has been the case in my garden the present season.

As the eggs are scattered singly over the leaves, and are very minute, it will be exceedingly slow work to hunt them out and destroy them.

Killing the caterpillars is after all the most certain and effectual means of getting clear of them that can be adopted. It is true it is somewhat laborious, and to some extent injures the cabbage in attempting to get at them; but Dr. Fitch's plan of using a pair of scissors will partially obviate this, and also somewhat lessen the labor. It is stated that by placing a leaf on the top of the cabbage in the evening they will be attracted to it and can easily be gathered in the morning; I did not try this, but their known indisposition to leave the leaf on which they are at work would seem to render the advantage of this method doubtful; still it would be well for those who are troubled with them to try it.

During the past season a neighbor succeeded in procuring very fine heads notwithstanding the presence of the pest in large numbers. I was informed by him that his success was owing to the fact that in the first place his ground was made as rich as possible; in the second place the plants were brought forward two or three weeks in advance of the usual time, and in the third place were pushed to heading by extra culture, and I believe by tying up the leaves in part. The variety used was the Flat Dutch.

I noticed in several cases that where the cabbage had been planted rather earlier than usual, and the heads had formed, the result was favorable; for notwithstanding all that has been said and written in reference to these worms boring into the heads, if they are firm and well formed they will suffer comparatively little.

Certain varieties also appear to suffer less than others, but I am not prepared to state positively as to the names, and therefore can only call attention to the fact.

In concluding my remarks on this species, while I would urge further experiments with topical applications, I would recommend to gardeners to rely chiefly on the following means:

Capturing the butterflies, especially the spring brood; killing the worms; earlier planting; selecting the firmest head varieties; and giving the plants as vigorous growth as possible by enriching the soil and thorough cultivation.

But the first remedy, to be effectual, depends upon concert of action.

P R O C E E D I N G S
OF THE
Horticultural Society of Northern Illinois.

THIRTEENTH ANNUAL MEETING,

HELD AT THE

COURT HOUSE IN ELGIN, KANE COUNTY, JAN. 27-29, 1880.

The thirteenth annual convention of the Horticultural Society of Northern Illinois was held in Elgin, Kane county, commencing at ten o'clock on Tuesday, January 27th, and closing at twelve M. on Thursday, the 29th.

The President, JONATHAN PERIAM, of Chicago, called the meeting to order at ten o'clock, January 27, and introduced the Rev. Mr. Hill, of Elgin, who opened the meeting with prayer.

The President then declared the meeting opened and ready for the transaction of business, as prepared and published in programme, and called for the report of the Treasurer, who presented the following :

REPORT OF TREASURER.

L. Woodard, Treasurer, in account with the Horticultural Society of Northern Illinois.

	DR.
1879.	
Jan. 22, To Balance on hand at last report.....	\$ 15.97
“ 23, “ State Fair Premium.....	50.00
“ “ “ Membership fees collected at meeting.....	34.00
“ “ “ “ “ “ since meeting.....	9.00
	\$108.97

		CR.
1879.		
Jan. 22,	By Paid for Book.....	\$.30
“ “	“ “ D. W. Scott & Co., as per bill.....	8.00
“ 23,	“ “ Telegram.....	1.00
“ “	“ “ L. K. Scofield, as per bill.....	16.00
“ “	“ “ O. B. Galusha, “ “	21.10
Mar. 1,	“ “ Express on stationery.....	.30
“ 15,	“ “ D. W. Scott & Co., printing, etc.....	22.00
“ 18,	“ “ O. B. Galusha, postage on books.....	2.40
1880.		
Jan. 2,	“ “ Postage for use of Treasurer.....	1.00
“ 27,	“ “ Cash on hand.....	36.87
		\$108.07

Respectfully submitted,

L. WOODARD, *Treasurer.*

On motion of Mr. Minkler, the report was accepted and referred to Finance Committee to be appointed by the President.

On motion, a committee of reception, consisting of D. C. Scofield and Dr. W. A. Pratt, was appointed.

Recess.—There being but few in attendance, a recess of thirty minutes was taken to await the arrival of the Committee of Reception and members from the incoming trains.

After the return of the committee with several delegates and old members a few moments were spent in a social way.

Resume.—The President then called to order, and upon motion of D. C. Scofield the following were agreed upon as the hours of meeting: 9 A. M., and 1.30 and 7 P. M.

The Society then adjourned to 1.30 P. M.

FIRST DAY—AFTERNOON.

The meeting was called to order at 1.30 in the afternoon, when the Hon. George P. LORD, Mayor of the city of Elgin, thus addressed the Society:

ADDRESS OF WELCOME.

Mr. President and Gentlemen of the Horticultural Society of Northern Illinois:

Your Committee of Arrangements have requested me to make the address of welcome on this occasion.

Complying with that request, and in behalf of the people of Elgin, I extend to each and all of you a hearty welcome, and hope the time you

spend with us may be pleasant, as also that your deliberating together may be the means of awakening a new enthusiasm in the industry which your Society represents.

And here I would say that the people of Elgin are not only in sympathy with your efforts, but they have given practical expression of their zeal in this direction, as may appear from the trees that adorn our streets and public grounds; some standing in rows like sentinels and others in groups like a great congregation, and it seems to me that even these express their silent welcome, while with their branches, like arms extended heavenward, they invoke benedictions on your Society.

With our words of welcome we have to offer you our congratulations. We congratulate you that the financial cloud which for the past six years has hung like a pall over our land has at last been lifted.

In a community like ours, where the theory that "the nimble sixpence is better than the slow shilling" forms the web and woof of our financial and commercial system, it is easy to perceive that an industry like yours, which in its scope must take in the results of years, must have suffered more than any other from this long-continued financial depression.

We trust that the season of prosperity upon which we have just entered may give a new impetus to the business in which you are engaged. Living, as we do, in a land more highly favored than any other, with the blessings of civil and religious freedom, it may be truly said of us, that every man may "sit down under his own vine"—if he will but plant a vine—and under his own "fig-tree"—if he can grow a fig-tree—and enjoy the fruit of his labors without molestation and without fear.

We therefore bid you God-speed in your noble work. Go on, then, ye men of courage and energy and faith; persevere in your efforts until every hill top shall be covered with noble forests, around whose giant trunks the storm-cloud shall gather and break in abundant showers, and under whose dense shade shall be formed and preserved those cooling springs whose waters shall flow forth to fill our streams and fertilize our vales.

Slacken not in your endeavors until all our plains shall be studded with fruit and shade, furnishing refreshment and protection for man and beast; for be assured it requires no prophetic vision to foresee that, in the years to come, unborn generations, as they behold the results and enjoy the fruit of your labors, will "rise up and call you blessed."

RESPONSE BY THE PRESIDENT.

President PERIAM responded in the following words:

Mr. Mayor,—It is with pleasure that I am permitted, in behalf of this Society, to thank you for the very pleasant and cordial words of greeting you have tendered us. It is pleasant to us to meet in this, one of the oldest as it is one of the most beautiful cities in Northern Illinois, and situated in the midst of a fine fruit region, and being, as the world now knows, the headquarters of Dairy products in the Great West. It

is pleasant for me to thank the citizens of this place through you, sir, for the hospitable tender of their homes to friends. It is fit that we should wish to meet here, as here is shown one of the earliest planting of forest trees, and a most successful one, by one of the fathers in horticulture in the West—the venerable D. C. Scofield. Again I thank you, in the name of the Society, for the cordial welcome tendered this Society.

PRESIDENT'S ANNUAL ADDRESS.

The President addressed the Society as follows:

Gentlemen and Ladies of the Northern Horticultural Society:

It is with great pleasure that I rise to address you at this the thirteenth annual meeting of the Society. How short these last thirteen years seem, since when a small but select body of enthusiastic and painstaking Horticulturists—not a few of whom live to continue their labors— assembled at Mount Carroll, in December, 1867, to form this association. How long to look forward to thirteen years to come. Yet it is the future which is as near as the past. It is our longings for the future that make the years seem as though they would pass slowly, and our regret that we could have accomplished so little in the past that makes those years seem so short. Have we, then, in reality, accomplished so little in these years past? No! the record is fully worthy of the dead and the living who have made the horticulture of to-day what it is. Let us look back a little farther, to the year 1851, to the meeting of the Northwestern Fruit Growers' Association, out of the labors of the members of which has grown our present State Department of Agriculture, our State Horticultural Society and our own Northern Illinois Horticultural Society. Then the country *was new indeed*, with homesteads scattered only here and there, "few and far between." The roads were mere tracks across almost boundless prairies, with no timber, except here and there groves that had gotten a foothold upon rough and broken ground or along the margins of streams. Hardly an orchard could be seen in a day's journey; our great cities were mere villages or hamlets; and only the beginnings of one railway, out of which has grown the vast net-work of the State—now the North-Western, with its two thousand miles of roadway. The Illinois Central was but begun. The other great lines were on paper. What a change! It indeed seems but as yesterday to look back upon, and yet what wonderful progress in those twenty-eight years. As the railway carriage now bears the traveler onward, farm after farm is passed, no open prairie is seen, but inclosed farms—farm joining farm—woodland groves, reared by the hand of the planter, of size sufficient for timbers for houses and barns, and one of the most noble of these plantings cultivated by a venerable citizen of this beautiful city. Orchards upon almost every homestead I had almost said, but will qualify it by saying, about the homestead of every intelligent farmer, with shelter-belts and groves scattered in profusion everywhere.

What has caused all this? The good work was laid out by the Northwestern Fruit Growers' Association, and so ably and earnestly carried out by the members of this Association, the first of whom were the leading spirits in that, and not a few of whom I see before me, gray haired, and yet working as earnestly as of yore, with the younger brethren who year by year have fallen into line in this noble work. If no other good work had grown out of the labors of the members of this Association than the fostering of tree-planting, that alone would remain as among the most beneficent ever undertaken in the West.

It is not alone our State that has profited by this work. It is the Great West beyond, that, profiting by our example, laid the foundation for groves and shelter-belts when first the trans-Mississippi region was settled. State after State, and Territory after Territory, as we go west—Iowa, Minnesota, Kansas, Nebraska and Dakota, have raised barriers towards heaven to sift the wind and break its force and power.

Our tree-planting necessities are over. We have timber enough. One-tenth the State in timber properly distributed will enable us to reach the best results in tillage. We have far more timber than we had twenty-five years ago. Let us keep it intact.

How about the planting of orchards? Many persons used to believe that trees would not grow on the prairie. When asked why, the answer was, "Oh, because they don't." A few thought differently, and planted orchards, a very few of which are now forty years old, more of them twenty years old, but the most of them have been planted within the last ten years. There are yet plenty of persons who believe that fruit-trees will not grow well on the prairie; and they will not *for them*. They either will not plant, or else neglect them after planting. Such, however, are never the men who make the horticultural history of a country, or, in fact, any history at all. These would neither assist in the formation of a society nor attend the meetings after it was formed. The orchards scattered all over Northern Illinois tell a different and most eloquent story as to the adaptation of the soil to the growth of the apple, that most noble of orchard fruits; they will grow if cared for, and furnish a most important and agreeable means of sustenance to the intelligent planter. We may congratulate ourselves, therefore, that the mission of this Society in two respects has been crowned with success. We *have* been the means of causing the planting of groves and orchards, the first of which lies at the very bottom of all successful agriculture in any prairie country. This planting of timber has not been confined to Illinois. The impetus given to the planting of groves and shelter-belts has extended as the settlements of the West have extended, and, growing almost solely out of the efforts attending the earlier plantings in Illinois, concurrent action of the people of this and other States at last waked up Congress to the necessity of protecting the industry connected with the growing of timber. Feeble though this protection was, it has nevertheless worked much good. So also in orcharding we have been able to live down the idea that fruit would not succeed in Northern Illinois, by showing that it can be raised about as easily as Indian corn, at least so far as apples,

grapes, cherries, strawberries, raspberries and blackberries are concerned, wanting only intelligent education as to varieties adapted to the climate, and the same care in guarding against insect depredators as the intelligent farmer must himself use to protect the crops of ordinary husbandry. I will go farther. We may justly claim, I think, that we have accomplished this: We have created not only a taste for the planting of groves and orchards, but we have demonstrated that it will pay every farmer so to do, to the extent at least of supplying the wants of himself and family.

What, then, remains further to be done in the direction of horticultural art? Ah! we are but on the threshold of our good work. Heretofore we have but been laying the foundation broad and deep. Let us look for a moment at this art comprised in the simple word horticulture. It is often considered to mean simply garden culture. It means, really, what garden culture implies, in every sense, a nicer and most careful culture, and nicer and most careful manipulation of every process connected with working the soil. If taken in this sense, Shakspeare's idea that it is "an art which doth mend nature" would be exact. And Lindley's definition, that "Horticulture is that branch of knowledge which relates to the cultivation, multiplication and amelioration of the vegetable kingdom," seeming as it does to include all earth culture, would not be far out of the way. At least, every farmer may take valuable lessons of the horticulturist in the preparation and application of manure, in the careful and exact plowing of the soil, and in the as careful and exact sowing of the seed and subsequent cultivation. Horticulture has a useful-practical and a practical-scientific side. The mere husbandman, the simple earth-worker, deals only with the useful-practical. He who may be truly called an agriculturist—for this word alone deals with all that pertains to earth culture in its various forms, to the breeding and fattening of animals for use, and to the various arts connected with horticulture—he, I repeat, who may truly accept the honorable title, agriculturist, must not only have a wide knowledge of what pertains to labor, but he must also be scientific as well. He must know why a thing should be done—have a real knowledge of facts. This is truly all there is to science. Now, the bringing together of why a thing is done naturally leads to how to do it in the best manner, and the best way is always the easiest. And this is the practical-scientific, and constitutes a man a husbandman, or stock-breeder in agriculture, or an orchardist, a vineyardist, a small-fruit grower, a vegetable gardener, a florist, a tree planter, or a landscape gardener. The sum of the whole is agriculture. We have professors of agriculture and professors of horticulture in plenty. Very few indeed can truly be written AGRICULTURIST after their names.

Thus it will be seen that while agriculture includes horticulture, that really we have the big end of the word. In answering the question what further remains for us to do, we say: In the first place we must keep up the enthusiasm in all that pertains to orcharding and tree planting, and we may now very properly seek to foster and extend garden culture, in the growing of vegetables, in a systematic manner, with as great a

variety of small-fruits as possible. There is a great and lasting work here before us, and one that will continue to grow on our hands as population and wealth increase. Following fast upon the heels of garden culture comes floriculture and landscape gardening. These we may now consider as demanding our special attention. We must also continue from year to year our experimental work, in originating and selecting varieties of fruits, shrubs and flowers adapted to our soil and climate. Ah, again that word soil! That opens up a big work. One great integer is composition, and the changes most feasible to render it better adapted to the wants of the horticulturist. Yes, I hear you say drainage. That is one of the first necessities, to free the soil from stagnant moisture; to take out its liability to puff up and heave; to render it more solid. But there is much else to be considered besides drainage, so I guess our mission will indeed grow upon us, rather than that we shall soon have closed our mission. No, our mission will never be closed, so long as we and our friends and neighbors like good things to eat, and the beautiful in nature to admire.

One other constant labor occurs to me: Experimental work in varieties adapted to our climate and covering the different seasons of ripening, and with a view to their more general adoption. To this end there undoubtedly should be experimental stations in at least three districts of the State, under the direction of practical men, with a view not only of fostering horticulture, but embracing the whole category of agricultural arts. If the horticulturists of Illinois can accomplish this work, it will constitute another noble work. And properly and carefully organized, it need not cost the State an onerous sum.

There is another direction in which it would seem that the time might be now ripe for this Society to use increased exertion. This is in floriculture, ornamental planting and landscape work. As wealth increases, the mind of man naturally turns to display. In our cities this runs to style in dress, elegant mansions, fine carriages and retinues of servants. In the country it as naturally turns to the adornment of the home. In the lessons we have taught in this direction we have not been derelict. The printed transactions from year to year amply show our labors in this work; but we had first to satisfy the practical every-day requirements of life, and the beautiful in our art of course must take the second place. Nevertheless, there is hardly one of our members but whose home will show that while he was dealing in the practical the beautiful has not been neglected. Wherever we find a lawn and ornamental trees and shrubs about a home we know the master is something better than a mere husbandman. Where we find a window-garden in winter, however small, we may be pretty well assured that the housewife has grown beyond the mere drudgery of stolid toil; that however exacting may be the daily routine of labor, there is still time left for the beautiful in art.

Herein lies the true majesty of our calling and of country life. Not even the luxury of the city can compensate for the true enjoyment that may be experienced at the home, when a few trees are casting their

summer shadows over a piece of nicely-kept grass, with handsome shrubs nestling here and there, and the little parterre of flowers, however small it may be.

There is one other direction that this Society has been constant and earnest in: Our record will show that we have earnestly endeavored to inculcate the importance, nay necessity, that every farmer should have a good vegetable garden. Herein we have not been able to keep the people quite so near to our ideas as we have in that other department of horticulture—the orchard.

But we must not therefore despair. Our own individual efforts, in the cultivation of vegetable gardens, will tell as surely in the end as they have in orcharding. In the cultivation of the vegetable garden, the average farmer lacks two things: *skill* and *will*. The skill to know what and how to plant and how to cultivate, and the will to do it well. He dreads to spare a day from the corn-field, for the systematic cultivation of the garden. He thinks it a waste of time to thoroughly prepare a piece of land for vegetables, and consequently about twenty-four in twenty-five confine their efforts to the raising of a few cabbage, turnips and potatoes, when, if he did but know it, the labor intelligently spent in properly cultivating a half acre of vegetables would repay twice told the same amount of labor put in the corn-field. Here, I think, is an important work that we may well prosecute with renewed vigor. It is for us to show how easy it is to raise half the living of a family on a small plat of ground, by planting in as straight rows and taking the weeds as early as the first-class farmer does those in his corn-field.

In all this we have and are laboring assiduously. We come together and talk earnestly and intelligently. The newspaper press, and to their honor be it said, especially the daily press, report our proceedings and extract from our printed volumes copiously. The State appropriates money sufficient for printing 1,000 volumes annually of the proceedings of the State Society, of which ours forms a part. I think there should be not less than 10,000 printed, so they could go freely among the reading farmers, for I don't believe in helping those who will not read. Such, like the Bourbons, never get out of old ruts, never learn anything. I think we should most earnestly press this matter of extending our usefulness through our annual volumes. One thousand volumes is small, indeed, for circulation among a population of 2,000,000 of people, all of whom get their sustenance either directly or indirectly from the farm, the orchard and garden, more than half this coming or should come from the orchard and garden, horticulture being in fact, in all densely populated countries, the most important branch of agriculture.

I have always believed that the true way to educate a people is to multiply school-houses. I think it better that the masses be taught the three primary branches of learning, rather than to let the many go uneducated, while Governments spend vast sums of money in building great universities to make masters of rhetoric. This universality of education is what has made the North pre-eminent in the arts and sciences, in manufactures, commerce, and the great agricultural wealth that is yearly feeding

the millions of Europe, which has even enabled the West in prolific years to send to them of our abundance of fruit in its natural state, and yearly of dried and otherwise preserved fruit. That we may still further foster our noble art and render it capable of still further expansion we must carry a common school system of horticulture into every neighborhood in the State. I have reference to neighborhood societies, where the one, two or three horticulturists in a neighborhood shall take the lead in getting the people together occasionally to discuss in a social way how best to accomplish the work in hand. I have but to point to two examples in our own State that have shown marked results for good in meeting once a month. These are the Warsaw and the Alton Societies. We should have such scattered all over the State. Then we should not lack for fruit anywhere; good gardens would be the rule and not the exception. There would be fewer doctors' bills to pay, and a large increase in the real wealth of the country.

These are all matters that it would be well for us to consider as among the questions that should naturally come up. In the regular reports of the several committees there will be ample scope for the discussion of the various questions connected with the practice of our art, and I know they will be carefully considered as they arise, so that when we shall have finished the labors that have called us together in yearly session we may part feeling and knowing that we have not only profited ourselves, but added largely to the fund of general information for the people of Northern Illinois, not solely these engaged in horticulture as a profession, but every farmer, every villager who owns even a rood of land; not only these, but of every person who has a home, however humble it may be.

DISCUSSION UPON THE ADDRESS.

MR. MINKLER.—If I had a horn long enough and could blow it loud enough I would sound out the sentiments of this address till they reached the Rocky Mountains. The people who own the lands, the farms, do not realize the value of the work we are doing or the importance of tree-planting; the horticulturists who constitute these societies are not a class of men who meet to blow their own horns to increase their own business. We leave our homes, pay our railroad fares and hotel bills while attending the meetings; and for what? Almost without exception from motives to serve our day and generation and provide for the generations which are to come after us; our course would be no different if we *knew to a certainty* that no pecuniary advantage would accrue to us.

We have, sir, accomplished much. We began here in Illinois by building and living in log houses, first settling near the groves, so we could get timber to build our houses and fences with. No trees could be seen over these wide wind-swept and desolate prairies. How is it

now? Why, with almost the first settling of these prairies horticultural societies were organized and the ways and means discussed and devised for raising trees and fruits upon them; we had to prove by examples that *trees would grow* on these prairies, which were thought to be destitute of them only because they wouldn't grow. Now we see groves and orchards all over these prairies, and we have proved that trees *will* grow, and bear fruit too.

Notwithstanding all this, my friends, I must dissent from what our President has said, in his excellent address, upon one point, viz.: that there is more *timber* in the country than there was thirty years ago. The fact is, nearly all our valuable timber is gone, timber-lands cleared up for farms or partly cleared and seeded to grass, so that when the growing crop of young trees is gone there will be no others to take their places. I don't think there is more than one-fourth the valuable timber in the State now that there was thirty years ago. There may be as many or even more acres on which orchards, young artificial groves and scattering young trees left from the original timber lands stand; but we know there is not nearly as much good timber now as formerly, and it seems to me that it would be evident to any one who travels over Northern and Central Illinois that the valuable timber-trees are not now growing to supply the wants of those who are to come after us. For instance, in the Auxsable grove, near where I live, there are not, to-day, fifty acres of timber land where there were one thousand forty years ago—all the best Black walnut and ash trees are gone, even where the land has not been cleared.

THE PRESIDENT.—I do not contend that there is as much valuable timber for mechanical purposes now as thirty years since, but I do believe that there is as much leaf-surface now as then, and it is the extent of leaf-surface upon which the amelioration of the climate or regulation of the rain-fall depends.

PROF. THOMAS.—*Mr. President*, I have traveled quite extensively over the State, and am satisfied that the state of things described by Mr. Minkler is the rule. Of course we in Southern Illinois, where I live, have too much timber-land—it is all timber, except where cleared up; but the groves along the streams which cross these great prairies of Central and Northern Illinois are mainly either swept away or thinned out and seeded, as he has said, so that the timber there will soon be gone. I do not believe that Illinois has more than one-fourth the timber that she had thirty years ago. These figures come from the census reports, for which people give in as timber-lands all the bush pastures and partly-cleared timber-lands. I have seen many thousands of acres on which there does not now stand

upon one mile square more timber than once stood upon five acres. Even in Southern Illinois the most valuable trees are gone. Within my remembrance there were plenty of wild-cherry trees; now they are *all* gone; nearly all the valuable oaks too are gone. It is said "figures won't lie," but when I read or hear read such statistics as these about the extent of timber-lands and timber-supply I do know they *do not* give the actual facts.

After a little further discussion upon this point, a committee of three was chosen to report upon the remaining portions of the President's address. This committee consisted of D. C. Scofield, Prof. Thomas and Mr. Galusha.

DISCUSSION UPON APPLE ORCHARDS.

MR. MINKLER.—The greatest mistake made in planting apple orchards is in the almost endless varieties planted. If I were to plant a thousand trees I would not plant more than twenty varieties.

A Voice.—Wouldn't ten sorts be better yet?

MR. MINKLER.—Yes, probably; but fifteen varieties would give best sorts and fruit the year round. Some of our best apples are unprofitable; we must plant such as will pay, when planting for market. As I have often said, the skin of an apple sells it—people prefer a bright red apple.

I tested this preference for red apples yesterday on the cars when coming to this meeting; I had taken some nice White Pippins, putting them into a paper sack, and some Ben Davis into another sack, and opening them so as to expose both, passed them through the cars, holding both kinds before each person, inviting them all to help themselves.

The result was that all the Ben Davis apples were taken, but only half the White Pippins, and we all know that the Pippin is by far the better apple.

A Voice.—If you had passed through again those who took Ben Davis would try the White Pippin.

MR. MINKLER.—I planted my trees two rods apart each way, kept the ground in a hoed crop, and in six or eight years the roots met. Buck-wheat is good and clover better in an orchard, but it should not be taken off the ground.

I had a large crop of magnificent Cayuga Red Streaks last fall, which was the result of thorough manuring the year previous. We must feed our trees if we want them to feed us.

In answer to a question which are his most profitable market apples, he said: Willow, Domine, Ben Davis, Minkler. (My wife don't think as much of Minkler as I do.—Laughter.) These are all late keepers. For summer and fall apples there is no discount on the Duchess—I couldn't keep house without her, (this is one of our old sorts which peddlers sell at fifty cents to a dollar apiece as a "Russian apple"); Benoni comes next; and for fall Maiden's Blush and Cayuga Red Streak.

A Voice.—Which are the best five sorts for home use?

Answer.—Benoni, Cayuga Red Streak, Jonathan, Grimes' Golden and Willow—then add Ben Davis, so as to be sure and always have plenty of apples of some sort.

MR. GALUSHA called attention to the Wythe as one of the most promising among our winter apples, saying that as far as yet tested it combines more good qualities of tree and fruit than any variety in general cultivation.

He also spoke of the Salome, which some members of this Society, not present, had tested, and were quite enthusiastic in its praise; and referred the members to page 133 of vol. 12, and also page 22 of vol. 13 (then printing) of State Horticultural Reports.

J. D. PIPER said he set seven cions of Wythe, four years ago last spring, in the tops of bearing trees, and this year they bore seven bushels of apples; that the apple is larger, handsomer and better than Rawles' Janet, its parent; that all who use it like it.

DR. SLADE.—I have about one thousand apple-trees in orchard. I planted from two to three hundred Golden Russets with the intention of top-grafting them with better sorts, and did graft part of them with Jonathan and others, but from one hundred Russet trees not grafted I have realized more profit than from an equal number of any other winter variety. The apples keep well, and have brought a better price than others, as they were marketed later in the season.

MR. MINKLER.—All the russet family should be kept in the dark and have the air excluded from them, and then the apples will come out sound and crisp in spring. Our oldest orchards are failing and we must set new ones; but we should not plant them upon the same site—select other good land.

MR. WHITNEY.—New or fresh land should be selected every time in planting orchards—that which has never before been in fruit-trees.

MR. GALUSHA.—I would like to have the experience of members with Grimes' Golden. It fruited for me the first time this year, and certainly surpassed my expectations; the trees seem to do pretty well and they

bore a fair crop—some of them a heavy crop of beautiful, symmetrical golden apples, the best in quality for dessert of any sort in cultivation, not excepting Roman Stem or Pomme Grise. The fruit is of good, medium size, similar in form to Jonathan, though a little larger and a little broader towards the calyx. It is among apples what the Seckel is among pears as to quality.

MR. WOODARD.—It don't bear well with me, though the trees do very well.

MR. MINKLER.—Grimes' Golden *may* have the same fault as the Jonathan, and I fear it has—that of dropping from the tree too much before time for gathering.

JUDGE WILCOX.—I am of Yankee origin and "want to know" something more about orcharding; I want to know if it can be made to pay in this vicinity; I have a number of orchards near Elgin, and they do not pay, though I think they have had a fair chance. The trees occupy the ground, spreading from tree to tree, so that nothing else of value can be grown among them, and, as they do not bear fruit, are cumberers of the ground. If I cannot get fruit from them I intend to cut them down. One orchard, planted thirty to thirty-five years ago, which is infested with insects (canker-worms—ED.) which destroy all the foliage, while others are infested in tree and fruit with other insects which either destroy the fruit or weaken the tree. I know of no variety which is profitable. One orchard bore pretty well for two or three years, but for the last five or six years has borne very little, while another of same age near by it has been almost entirely barren.

MR. MINKLER.—Probably the Judge's trees are Eastern sorts. I once had the Newtown-Pippin fever, and planted a good many of the trees, but would never plant another on any account.

MR. WHITNEY.—Orchards should be treated according to the soil in which they stand, and varieties selected which are adapted to the soil—there are no rules which will apply everywhere.

MAYOR LORD.—I would like to know what varieties of apples to plant on sandy soil, also on clay soil.

PROF. THOMAS.—Will it *pay* to raise apples in Northern Illinois? Can any one answer this in the affirmative from experience?

MR. WHITNEY.—*Yes, sir, it will pay.*

JUDGE WILCOX.—My soil is a deep, prairie loam with clay sub-soil underlaid with a stratum of sand. It is my opinion that three-fourths the orchards around Elgin are nuisances; even Mr. Scofield, who is preaching orchard culture here, has an orchard near one of mine which is no better

than the other failures; it stands year after year producing no fruit. If it were mine I would cut it down, as I intend to my own. (Laughter.)

D. C. SCOFIELD.—*Mr. President*, I must confess that old orchard has been sadly neglected, and I alone am in fault. I manured and cultivated it some while it was young and it bore several crops of fruit; but from the multiplicity of cares upon me it was neglected, and, as the Judge says, is unprofitable. But I have preached orchard culture all my life and I still preach it; I preached it to a thousand people in Connecticut before I came here, though few would heed and practice upon the sermons. I wish to relate one exception as a sample of good culture. I sold trees thirty to forty years ago to one man who had a piece of ground which had been under cultivation one hundred and fifty years. He thoroughly manured and prepared the land, planted the trees upon it and continued to manure and cultivate year after year; the trees soon came into bearing and continued to bear heavy crops, while others all around bore very little; and people came from far and near to see that remarkable orchard loaded with fruit of surpassing excellence. And what is true there may also be made true here. My sermon is this: Make the ground rich; fit it in the best manner; prune off all useless branches while very small and *never* cut off a large one; manure from year to year or at intervals as needed, and continue the cultivation; put hoed crops on the ground, but never potatoes—for you will then have to work the ground too late in the season, producing too late a growth of wood; and as the trees begin to bear increase the manuring. This is what we preached to the Connecticut man and which he practiced. His trees were planted eighteen feet apart, one hundred and sixty to the acre, and of course they required double the amount of food as though twice as far apart, or eighty to the acre. They began to bear the fourth year after planting and continued to increase the crop every year, and on the eighth year from planting he sold six hundred dollars' worth from the acre.

Ninety-nine men out of a hundred don't give their trees food enough.

(He spoke of Mr. Sheddon's orchard, giving about the same testimony as last year, for which see page 227, vol. 12.—SEC.)

JUDGE WILCOX spoke of an orchard near by upon oak-barrens soil, which, though not manured, was bearing well; also of a pear orchard near Lockport, New York, on clay ground, which bore immense crops of fruit, which vied with California pears in size and beauty; and thinks that soil has much to do with productiveness.

MR. GALUSHA cited the Judge to old, sickly, unproductive orchards which he knew had been rejuvenated and rendered productive by thorough

manuring and good, though shallow, cultivation, and advised him to do as that good horticulturist asked permission to do, about whom we read in the good book—not cut it down, but “dig about it,” etc.

MR. WOODARD.—I had some experience in planting an orchard at Bensonville, between Elgin and Chicago, planted in a clay loam. The best varieties were Sops of Wine, Golden Russet and Duchess. Three hundred trees of Duchess produced two hundred barrels, which sold for five hundred dollars. Russet, Ben Davis and Willow are all profitable sorts to plant here for winter; also Tetofsky for summer. Red Astrachan does well on good clay soil, but not on sandy soil. I would dig out all the old barren trees which came from the East, and plant new orchards; the five or six sorts I have named will prove profitable here.

MR. GALUSHA.—I agree with Mr. Scofield as to the value of cultivation and feeding of orchards. These old, barren trees are almost always infested with bark-lice, borers and other insects, much of whose work seems to be due to the previous feeble condition of the trees; for I think, as a rule, that the bark-lice seldom seriously damage trees which are kept in good condition.

PROF. THOMAS.—Mr. Galusha is right in this respect. It is of the greatest importance in preventing the sad consequences of insect depredations that the trees be kept in a state of vigor by good culture.

L. K. SCOFIELD.—Duchess and Ben Davis succeed well here and will sell (though Ben Davis is but little better than a pumpkin). Judge Wilcox may also plant Willow Twig with an assurance that it will prove profitable; but if, as I suspect, his trees came from the East, I would advise him to dig them out and plant varieties adapted to this section of country and give them good care.

MR. SLADE.—Many of us want something new and *some* of us have been badly bitten by investing in new varieties. While we have old, well-tried sorts which pay we should stick to them. The Ben Davis has been spoken rather sneeringly of, as being of poor quality, but I call it a pretty good apple; it is a fair apple to eat and a good cooking apple—better than Willow Twig, which has received so much praise. In answer to a question, he said that Willow was very profitable because it keeps so late and retains its freshness to the last. He spoke of a Mr. Snow, near Elgin, who had the Willow Twig growing and who said that if he were planting an orchard of one thousand trees for profit he would plant nine hundred of them Willow Twigs. On being asked what he would plant for the other hundred, he said, “Well—well, I think I couldn’t do better than to plant Willow Twig.”

MR. MINKLER.—The only thing I *lie* about is an apple-tree, and I put it on the bark, as high up as I can reach.

In reply to a question he said, the Minkler is hardy and productive, and the fruit keeps well and sells well in the spring.

MR. WHITNEY.—Minkler apples mixed with Winesap make a cider equal to that from Little Romanite.

L. K. SCOFIELD.—There are a few sorts which are generally profitable and we should fix upon these—even if but the two—Ben Davis and Duchess, and recommend and plant them. I believe there are five or six sorts which we can plant and succeed with nearly every time; publish these recommendations as widely as possible. I wish the recommendations of our President could be carried out and ten thousand copies of our reports distributed among the farmers of the State.

MAYOR LORD.—The reports of the State Horticultural Society are read with more interest by the agriculturists, perhaps, than is generally supposed. I read them and study them too, and never open a volume of them without getting some valuable information. I know of no book which contains so much practical information upon horticultural subjects. If they can be distributed liberally over the State an immense saving of time and money would be saved by orchardists.

THE PRESIDENT.—There are no ten, five, or even two varieties of apples which are valuable all over the State. Planters should go to their neighbors who have orchards on similar soil and find out what sorts do well in tree and fruit and buy and plant them, no matter if there are only two to five kinds. I have had some experience in orcharding in Cook county, planting on a sandy soil, about two feet deep, on a clay subsoil. Bellflower, Seeknofurther, English Russet, Maiden's Blush, did well there. Northern Spy bore well after about eight years from planting.

A Voice.—What are the best four apples to grow in Northern Illinois?

THE PRESIDENT.—Gentlemen may name those which succeed best with them—first, the summer apples.

MR. WHITNEY.—Red Astrachan, best early.

D. C. SCOFIELD.—It don't bear with me.

MR. WOODARD.—Tetofsky.

MR. WHITNEY.—I have Red Astrachan trees not ten inches through which gave me sixty dollars' worth of fruit per tree last fall.

MR. MINKLER.—For autumn, Maiden's Blush and Cayuga Red Streak.

MR. WOODARD.—St. Lawrence is best fall apple at Marengo.

THE PRESIDENT.—Please name your best winter apples.

DR. PRATT.—English Russet (at Elgin).

MR. MINKLER.—Willow Twig, Jonathan.

MR. WHITNEY.—Jonathan.

MR. GALUSHA.—Jonathan, Willow, English Russet, Roman Stem.

The President announced, as the Committee on Treasurer's Report, the names of S. G. Minkler, S. M. Slade, H. W. Williams.

He then called for the reports upon gathering and keeping apples.

Mr. GALUSHA, from the committee read as follows:

REPORT UPON GATHERING AND KEEPING APPLES.

BY O. B. GALUSHA, MORRIS.

In the old description, *How to Dress a Hare*, the first direction was to *catch* the hare, and this catching the hare is an item of great importance, for if he is mutilated by dogs or clubs in the catching he might as well go to the dogs altogether, for no after care or skill can make him presentable either in the market or on the table.

So with our apples, if not properly gathered, assorted and handled their market value is greatly impaired.

We will, therefore, first *pick our apples*. The importance of careful hand-picking has been reiterated until it is an old story to every one; yet it is one of that class of old stories which *must* be repeated, mentally at least, else in the hurry and bustle of fruit-gathering it will be temporarily unheeded.

“*Apples designed for keeping should be handled as carefully as eggs*” when preparing them for market. These words or those of similar import have often been repeated at the meetings of this Society, still they are probably disregarded by three-fourths of the orchardists within its limits, as may be seen by standing in the markets during late autumn, when apples are being brought in and sold.

There is, however, a more serious mistake among orchardists than this, viz.: that of putting abraded, bruised and wormy apples among those intended for market or keeping for winter use.

The general prevalence of the codling-moth, infesting as it does so large a proportion of our apples, presents a strong temptation to the orchardist to put in such wormy apples in packing for market as do not exhibit any conspicuous marks of the work of the larvæ. Those who do so are short-sighted, if not absolutely culpable; for such fruit is quite liable to decay in the barrel, often affecting that in contact with it, and thus detracting from the value and probably from the market price of the whole.

All such fruit should be put aside to be cooked and mixed with a little meal, fed to stock or used for the manufacture of *vinegar*.

Do the cider-drinkers ever reflect that almost every glass of cider which they swallow is but a decoction of worms and their castings in apple-juice?

Apples should be picked as soon as the seeds turn brown, as a general rule (and I know of no better one), as this is an indication that the office work of the parent tree is accomplished.

Apples should be gathered, if possible, when dry and cool, or not very warm, and put immediately into barrels, and if dry and cool, headed up as nearly air-tight as practicable, *and not exposed to the sun* or wet weather afterward—keeping as cool and even in temperature as possible without severely freezing. When ready for marketing, if a long time gathered, the barrels may be opened, the fruit carefully examined, all specked or rotting ones thrown out, rebarreling, pressing down well in the barrel. On such packages you may proudly stamp your name with the assurance of a compensating price and a future demand for fruit *of the same brand*.

S. M. SLADE, from same committee, reported :

Mr. President, Ladies and Gentlemen :

In the discussion of this question of the best mode of gathering and keeping apples, I know the Society will excuse me for saying but little, from the fact that other members of the committee present have a much larger experience and are far more able to properly handle the subject than myself.

The most I hope or desire to do, therefore, is to barely open up the subject with a few crude thoughts, leaving it for my compeers to entertain you as they are abundantly able to do, by giving you all the important information needed upon the subject. The first point, then, is to pick your apples from the tree ; and this can hardly be done too early. A very little neglect in this vicinity after the sound apples commence to drop will find the Stannards, the Jonathans and some others mostly upon the ground. If you cannot pick all when you should, use discretion by picking those most likely to drop first. Of course the more carefully you can pick the better, and if you cannot use all the care required in picking up and packing eggs, do not forget to use all the care you can. After gathering I consider it of prime importance that they be stored somewhere, or if nothing better offers lay in piles on the ground for some time before going into the cellar. The cooler the cellar can be kept without freezing the better for the fruit. In my own experience I have found but little difference between deep and shallow receptacles, so far as the keeping of the fruit is concerned ; but where apples are to be looked over occasionally, as is often necessary to be done, shallow receptacles are certainly a great convenience.

It is quite important that some varieties be barreled or closely confined from the air, of which, perhaps, the russets are the most notable. Whether it can be made to pay or is profitable to resort to any of the various methods to try to preserve the apple fresh and crisp as it comes from the tree to any great extent I am not sure ; but that we may have a few of this character lasting through the season, which the family will highly appreciate, and with no expense except the amount of labor expended, there is no doubt.

For this purpose finely cut straw used generously in the barrels answers a good purpose; leaves from the forest or from the apple-trees themselves I consider equally as good. But the best results I think have been obtained by packing in sand thoroughly dried in the sun by repeated stirring up and turning over, or in the stove. By this process you may rely upon apples with all the better qualities retained, and that cannot fail to be appreciated by yourselves and your friends when placed before them. With these few remarks I leave the subject for the other members of the committee.

D. F. KINNEY, of Rock Island, sent in the following, which was read by Secretary Galusha:

Apples should be gathered only when dry and very carefully handled, never thrown into the basket, but laid in with the hand. Some varieties should be picked early, while some others are improved by remaining longer on the tree, particularly Willow Twig and Janet.

They should be kept as cool as possible, and if they should freeze a little no damage will ensue if they are kept in the dark and excluded from the air.

DISCUSSION UPON THE REPORTS.

MR. SLADE.—I have eaten apples which had been lightly frozen and thawed three times, which were good.

I tried this experiment: I headed up tight a barrel of Willow and a barrel of Ben Davis in autumn, put the barrels at the north side of my house and covered them lightly, letting them remain all winter. They froze solid and remained so all winter, and when thawed out in spring were worthless except for vinegar—the freezing was too severe.

MR. MINKLER.—If apples get frozen on the trees before gathering don't pick them for a day or two, and they will recover if not frozen very hard. If they get frozen in a pile in the orchard cover them well with straw and let them thaw out under the straw. We usually wait too long before picking our apples. I now pick all sorts, even the Janet and Willow Twig, before the first day of October, and find they keep better than those of same sorts picked later.

THE PRESIDENT.—Each variety, both of fruits and vegetables, has its zero point—a degree of cold to which it can be subjected and recover from its effects. Thus the zero point of the bean is but about 34° , while the pea will recover from a temperature several degrees below freezing, and the cabbage will endure a still colder temperature without damage.

So in apples, we find some varieties good after being subjected to a temperature which would destroy others. Every orchardist may soon learn which sorts may be safely exposed to slight freezings.

L. K. SCOFIELD.—A friend of mine had a large number of barrels of apples freeze up; he covered them well with flax straw, and when thawed out under the straw were fresh, crisp and nice, though I doubt if they would keep as long as though not frozen.

D. C. SCOFIELD.—A good temperature for keeping apples is as near 31° as possible—they will not freeze at that temperature. They have been sent from the United States to the East Indies, surrounded by ice, and though six months on the voyage arrived sound.

The Society adjourned to 7.30 in the evening.

FIRST DAY—EVENING.

The evening session was opened at 7.45 o'clock.

The President exhibited a tastefully arranged basket of flowers contributed by Edgar Sanders, of Chicago; the tables were also ornamented with collections and bouquets of ferns and flowers from the South Park Association, of Chicago, from the Lincoln Park Greenhouse, and from Mr. O'Neil, of Elgin, all tastefully arranged in bouquets by Mr. O'Neil.

In introducing Prof. Cyrus Thomas, State Entomologist, he said he regretted exceedingly that the people of Elgin seemed so generally to lack in appreciation of the work of this Society, and especially in interest in such scientific lectures as the Professor is about to give us—such lectures as few are privileged to enjoy, even by paying an admission fee. He hoped for a fuller attendance to-morrow evening when the Hon. James Shaw will lecture upon Geology and Soils.

LECTURE BY PROF. CYRUS THOMAS, CARBONDALE.

Professor Thomas then delivered substantially the same lecture delivered at the meeting of the State Society last month. (This may be found in full upon pages 111-120, inclusive, in this volume.—EDITOR.)

At the close of the lecture the members of the Society, with the few citizens of Elgin present, gave Professor Thomas a unanimous vote of thanks by rising.

On motion, the time for election of officers for 1880 was fixed for to-morrow at two o'clock P. M.

Mr. GEORGE THOMPSON, of Geneva, upon request of the President, read the following paper, written for the Society:

THE HONEY-BEE.

Much has been said and written upon the insect enemies of the tillers of the soil, and as mankind are more inclined to look upon the evils they have to contend with it is well, I think, at times, to look at the good or the benefits arising from our friends in insect life. It was this thought that induced me to draw your attention to the honey-bee as one of your best friends.

The bee, like all other things, whether animate or inanimate, has a history; and in order to find out a beginning we must go away back thousands of years before the advent of man upon the earth and look into the great book of Nature and there ascertain in what period of the world's history the bee and its kindred, the hymenopterous or honey-eating insects, made their appearance. Now, we all know these could not have had any existence previous to fruits, flowers and forest trees, such as we have to-day, and these we are informed made their appearance about the beginning of the great tertiary division. Miller says the first bee made its appearance in the dawn of this period, and as time advanced bees and butterflies rapidly increased. In speaking of the bee he says: "Her entombed remains testify to the gradual fitting up of our earth as a place of habitation and particularly marks the introduction of the stately forest trees and the arrival of the delicious flowers." Agassiz remarks: "It was not till near the latter end of the tertiary ages the apple, pear, plum, peach, quince, cherry, raspberry and the various bramble-berries made their appearance." This is the testimony of the rocks regarding the honey-bee and the plants from which it drew its subsistence.

In our own history the bee or its products are very early mentioned. The first notice we have of it is when Jacob is sending down a present to the ruler in Egypt; honey is one of the articles mentioned. It is also mentioned in the books of Exodus, Leviticus and Deuteronomy, and in Judges we have an account of the swarm of bees that Samson found in the carcass of the lion that he killed. The land of Canaan is always spoken of as a land flowing with milk and honey. This may be poetical language, nevertheless it is recorded that when Saul and his army were going through the woods the honey was so plenty that it dropped to the ground. The most of the Jewish writers speak about honey either as an article of diet or commerce, for we find them trading off their surplus honey six hundred years before the Christian era down in the great city of Tyre. The old poets and philosophers outside of the Jewish nation, such as Homer, Solon, Virgil, Aristotle, Pliny, Herodotus and many others wrote and sang in the praise of the bee or its products. In Egypt, Greece and Rome bee-keeping was extensively practiced; a great amount of honey was used in making cakes for the feasts of the gods, also for medicine, embalming of the dead, in making vinegar, mead, metheglin and all kinds of wine. For the past eighteen hundred years bee-keeping has

received considerable attention. In what is called the Middle Ages, a vast amount of wax was used for candles for the Romish churches throughout Christendom. At the present day many are making bee-keeping a specialty, and by keeping pace with the intelligence of the age and the modern apiarian appliances one-half more honey can be raised now than could be a few years ago. For the amount of capital and labor bestowed, I think it pays far better than any other rural pursuit; but, like all other kinds of business, it requires skill, labor and perseverance, and with these and a favorable season it is a profitable occupation. But I would not advise all or any of you to rush into bee-keeping. Allow me to show you a more excellent way. If there is a bee-keeper within three or four miles of you, encourage him not only with your sympathy, but by a free exchange of your produce for his, and I am sure it will place upon your table an article unsurpassed, not only for pleasure but for health. The bee-keeper's interest and yours ought to run in the same direction, for without bees in your garden you would have less fruit. I will now endeavor to make this plain.

The Maker and Ruler of the universe never works without means; and the adaptation of means to ends calls forth our wonder and admiration. Now, one of the means He has put into operation to secure an end is the honey-bee. Lured both by beauty and fragrance, it carries from flower to flower that fine, subtle dust, pollen, and thus insures abundant and perfect fertilization. It is admitted by all who have paid any attention to the subject that bees not only improve the quality, but increase the quantity of fruit. A. S. Packard says: "The great use in nature of the bee is the securing of a good crop and the permanence of the best varieties of fruit; for it has been noticed that fruit-trees are more productive when bees are among them, for when the bees have been removed the fruit crop has diminished." A bee-keeper at Potsdam writes to him that his trees yield decidedly larger crops since he established an apiary in his orchard, and the annual crop is now more certain and regular than before. Baroness Burdette Coutts, in England, had a peach-house, but got very little fruit till they introduced a swarm of Italian bees, when they had an abundance of fruit.

Many honest people think that fruit in some way is injured when the honey is taken away from the flowers by the bees, but this is a great mistake. A few years ago, in the town of Wenham, Mass., some fruit-growers came to the sage conclusion that one of their neighbors' bees were a great damage to their fruit by visiting the flowers. The subject was discussed for and against; a town meeting was called, where one man declared that the bees, by taking away the honey out of the flowers, made his fruit wormy and sour, and so they voted that the bees must go. Now for the result. An eye witness writes: "All our fruit-trees bloomed profusely; apples and cherries never looked better and more promising, yet I venture to say that there never was so little fruit raised in Wenham as that year. The vote was reconsidered, and the bees were allowed to come back." Prof. Gray says there is no doubt that the sole use and object of honey in blossoms is to attract insects, so that they may in their visits

carry pollen from the stamens of one flower to the stigma of another, and in that way insure the formation of the fruit. Again he says, "I have no idea that the honey, after being secreted by the plant into the open flower, is ever taken up again by it, so that the plant loses nothing it could use by the bees carrying away the honey." Darwin, in speaking of the benefits of bees, says, "I have found that the visits of bees are necessary for the purpose of perfectly fertilizing some kinds of clover. Thus, for instance, twenty heads of Dutch clover yielded 2,290 seeds; twenty other heads, protected from bees, produced not one. Again, a hundred heads of red clover produced 2,700 seeds, but the same number of protected heads produced not a single seed." Again, he says that, "although some plants are capable of self-fertilization, yet cross-fertilization of the flowers of one plant by the pollen of another produces more seeds, larger seeds, and stronger seedlings." Many have complained that the bees destroy their fruit in the fall. I do not believe this charge, for I have not yet seen any direct reliable testimony. It is the firm conviction of all practical and close observing bee-keepers that bees do not first puncture the fruit. It is true, if you go into your vineyard you will at times find bees on your grapes, but if you look closely you will see them sucking out the juice where the fruit has already been punctured or burst, and this is often the case after a shower when the fruit is ripe. But if it could be proved beyond all doubt that the bees at times help themselves to a little fruit, let us be willing to share with them and give them credit for the good they do. I, for one, am satisfied that wherever there is an abundance of bees there will not only be more and better fruit, but a greater variety of new fruit. Art has done much in this direction, but Nature more.

"So work the honey-bees—
Creatures that by a rule in nature teach
The art of order to a peopled kingdom."

In what has been said I have given you nothing original, but have culled and thrown together a few truths and facts with the intention of being more suggestive than instructive, in order to draw out discussion upon the subject. (Applause.)

PROF. THOMAS.—Honey in Southern Illinois differs from that in Northern Illinois; it has a more acrid taste, and is apt to produce distress in the stomach soon after eating it. What is the cause of this difference?

MR. THOMPSON.—There are as many kinds of honey as there are varieties of flowers, each one producing honey of a flavor peculiar to itself.

SECRETARY GALUSHA.—*Mr. President*, I wish to call attention to the quotation in reference to cross-fertilization producing better seeds and stronger seedlings than self-fertilization, and also to another analogous fact, that not only does cross-fertilization produce better seeds than close-fertilization, but the fruit, which is but pulp formed around the

seed to sustain its early growth, is consequently better, larger and firmer. All planters of strawberries should especially recognize this now generally admitted fact, and plant their varieties in belts or bands through their plantations, alternating the varieties, being careful to plant those which furnish an abundance of pollen in close proximity to pistillate sorts and those in whose flowers pollen is somewhat deficient, for many varieties, like Crescent and Windsor Chief, though not strictly pistillate, will produce a large proportion of imperfect berries unless the ovaries are fertilized by pollen from other varieties.

This law of cross-breeding is recognized by the breeders of animals, and the error of in-and-in breeding is always avoided; but, though the same law prevails in the vegetable as in the animal kingdom, it has hitherto been either lost sight of or almost entirely ignored. It is a law of universal application, from the lowest forms of vegetable to the highest forms of animal life.

MR. MINKLER.—Bees are often charged with puncturing fruit, but I think they never break the skin—only take the juices when and where they begin to ooze out from ruptures previously made.

MR. SLADE.—I tested this matter once in this way: I took some clusters of grapes which were badly ruptured, leaving them as they were, and also some others, from which I carefully picked out all the punctured and cracked berries, and carried these clusters to the vicinity of the beehives and watched them. The bees soon found them and ate freely of the ruptured fruit, but did not puncture a berry. This experiment seemed conclusive.

MR. O'NEIL.—Fertilizing by other flowers is advantageous, as has been said, but we cannot rely entirely upon the bees to do this work. If different varieties are quite near each other the wind aids greatly in the work.

THE PRESIDENT.—Accidental cross-fertilization, either by bees or the atmosphere, cannot be depended upon for the improvement in varieties, for however excellent the qualities of one of the parents may be, it is liable to be crossed with a variety quite inferior, if within reach of the bees or within the limits of the distribution of pollen by the winds. To secure new varieties of excellence the blossoms of each parent plant must be protected and carefully fertilized by hand.

The Society adjourned to nine o'clock to-morrow morning.

SECOND DAY—MORNING.

The Society assembled at the appointed hour on Wednesday morning, and the Rev. Mr. DICKINSON, of Elgin, officiated in the opening exercise.

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

Mr. GALUSHA, from the Committee on President's Address, presented the following:

Mr. President and Fellow Members:

In looking over the topics in the most excellent address of our President, your committee find much to commend to the thoughtful consideration of the members of this Society, and little which we cannot heartily indorse. We will name a few subjects which seem to us of special importance:

1st. The suggestion that the true agriculturist must know not only the details of successful work, but also *why* the work should be done thus and thus, is one which has more significance than is often attached to it. One object of such societies as this is to elevate, educate the laborer. Science is explanation of existing and known facts so as we may apprehend their nature and the nature of their antecedents or causes. This intellectual labor is elevating, refining and promotive of interest and enjoyment in the physical labor in the various processes by which to arrive at the desired results.

We believe there is as great need of brain-work on the farm, in the orchard and in the garden as in the study of the clergyman or the office of the lawyer. To make so-called industrial pursuits take rank with the professions the laborers must be educated in the sciences which underlie and explain the processes and results of their labor.

Hence we should encourage the teaching of these sciences in our public schools, and should heartily support our Industrial Universities.

2d. In accordance with the advice in the address, we emphatically advise a more general attention to vegetable gardens by the farmers of the State, and urge every member of this Society to set such an example in this direction as he would like to see his neighbors follow.

3d. We recommend that each orchardist who has trees which are reasonably hardy and productive, of fair fruit of from medium to good quality, to sow the seed of such fruit and reserve the most thrifty and hardy of the seedlings for future fruiting, with a view to procuring new valuable varieties which may prove adapted to his own and similar soil under similar climatic conditions.

4th. The exhortation to increased attention to Floriculture and home adornment should be heeded by all. If we wish to keep our smartest

and best boys and girls on our farms we must make our farm-homes attractive—these attractions must be more potent than those which allure to mercantile and professional pursuits.

5th. We agree fully with our President in the recommendation to publish at least 10,000 copies of the Transactions of the State Horticultural Society, and for the reasons given in his address; and recommend that the President and Vice-President of this Society for 1880, who are members of the Executive Board, be instructed to confer with other members of the Board to secure their co-operation in bringing this matter before the next General Assembly of this State.

6th. We heartily indorse the sentiments of the President in relation to the multiplication of horticultural societies; and recommend the members of this Society to follow out this suggestion each in his own town or neighborhood, as there may be opportunity; and suggest that local clubs or societies, in which agriculture, horticulture and home adornment shall each have a place, will prove most valuable agencies in accomplishing the desirable results contemplated in the first point named.

(Signed) O. B. GALUSHA,)
CYRUS THOMAS,) *Committee.*
D. C. SCOFIELD,)

DISCUSSION OF THE REPORT.

MR. MINKLER spoke with much earnestness upon that part of the report and address which relates to a wider distribution of the Horticultural Reports of the State, urging the points of the economy of educating the people in the direction of tree-growing and fruit-raising; that the cheapest and best way to do this is to publish enough of these reports so that all owners of the soil who wish to read them may have the opportunity of doing so.

PROF. THOMAS.—The appropriation by the State for publishing these reports should be much larger. It is in the wide diffusion of such knowledge as these reports contain that the prosperity of the people, and consequently the State Government and State institutions, depend. I have carefully looked over the agricultural and horticultural reports of nearly all the States whose Legislatures publish such reports, and find none which contain as much valuable information as those of the Illinois State Horticultural Society. And I am not alone in this opinion; these reports are frequently mentioned by educated and practical gentlemen in other States as invaluable contributions to industrial literature; and some of the leaders in horticulture pronounce them the most valuable works of the kind published in America. These reports should not be circumscribed in their circulation; I am convinced that an appropriation sufficient to

publish ten thousand copies, and pains taken to distribute them among the owners of the soil of the State, would increase the revenues of the State far more than the amount of the sum expended, besides resulting in the more general health, enjoyment and prosperity of the people.

D. C. SCOFIELD spoke upon the same points, agreeing with the sentiments expressed, adding that great good had already been accomplished by the publication of the papers and discussions of these societies upon the subject of tree-planting; that the eighty millions trees planted in Iowa within the past few years were some of the fruits of the influence of the early efforts, examples and teachings of our own Illinois horticulturists, and of the enthusiasm kindled in our own meetings.

MR. SLADE.—We can go before the General Assembly and say to them, we want books for the people; you already publish enough to supply each member of your body and of the horticultural societies, with a few for some of the district school libraries, but we now want them for the farmers of the State, who need information on these matters. I think if the matter is properly presented we can succeed in getting an increased appropriation.

L. K. SCOFIELD.—I have many applications for these books, but I can't furnish them. Large numbers would go into right hands if we had them at our disposal; and if they are worth as much as has been claimed here, we should certainly have a supply to put into the hands of those who will be profited by them. Of course great care and discrimination should be exercised in their distribution. We should see they are not used simply to ornament or fill up the shelves of persons who take little or no interest in horticulture.

MAYOR LORD.—I am persuaded these reports would accomplish great good if they could be widely circulated. They are calculated to enlist the thought of the most intelligent among the farmers of the State. Our Legislature should be made to see and realize their importance as aids in developing one of the great resources of National and State wealth and prosperity. The people *will read them* and be influenced by them if they can get them.

JUDGE S. WILCOX.—I disagree with the sentiments expressed by these speakers. It is not the business of the Government to look after and foster these industries. The State has no right to tax the people for such purposes—the principle is wrong. This is no time or place to argue this question; but I cannot refrain from entering my protest against using the people's money for such purposes.

PROF. THOMAS.—I think it is time such subjects should be discussed, and the legitimate offices and work of our Legislatures understood, that our minds should be established upon these points. I believe the Government should foster agriculture, which is the basis of all individual and national wealth and prosperity. Our Legislatures *are the people* themselves or their delegates or representatives assembled to make laws and regulations not only for the restraining of criminals, but for devising means to secure general intellectual culture and to develop the material resources of the State.

We are too apt to look upon our legislative bodies or the "Government" as some arbitrary power above us which dominates over us, instead of a part of the people chosen to execute the will of the whole people in promoting general peace and prosperity.

MR. MINKLER.—*Mr. President*, which is cheapest—to educate the whole people or support half of them in the penitentiary? (Applause.)

MR. WILCOX.—The precedent of taxing people for any industry is a bad one. Establish the principle that the Government is to foster all interests which are for the good of the people, and we would be soon led to ruin, the people would be taxed to support all branches of industry. Our public schools are all wrong; our legislation has been sadly diverted from its legitimate channel.

THE PRESIDENT, calling Vice-President PRATT to the chair, said: The Government fosters education, and it seems to me that if there is any legitimate work for our Legislature it is this. The State Government has seen fit to make the Illinois State Horticultural Society (of which this Society is an integral part) a Department of the State. We are not in the position of clubs and societies organized for the purpose of promoting the personal interests of their members. By virtue of our charter we are a part of the Government, subject to regulations provided by other departments—the General Assembly and the higher courts. These other branches have wisely decided to allow us to publish for the good of the people these reports of the State Board of Agriculture and the State Horticultural Society; and I do not see how any intelligent person dare assert that these publications and the work of these Societies or Departments have not greatly enhanced the material wealth of the State, so that our taxes, upon which stress has been laid, are much less than they would have been without the existence of these bodies.

It is generally admitted that valuable as are the agricultural reports of the State, those of the State Horticultural Society are not a whit behind them as promoters and incentives to progress in developing the

material resources of the State; but while twenty thousand copies of the Reports of the State Board of Agriculture are published only one thousand of our own are issued. This disproportion seems neither wise nor just; and I think with proper effort by the Executive Board and members of the Societies we may obtain an appropriation sufficient to publish ten thousand copies annually.

The Report of the Committee was *adopted* by an almost unanimous vote.

REPORT UPON TREASURER'S ACCOUNT.

Mr. MINKLER presented the following report :

Your committee on Treasurer's Report have examined his accounts and vouchers and find the same substantially correct.

SIGNED BY THE COMMITTEE.

REPORT UPON ENTOMOLOGY.

Prof. THOMAS, being called for, responded, speaking without notes.

He first spoke of the ten-lined or Colorado potato-beetles, and said they may be held in check by a united effort in any neighborhood in picking and destroying the parent beetles as fast as they appear in the spring. This he claimed would obviate the necessity of resorting to Paris green, against the use of which much objection is made; but that the parasites and predaceous beetles, especially our little friends, the lady-birds, will probably give us immunity from this pest for a few years.

He recommended driving the old sort of long, striped potato-beetles from the potato fields, as they are as easily driven as a flock of geese, and two or three times driven off they will stay away.

He stated that although the Hessian fly had appeared during the past season in considerable numbers, yet there was little cause for fearing their depredations the coming year. He had noticed that unusually warm weather in autumn developed the flies from the chrysalids, and then they were destroyed by cold during the succeeding winter; and he thinks this is the fact in the present season—that the insects were generally developed by the very warm weather in autumn, and such are probably destroyed by this time. He then gave the history, descriptions and modes of feeding of the European Cabbage-butterfly.

(These remarks are all embraced in the Professor's paper published on pages 242-257 in this volume.—EDITOR.)

REPORT UPON GRAPES.

P. A. BOUVALLET, of Belle Park, sent in the following report, which was read by the Secretary :

We live sixty-three miles due south from Chicago; our vineyard is planted on a sandy bluff, from ten to forty feet above the prairie level, three hundred feet above Lake Michigan and six hundred feet above the Gulf of Mexico, the soil being pure sand.

Herewith is the list of grapes in their order of quality and profitability, all doing well, improving with age, and with no mildew :

(1) Oporto, for wine; (2) Delaware, for market and wine; (3) Martha, do.; (4) Concord, do.; (5) Perkins, do.; (6) Catawba, do.; (7) Isabella, do.; (8) Rogers' No. 4, do.; (9) Rogers' No. 15, for market; (10) Rogers' No. 13 (Salem), market and wine; (11) Hartford, market; (12) Rogers' No. 9 (Lindley), market and wine; (13) Maxatawney, do.; (14) Rogers'—, market. Norton wants water and sugar to make wine; I do not like it; Clinton I destroyed by uprooting five hundred of them for the crime of breeding a noxious insect that stings the fruit and makes it rot.

On trial—Brighton, Eumelan and Ives.

We would say—Down with the Clinton; and we have the proof that we did well in destroying our Clintons.

We would also say—Away with extra care in pruning and cultivation. This we call assassination in pruning and dyspepsy in extra cultivation and manuring.

In marketing grapes we get the highest prices for Martha, Delaware, Rogers' No. 15 and Perkins, for their earliness; and, after them, Rogers' No. 4 and Concord. Oporto is the leader for red wine, and Martha for white wine, and next comes Delaware. Wine from Rogers' hybrids imitates foreign wines; Concord makes a very red wine. All the grapes marked "for wine" make a true wine without the addition of sugar, water or alcohol; and there is no other way of making wines to compete with foreign wines.

Secretary GALUSHA also, by request of the President, read the following :

REPORT ON VEGETABLE GARDENING.

BY E. C. HATHEWAY.

Mr. President and Members of the Horticultural Society of Northern Illinois:

Should we, like Fortunatus, wish to be blessed with a purse, which the good dame had bestowed upon him, which, to relieve him from starvation, was to be always full, then surely we should not choose *market gardening* as our occupation; not that market gardeners do not make money, for undoubtedly those who are blessed with a considerable amount of capital, backed with brains, energy and good executive ability, *can* make this branch of industry, in most cases, a success.

I say capital first, for no man with his wits about him will attempt to make a start in this business without sufficient money to purchase his outfit of horses, wagons and the necessary tools, besides at least *five* three by six-foot sashes for each acre of ground cultivated, and in addition to all this he should have not less than five hundred dollars, *in cash*, for each ten acres, with which to pay running expenses until his growing crops shall commence to make returns. Year after year we see men embarking in this business without these before-mentioned requisites, and in quite every case lamentable failure has been the result.

The era of high prices for the products of the vegetable garden has passed away. When money could be loaned for from ten to twenty per cent.; when laborers and mechanics received from two-and-a-half to five dollars per day, then gardeners could get prices commensurate with the cost of production and something of profit besides; but now, when money is loaned at from five to eight per cent., and against this is assessed annually, as taxes, from three to five per cent., then it becomes even the ordinary capitalist to "go slow" in his expenditures, that he may not impair that capital; and, as vegetables are a prime necessity upon his table, he seeks to produce to a certain extent his own supply.

The laborer and mechanic also, who while they received large prices for their labor could buy without stint, and at big prices too, as it would not pay them to lose time to cultivate a garden then; now the very low rate of prices at which they are obliged to labor compels them to curtail their expenses and reduce them to the very lowest limit, and in order to do this they dig up the little garden plots, with the assistance of wives and children, perhaps, plant them, and in this way, after a fashion, manage to supply partly, if not wholly, their own tables with what vegetables they need. Therefore, from these causes the sales from the market garden are more restricted than formerly.

In no business does a man require more brains, in order to be thoroughly successful, than in market gardening, as his discernment must not only be acute as to *what* to plant, but *how* and *when*. He must not rely altogether upon watching his neighbor as to what *he* is planting, but must judge for himself as to what the wants of *his* customers will require. His neighbor's *how* should not be his, unless he has thoroughly proved its adaptability to his circumstances. As to the *when*, that should be the result of close observation and good judgment born of experience.

A business of this character not backed up and pressed with energy will be a failure from the start, as it must be the operator ready for the season, and not the season waiting for the operator. Nature is always ready with her proper appliances at the proper season, and will occupy the ground with a crop of her own sowing if man is not ready to substitute seed of *his* selection in place of hers, and also to assist, through cultivation, the growing and maturing of it.

Executive ability, though considered last, is by no means least in importance to the gardener; he must not only cater to the various wants of nature and the requirements of his growing crop, but he has also his force of laborers to look after; and here, in the economic and proper

distribution and division of labor, lies one of the principal secrets of his success. In addition to all this, the rapid gathering, bunching, proper washing, also a proper attendance to and pushing of sales, will depend upon the gardener's ability, and upon which will depend largely his success.

As I am compelled to be brief, I will now for a moment turn to the consideration of the home garden, where a somewhat different condition of things prevails. Here the object is to suit one's own taste rather than that of the "dear public," therefore less difficulty occurs, and as but a limited amount can be grown, but small expenditure is required, and that principally for seed. The plants, that is for early, the planter must purchase, as in such small operations it will not pay him to make a hot-bed; therefore he must depend upon the commercial growers for this part of his supply, but beyond this his operations can all be conducted by himself.

His first business, therefore, will be to secure a supply of seed, such as he may think he will need; this, of course, it is best to obtain from some responsible grower—and there are many such, some of them almost at our doors. I often see individuals buying their pockets full of seeds at the "store." I cannot help extending to them mentally my commiseration and my desire to say to them *don't*, and feel like adding another prayer to the (garden) Litany in this wise: From all temptingly displayed and wonderfully illuminated papers of "*store seed*," *good Lord, deliver us.*

Let the planter remember always that to grow fat vegetables it requires fat land, and also, if the garden is naturally flat, then it would be advisable to lay out beds for small-seed plantings, digging alleys along their borders to the depth of from three to six inches, the soil of which is to be thrown upon the beds laid out, which should, at the time of seed planting, be left a little crowning in the center. If the ground be light and sandy, use cow manure as the principal fertilizer; if clayey or cold and sodden, use horse manure or wood ashes, or what is still better, plow or spade in sods, grass, weeds and coarse litter the fall previous.

The planter should aim to produce for the use of his table the greatest variety, and in succession, only planting of each kind sufficient to last through the season of its best condition, and by continuous plantings to keep up this season of *best condition*, and results will follow of a much more satisfactory character than if one single planting of each kind had taken place.

The vegetable list for the past year requires but little revising from the older lists that have been in vogue for some years past; a few, however, of the newer varieties are calling loudly for recognition, and undoubtedly many of them deservedly so; of these, which have been quite thoroughly tested, Henderson's Summer cabbage is a variety that has given more satisfaction than any other which I have ever grown; although not the earliest, yet it comes along, flush, with the second early sorts, and, while it is a large cabbage of excellent quality, it possesses the peculiar trait of not bursting, as most cabbages do, as soon as the head

gets quite solid. The Golden wax-bean is another of the novelties that has sustained the claims made for it as an early snap or bush bean; it is quite stringless and is of extra good quality, besides being very productive and as early as any bean that I have ever raised.

Last spring I received from Department of Agriculture seven small potatoes, the combined weight of which was thirteen ounces. They were called the "Beauty of Hebron." Each potato gave ten eyes, making when cut seventy sets; these were planted in test rows with forty-three other varieties. I must confess to some misgivings when I committed these diminutive reminiscences of *Solanum tuberosum* to the bosom of mother Earth; but, behold, she proved a good and generous nurse, for when dug in the fall the little thirteen ounces had increased to one hundred and eight pounds of tubers, all large, smooth and regular in shape, with no small ones at all. The quality of this potato I think superior to any I have ever tasted.

The varieties above mentioned, as planted for test, were all treated alike, as to soil, culture, etc.; all were planted in drills, sets dropped fourteen inches apart, each set having one eye or bud; at time of digging the Beauty of Hebron yielded fifty-five per cent. more than any other variety; Snow-flakes stood second; Early Rose, third; Kartoffel-weiss (a new variety received last year from Germany) was fourth on the scale, and so on down the list to Compton's Surprise, which, singular as it may appear, was the poorest of the lot.

It appears to me as useless to append here, as it is customary, a long string of varieties of vegetables, which I might perhaps claim as *best*; as soils, locations, exposures, etc., etc., differ so much it is probable that those which would be of value with me might be without value in other localities; therefore I shall omit such list and advise each to test for himself as to what would be of greatest value to him in his own peculiar locality.

Insects in general have done but little damage to the vegetable garden the past season; for the striped-beetle and also the squash-beetle continued applications of land-plaster have kept them sufficiently in check, even where it has not wholly banished them.

I have saved cabbages from destruction by *Pieris rapæ* by using strong lime-water, to which was added one or two grains carbolic acid (reduced to solution) to each gallon of lime-water, applying the mixture with watering-pot with a fine rose attached. This application was made twice a week from the time the butterfly made its appearance until fall; the consequence was that I had a fine lot of good cabbages, which brought me good prices.

DISCUSSION UPON THE REPORT.

PROF. THOMAS.—In the southern part of the State we are flooded with Eastern seeds, which not only are old seeds sent out over and over again, but we cannot get the kinds we want—the varieties are not always those named upon the package. For instance, last spring I wanted some

nutmeg-melon seed and offered five cents per paper if but two seeds in the paper would grow and prove true to name, and on these terms bought several papers, but all were alike worthless.

MR. WILLIAMS.—While I am aware that there is much cheating on the part of seedsmen in sending out the same seed, with a *little* good seed mixed in, repeatedly, yet the germination depends much upon the way they are treated by the planter.

THE PRESIDENT—As I have done something at market gardening I may as well let out one of the gardeners' secrets. They get good seed, but they *pay nearly five times as much* as those do who buy the old, poor, mixed seed at the stores, even when buying from the same parties.

•He related an incident in which the Commissioner of Agriculture wished a large lot of seeds of a certain variety, and of which one party offered him good seed, though at a price which he thought exorbitant; he refused to purchase, and bought from another party at a much lower price. Mr. William Saunders, of Washington, bought the "high-priced" seed and it proved a good bargain, all being fresh, plump seed; while that bought by the Commissioner was very inferior.

WINTER-KILLING OF FRUIT-TREES.

MR. MINKLER handed the following question to the Secretary, which was read :

Will fruit-trees be liable to be killed above ground if their roots are not locked up in frost?

The question was answered in the affirmative by several members. The President explained that the winter-killing of fruit-trees was not caused so much by the degree of cold as by the condition of the tree and the soil when they go into the winter; that if the ground is unfrozen and covered with deep snows and the sap circulating quite freely, intense cold, especially if coming suddenly, will damage the trees.

GREENHOUSE PLANTS AND INSECTS.

The President called for the report of Committee on Greenhouse Plants.

MR. WILLIAMS, from the Committee, said he had no report prepared; had forgotten that he was placed upon the committee, but would state that there had been a revival of business in this department; the demand

for cut flowers and for plants for window-gardening had increased considerably during the past season, and people are displaying more taste in home adornments and a better class of flowers and plants are called for; the demand for bedding plants was greater last spring than for several years previous. There were two serious evils which he encountered, viz.: the black rust upon the verbena and the mealy-bug, for neither of which had he found a remedy.

THE PRESIDENT.—I have been troubled with the mealy-bugs upon my plants; I had a box in which fine plants were growing which became infested; I inclosed them in glass, carried them out of doors and shut in numbers of lady-bugs, which soon destroyed them.

PROF. THOMAS.—The Lady-bug will not endure much heat; you cannot keep them among your plants in a warm room.

SECRETARY GALUSHA.—Mrs. Jones, of Indiana, stated in the recent meeting at Normal, Ill., that dilute liquid ammonia sprinkled over the mealy-bugs will destroy them.

MR. O'NEIL.—I destroy this insect by syringing with cold water—almost at the freezing-point; I kill oleander scales with a decoction of quassia.

MR. WILLIAMS.—Cold water won't wet them; it will slip from them like water from a duck's back, and if you put on enough to chill them to death you will hurt your plants. Alcohol, forty-five per cent. strength, will kill them, but this, too, is injurious to plants.

MR. O'NEIL.—I destroy the green fly by syringing with a strong decoction of tobacco, which is better and cheaper than fumigating the plants.

MR. CROW.—I brush off the insects about once a week and kill them; very cold water is injurious to greenhouse plants.

MR. WILLIAMS.—I wish Dr. Thomas would investigate the habits of the Mealy-bug; the old ones go into winter quarters and seem to come out a million for each mother bug; I don't understand how it is.

The meeting was adjourned to two o'clock.

SECOND DAY—AFTERNOON.

ELECTION OF OFFICERS.

The following officers were elected by ballot for the ensuing year:

President—DR. W. A. PRATT, Elgin.

First Vice-President—JONATHAN PERIAM, Chicago.

Second Vice-President—A. R. WHITNEY, Franklin Grove.

Third Vice-President—ARTHUR BRYANT, JR., Princeton.

Corresponding Secretary—D. W. SCOTT, Galena.

Recording Secretary—O. B. GALUSHA, Morris.

Treasurer—L. WOODARD, Marengo.

LOCATION OF NEXT MEETING.

The voting for locating the next annual meeting was done by rising, and was very close between Franklin Grove and Crystal Lake. After several votings Franklin Grove was declared the choice of the Society.

MISCELLANEOUS QUESTIONS AND ANSWERS.

The following questions, which had from time to time been placed upon the Secretary's desk, were, upon motion, taken up, read and discussed:

First Question.—What are the three best and most profitable (a) Summer Apples, and (b) three Fall Apples?

MR. WOODARD.—For summer—Tetofsky, Sops of Wine and Duchess of Oldenburg.

MR. PIPER.—Summer—Red Astrachan, Excelsior and Tetofsky; for autumn—Fall Winesap.

MR. MINKLER.—Duchess for summer; Cayuga Red Streak and Maiden's Blush for autumn.

MR. GALUSHA.—For summer—Sops of Wine, Benoni and Duchess; for autumn—Maiden's Blush, Fall Winesap, Snow.

Second Question.—How can curculios be prevented from destroying plums?

MR. MINKLER.—Catch them on sheets.

L. K. SCOFIELD.—Keep chickens under the trees.

Third Question.—What are the best Cherries for Northern Illinois?

Several Members.—Early May (Richmond) and English Morello.

Fourth Question.—What are the best six self-fertilizing Strawberries most profitable for Northern Illinois—productiveness, hardiness and flavor taken into the account? Mr. Galusha was asked to reply.

MR. GALUSHA.—If profitableness means firmness for shipping, I will answer—Charles Downing, Captain Jack, Miner, Sharpless, Kentucky and Wilson.

MR. CROW.—I would include Prouty in my list.

MR. GALUSHA.—I would also if I were recommending varieties for high culture and in hills or narrow rows. Prouty is immensely productive, but unless so cultivated the berries are mostly small, though firm and of excellent flavor.

Fifth Question.—What are the best four varieties of Raspberries—two each of black and red—for Northern Illinois?

MR. GALUSHA.—Gregg and Seneca, black; Cuthbert and Turner, red.

MR. CROW.—Kirtland, red; Mammoth Cluster, black.

Sixth Question.—What are the best varieties of Gooseberries now in cultivation?

MR. ROGERS.—Downing's Seedling.

MR. BRYANT.—Houghton.

MR. GARRETT.—Smith's Improved.

Seventh Question.—What is the best and cheapest package in which to ship cherries?

MR. GALUSHA.—I ship in berry boxes and crates as the *best* package, probably not the cheapest.

MR. WILLIAMS.—I ship in shallow half-bushel boxes, and like them best; commission men also prefer them to any other.

MR. CLAYSON.—I give preference to half-bushel boxes.

Eighth Question.—Are there any Raspberries and Strawberries which can be shipped thirty-six hours distant and arrive in good order?

THE PRESIDENT.—Divide the question—first the raspberries.

MR. THOMPSON.—Mammoth Cluster.

MR. GALUSHA.—Gregg, black; Cuthbert, red. And second, for strawberries I will say, Capt. Jack, Wilson, Continental.

Ninth Question.—Does the Snyder Blackberry stand our winters without injury; is it free from rust?

MR. WILLIAMS.—It endures the winters with me.

MR. CROW.—The Snyder is hardy; no rust.

MR. GALUSHA.—It was damaged somewhat on my grounds last winter for the first, owing, I think, to having been pruned too late, as the last

pruning was given about the first of September, and the excessive drouth which followed prevented much more growth. It does not rust.

Tenth Question.—What varieties of Raspberries are more hardy than Philadelphia?

MR. GALUSHA.—*Mr. President*, there are two things to be taken into the account in estimating the hardiness—constitutional vigor and firmness of wood, and also the quality of the leaves. If the leaves are tough or pubescent so as to resist or ward off the attacks of insects (mites) which attack the leaves and suck the juices, then the canes will ripen well and be prepared to resist cold; whereas, if a variety of strong vigor, and one which left to itself would prove entirely hardy, becomes denuded of its leaves while the canes are yet succulent in summer, it will succumb to a degree of cold in winter through which one naturally more tender may pass unscathed. This is just the state of things existing among the raspberries; the Philadelphia is naturally hardy, but its leaves are peculiarly liable to the attacks of acari, which destroy the foliage early in the season, and the immature canes are consequently damaged or entirely killed by the subsequent cold.

When I mention varieties as being “hardier” than Philadelphia, I wish to be understood as meaning that they are either naturally entirely hardy in this latitude, or that their foliage resists attacks of insects and ripens the canes so that they go through our winters safely.

The Cuthbert, Thwack, Reliance, Turner and Brandywine have not been seriously damaged by degrees of cold which nearly destroyed Philadelphia, Highland Hardy, Early Prolific, and killed Pride of Hudson to the ground. Thwack was not injured even in the terminal buds last winter, which was a severe test; yet this and the others named as hardy would doubtless have been damaged had their foliage been killed before the canes were mature.

Eleventh Question.—Is there any Cherry as valuable for Northern Illinois and Southern Wisconsin as Early Richmond?

Many Voices.—No, no.

REPORT ON ORNITHOLOGY.

BY A. L. CUMINGS, GALENA.

The Secretary read the following report, which had been forwarded by Mr. A. L. Cumings, member of the Committee on Ornithology:

HORTICULTURAL ORNITHOLOGY.

In these days of careful inquiry and patient research we are nothing if not scientific. Hence we hear of scientific inquiries into the habits of

birds, especially their habits of food, as a means of determining whether they are friends of the horticulturist or his foes. These inquiries are being pushed in various directions by scientific men with varying degrees of success. The most earnest and indefatigable worker in this field is Prof. Forbes, the results of whose inductions have been published from time to time and are of great interest as leading the way towards great results in the future.

Perhaps no one else can be so well aware of the greatness of the task as he who has undertaken it, and has already made progress sufficient to show how broad a statistical base is necessary for the superstructure he proposes to rear; consequently in his report to the State Society in 1876 he disclaims having done anything more than to enter upon the work and point the way to others. This he did admirably, and followed up as admirably in his report to the same Society in 1878. Yet a careful comparison of the reports shows more clearly than mere theory could do how absolutely necessary it was to extend his observations, not only over a series of years, but over each portion of those years, covering all the possible changes of diet induced by age and circumstances, in order to evolve from the chaos of conflicting testimony a rule of harmony and order, by means of comparison and explanation.

We have before us only those reports above alluded to, and shall note but a few instances to show the necessity of more thorough knowledge, based upon a more extended observation.

In 1876 our very dear little friend the cat-bird was in danger of condemnation as the victim of circumstances. Just think of it! Forty-seven per cent. injurious to only twenty-seven beneficial, and twenty-six neutral. No wonder that his enemies were exultant and executed the scalp dance over his threatened annihilation. But in 1878 the report stands unquestioned nine beneficial to six injurious, with the doubtful element of the single Hymenoptera given against him. Treat him as prisoners are entitled to be treated in civilized communities—give him the benefit of the doubt—and the record stands ten to five in his favor.*

So our graceful little mocker stands acquitted, and wears his scalp jauntily on his own head.

In fact no other member of the thrush family has half so good a record in our notes of observation as he. Coming early in the season he settles himself among the almost naked limbs of the orchard and forages for insect food long before fruits of any kind appear. He feeds his young on insects, and only takes now and then a strawberry by way of grace to his meat. He takes currants and raspberries rather freely in their season, it is true, but he has seldom disturbed our cherries, and

* Inasmuch as one "beneficial insect" or predaceous beetle will destroy an average of, probably at least, twenty-five injurious insects, does it not follow that the balances in both these accounts are overwhelmingly large *against* "our very dear little friend, the cat-bird"? Besides destroying so many of our friends among the insects, this "jaunty" little fellow is a most voracious gormandizer of fruits at certain seasons of the year. See report by Prof. Forbes on page 133 of this volume.—SECRETARY.

never, to my knowledge, our grapes. His depredations through the entire season would not equal one-fourth those of the robin, while the brown thrush does absolutely nothing for the garden or orchard, as a rule, until having raised his young in the forest or grove or hazel thicket he brings the whole newly-fledged brood, with "his sisters and his cousins and his aunts," to pick our cherries and other fruits, with as much affrontery as if he had raised them himself. Then the whole hungry brood fasten upon one fruit after another as it ripens, keeping an eye especially to the finest cluster of your earliest grapes, which he punches with his long bill, even through carefully-prepared nettings if necessary. The cat-bird is delicate in his feeding compared with this gormandizing monster, or even with the portly robin, and is in fact a gentleman in his feelings and deportment—a cleanly gentleman too, if almost hourly ablutions in the dust and heat of summer can authorize that distinction. I trust I have defended successfully, if a little warmly, my graceful, clerical-looking little friend.

In the report of 1876 the sparrow-hawk was quoted as wholly injurious, being 100 per cent., in other words at par, in his unmitigated rascality. In 1878 only one specimen appears to have been examined, and he was probably shot on fast day, having only a single item, a mammal (probably a mouse), in his abstemious craw. Well, we should say from that exhibit he had nobly redeemed his character, and that his virtue instead of his vices might be hereafter quoted at par.

Only two other instances and we have done with the reports. In 1876 the barn-swallow and the chimney-swift were each quoted at eighty per cent. injurious, while in 1878 the two barn-swallows examined exhibited two Hymenoptera as against one Coleoptera, one Carabidæ, one Diptera, one Hemiptera and one Neuroptera, or five to one beneficial, counting the Hymenoptera as injuriously destroyed. Of the chimney-swift three were examined, exhibiting three Hymenoptera to ten whose destruction might be considered beneficial. These reversals of former decisions merely show that the facts so far accumulated are not sufficient for the determination of character, even in birds. We admit the skill and carefulness of the Professor, and his scientific methods, and agree with him perfectly as to the necessity of more extended research in his well-chosen field.

The cedar-bird is frequently quoted as altogether injurious, but in this there is certainly a great mistake. There are many seasons in which they are forced to live on insects, as they sometimes remain in this climate all winter. The present winter is unusually mild, and scarcely a day passes without a large flock of cedar-birds making their appearance to gather fruit from what is left of the crop of a large Mountain ash, which stands in front of my window. Of course the remnant of the feast can scarcely supply their needs and frequently the trees are quite stripped of fruit before winter fairly sets in; and then they subsist on seeds of weeds and eggs and larvæ of insects, until the next season supplies them with fruits. In this connection we may be pardoned for quoting from the *Industrial Press* of March 20th, 1879, a paragraph written by me as descriptive of

their habits: "We were interested last Sunday afternoon in a flock of cedar-birds, considerably over fifty in number, who appeared to be on a frolic in the air, all seeming in motion at once. It seemed the movement of a miniature army on parade, advancing, attacking, wheeling and retreating as if in obedience to the word of command. In fact they were engaged in serious business, feeding on the innumerable insects that filled the air. Wilson speaks of their fly-catching as lazily done. We never saw more expertness and alacrity shown on the wing than that displayed by these birds. The air seemed full of them. One would rise aloft in an almost perpendicular line to a considerable height, fluttering here and there as if his only object were to display both sides of each feather on him in the glittering sunlight, then a pause in mid-air followed by a direct downward flight equally grotesque and rapid. At times the pale-yellow markings of wings and tails showed white in the sunlight, and the slender forms and sharp crests looked so unlike the same bird at rest as to cause doubts of their identity. These birds generally feed on berries and seeds, on which food they grow very corpulent. But at this season they are and have been for some time on short allowance, and are very thin and slim, very unlike in size and shape the same bird in autumn."

Cuvier, the celebrated French naturalist, is said to have reached such perfection in science that from a single bone of an unknown animal he could ascertain the general class and species to which it belonged. Nay, more, he sketched from that single starting point the entire skeleton, which was found, on comparison with the afterward discovered and restored anatomy of the animal, perfectly to agree with the same in all its parts. Here is the true and for the present only basis of science as to the feeding habits of birds. Their structure, especially that of the beak, surely and perfectly indicates the *general* feeding habits of the bird to which it belongs. These general habits often yield to special ones, which are sometimes the result of inclination, but oftener of necessity. Perhaps few seed-eating birds would refuse insect-food when their natural food could not be obtained; nor could insectivorous birds, as a rule, refuse seeds if presented as the alternative of starvation. Then, as Prof. Forbes quietly remarks, many fruit-loving birds feed their young wholly on insects and their larvæ until, full fledged, they leave the nest, and with their new phase of life adopt for the first time their natural food. Hence the necessity, which we all recognize, of carefully studying the minutest details of their feeding habits from the earliest to the latest period of their lives.

With this study we are confident that the truth now partly recognized will fully appear, that the so-called enemies of horticulture are largely so considered from a misunderstanding, or at least an *imperfect* understanding of their true character and habits. When we view created things as they really are, then, and then only, shall we begin to understand how few things (if any) were made in vain.

REPORT UPON SMALL-FRUITS.

BY G. W. GARRETT.

GEORGE W. GARRETT, from Committee on Small-Fruits, reported as follows:

Small-Fruits for the Farmer.—One who really enjoys all varieties of small-fruits, in their season, cannot readily account for the fact that not one farmer in fifty in the State has more than an occasional dish of berries or other small-fruit on his table. With many farmers this is in consequence of the opinion that it requires "professional skill," and they give it up, and say, "we can buy our small-fruit cheaper than we can raise it," "or we have not time to attend to it." The consequence is, but few of them have but an occasional dish, and those gathered from a neighboring meadow, or from the corners of the fences. No farmer would think of raising a good crop of corn or potatoes in this haphazard way. If he wanted a good crop of corn he would thoroughly prepare the ground, procure good healthy seed and give good culture. How can a farmer expect at the harvest to have his bins and cribs filled unless he performs his part the whole season; corn does not grow spontaneously, neither does small-fruit. The same care and attention in the preparation of the soil and selection of plants and vines, in this department, as well as any other, depends largely upon the cultivation given it; good cultivation will give an abundance of small-fruit for the table, such as strawberries, raspberries, grapes, currants, etc., and with a succession of these fruits the farmer can have fruit from June 1st to New Year's. No class of people are so well fitted for such facilities as the farmer, having an abundance of room and fertilizers convenient to make the ground produce well. Small-fruits require just as good soil and cultivation as corn or any other crop to have an abundant yield.

It might not come amiss to give a few simple directions for the method and cultivation of small-fruits, so as to induce the farmer to plant more abundantly, if not for market, "for home use."

Strawberries succeed best on good soil, with ample drainage, near to water if convenient, so in a time of drouth they could be watered. Well-fed plants will repay in quantity and quality of fruit. In setting, set in rows four feet apart, and set the plants from one-and-a-half to two feet apart in the rows.

A bed six rods long by four rods wide will furnish an ordinary family with all the fruit they need. Keep the bed clean from grass and weeds, use a horse and small-tooth cultivator until the runners drive you out, then use the hoe the balance of the season.

Do not stop when harvesting commences, but continue through the season, as at this time of the year the purslane bothers most; after the ground is frozen, mulch with leaves, wild hay, straw or chip manure; be careful not to mulch too deep, as you may smother the vines; cover about one inch deep. In the spring, if the ground becomes hard and packed

down, spade up the ground between the rows and plants with a potato-fork, remove the covering to where you have loosened the ground.

For early strawberries, plant the Duchess, next the Wilson (for market), Green Prolific (for home use), Crescent Seedling (for profit). This kind will require the least care and attention; they are said to keep the grass and weeds from the bed better than any other variety; they ripen about a week earlier than the Wilson, and last longer, having fair to large berries, of delicious flavor. With my experience, they will yield from one-third to one-half more than any other variety. For late varieties plant Col. Cheney, Champion, Kentucky and Great American. *Do not forget to give the Great American extra culture if you expect large returns.*

In planting in this way you can have strawberries as late as the 20th of July. Other varieties worthy of trial are Chas. Downing, President Lincoln, Glendale, Red Jacket, Forest Rose, Prouty, Essex Beauty, Sharpless, etc.

Before strawberries are gone raspberries commence to ripen. A patch of land containing a few square rods, well set in these, will insure a good supply for a family until grapes begin to ripen. Tips of the black-cap variety should be planted in rows six feet apart and four feet apart in the row. Raspberries give an abundant yield where good cultivation is given. The best varieties of the black-caps are Mammoth Cluster and Gregg. The red varieties are propagated by suckers, and should be treated the same as other varieties. Several new varieties have come into being of late, and well recommended, such as Cuthbert (No. 1), Reliance, Early Prolific, Henrietta, Pride-of-the-Hudson, Philadelphia, Queen of the Market (said to measure three inches in circumference).

The question may be asked, How shall we know what varieties to set? Ask some of your reliable nurserymen. A plantation of raspberries will do well for a number of years; every farmer should plant them for home use, for canning and preserving for winter use; they are not excelled. They require no sugar for preserving them. Cut out the old canes each year, and as the new canes grow to three or four feet in height pinch off the stalk, so they will grow more stocky and less liable to winter-kill. Mulch well and you can depend on having fruit.

Currants are easily grown, and are generally cultivated, or *allowed to care for themselves* as best they can. With very many farmers this is the only fruit they have, and they are left to sod in. Give them plenty of room, good cultivation, and mulch well, and you will be liberally rewarded.

Red Dutch, White Dutch, Cherry, White Grape and Versailles are all good varieties.

Blackberries, of late years, have become a standard fruit and are proving a great success. They fill out the season admirably, until grapes ripen. Those now recommended are Snyder and Taylor.

Cherries will hardly come under the head of "small-fruit." Taken in one sense they will. In many parts of the State they are grown suc-

cessfully, and prove to be a valuable acquisition to extend the small-fruits, as they are so valuable for canning, preserving, drying, etc. The greatest humbug of the age is the "Utah Hybrid, or Cluster Cherry." The well-known varieties are E. Richmond, Morello and Kentish.

As I have taken up so much time, I will endeavor to make only a few remarks on Grape culture, giving a general outline, and leave the balance to others.

Grape culture is so simple that every farmer should try a few square rods of land to vines. For location, select the warmest place in the garden, well drained, if possible on the south side of a hill. Prepare the ground by a heavy coat of manure, plowing deep and pulverizing thoroughly; stake off the ground in rows north and south, eight feet apart, so as to admit the sun as much as possible; set in the row from eight to twelve feet apart, according to the kinds and manner of training. In setting, dig the holes from eight to ten inches deep and two feet across, set the plants on an angle of forty-five degrees, for the convenience of covering, put in a light covering of earth, press down with the fingers among the roots, fill up the hole with loose dirt, and mulch well, so as to keep moist and insure a large growth the first year. One cane is sufficient for the first year; pinch off all the others, cut back in the fall to three buds, cover lightly with earth or coarse litter, tie to a stake the second year. Undoubtedly all the buds will grow; after they have started well select three or four of the strongest canes and pinch off the balance, cut back in the fall to three or four feet, leaving from two to three buds on the branches; in the fall cover as usual. The third you are ready for your trellis (or stake as you choose); this year they will begin to bear a little. Further information, and cuts explaining trimming and manner of training, can be had by procuring a "*Hand-book for those who grow fruit for their own use*," by F. R. Elliott, author of the "Western Fruit-Grower's Guide," price 60 cents.

The grapes for the farmer must be hardy, early and prolific. The Concord takes the lead for a standard variety; the Worden, a very nice flavored dark grape, is quite a favorite, and ripens a few days earlier than the Concord; the Janesville, a great favorite for the Northwest, ripens about two weeks earlier than the others, is very hardy, but second quality for flavor; Delaware, A No. 1 for quality of fruit, but not quite so hardy; the Rogers' Hybrids are not behind; No. 15, Agawam, very popular; No. 9, Lindley; No. 4, Wilder; No. 19, Merrimac. With the new varieties come the Brighton, Florence, Martha, Lady and Lady Washington, and one of the latest, the Prentiss; all of these come well recommended.

With all of these facts before us, what farmer is there who can deny his family the luxury of small-fruit, when it can be had for so small an outlay?

A few dollars to start with, with the increase they make, in a short time will supply any family with all the fruit they need; it will, of course, require care and attention to keep the ground in good condition. One acre of land devoted to small-fruit will add largely to the comfort and

health of a family, besides making home more attractive for the boys and girls. Will you procure this supply, or leave it to the professional fruit-grower to supply the villages and cities with fruit, while you content yourselves on the coarser luxuries of life—*like pork and beans?* (Applause.)

DISCUSSION UPON THE REPORT.

MR. GARRETT, in answer to a question, said he had fruited the Mer-rimac and liked it; he had not fruited the Martha.

MR. SLADE.—The Long-bunch Holland currant is not mentioned in the report. This variety has borne from three to five times as much as any other on my ground. The fruit is larger than the Red Dutch, but not quite as large as Cherry; it sells well in Elgin; it holds on till frost, if not gathered. The bush is double the size of other sorts. I don't understand why it is not found in Eastern catalogues, as it is certainly the best sort in cultivation.

THE PRESIDENT.—The concurrent testimony of members of this Society is that it is the most valuable variety.

L. K. SCOFIELD.—I have grown it many years; it is a rampant grower, and on the whole the best sort, though it should have the benefit of the sun, for if partially shaded the fruit is apt to dry up. It is a week or ten days later than Red Dutch.

MR. WOODARD.—The Long-bunch Holland wears better with me than any other.

MR. KLUMP.—All small-fruits should be planted in long rows and cultivated with a horse. I wish to know if summer cultivation of rasp-berries is injurious?

MR. SLADE.—The more cultivation the better the crop.

MR. GALUSHA.—If raspberries are cultivated till near time to begin picking the fruit will be larger and finer, though the cultivation should be such as not to break the roots much.

MR. CROW.—Miami is the principal sort of black-cap grown at Crystal Lake, and this is grown in large quantities. The planting is done in squares—rows both ways—and cultivated both ways till the fruit ripens. The red varieties are rowed but one way and cultivated till ripening commences.

MR. MINKLER.—In growing raspberries and blackberries for suckers to sell or plant they should be grown separate from the fruit plantations.

MR. GALUSHA (in answer to a question).—The New Rochelle, a dirty-colored hybrid variety, is the best berry for pies which I have grown.

The fruit is large and pulpy, with an agreeable mixture of acid and sugar; the canes bear heavy crops, though the color prevents a ready sale.

MR. SLADE.—We should not make such distinctions, except for berries to ship, for such berries will sell in our home markets upon their merits.

MR. GALUSHA was called out on strawberries, but as his remarks were substantially the same as his reports and discussions in the meeting of the State Society, as found on pages 92 to 100, also 198 to 201, in this volume, they are omitted here.

The meeting adjourned to half-past seven.

SECOND DAY—EVENING.

The Society met at the appointed hour.

The President named the following gentlemen as Committee on Final Resolutions: James Crow, H. D. Emery and Arthur Bryant, Jr.

HON. JAMES SHAW, of Mt. Carroll, was introduced by the President as the lecturer for the evening. Mr. Shaw gave a very learned and able extemporaneous address upon glacial action and the teachings of the rocks, the boulders and the deposits, in explaining the origin and formation of the soils of Illinois. He closed this address as follows:

THE STRUGGLE BETWEEN THE GRASSES AND THE TREES.

Having now shown you the origin of our soils and surface deposits, and the vast forces and agencies which moved, mingled and mixed them together; having spoken of the surface of the country when left bare by the receding waters, I wish now to present a resume of some views of mine, published in one of the volumes of the Illinois Geological Reports, as to the struggle for the possession of the land by the vegetation which subsequently sprang up.

Closely related to this subject of our surface geology—indeed it is a part of it—comes this question of the origin and formation of the prairies, and the struggle between the grass and the trees for their possession.

This is the prairie State, and we of the Rock River country live in its very garden. All the grades of prairie land may be found in most of the counties, such as the high, upland prairies, the river bottom or alluvial prairie, and the low, wet savannas of the swamp lands. Why are these prairies treeless? And has this fact any significance for the horticulturist and the tree agriculturist?

Several causes have been assigned for this striking phenomenon.

One attributes it to the agency of fire. The annual burnings of the dry fall grasses by the Indians, in all the years they roamed over the broad expanse, is said to be a potent cause to keep down the growth of trees. The prairies have been kept swept clean of forests by a broom of flame; not only kept clean, but the devouring element has constantly encroached on the domain of the timber, and as constantly enlarged the province of the grasses. We all know the omnipotent power of fire, when unchained and wild in its devouring rage. It has melted and licked up great cities of stone and iron, and wrapped green woods in its devouring crimson and black mantle. But I find no satisfactory evidence that our grand prairie was ever covered with an arborescent growth. The soil contains no history of its decayed roots, and the chemical analysis of its materials no trace of the ash and mineral residuum of its burnt tops.

Another theory supposes that the prairies are caused by receding waters; another still, by the original constitution of the soil; another, by the supposed hostility existing between the trees and grasses; while the true theory would embrace them all, some operating in one locality, some in another, and combined in various degrees in others, modified by atmospheric agencies, bounded by certain isothermal lines, inclosing certain zones and belts of moisture and dryness.

The annual fires which were supposed to sweep through the grass, killing every tree germ and young tree almost before they could take root, is the theory entertained by many of our old settlers, and it is much favored by Judge Caton, in his thoughtful and cautious essay upon this subject. In some places the fires are supposed to have encroached year by year upon the forests; in other places, as along the moist places and by the margins of streams, where the fire would be checked, the timber springs up and displaces the herbaceous vegetation and grasses.

The treeless character of these plains cannot satisfactorily be accounted for by the lacustrine origin and nature of the prairie soils and subsoils. It is said that trees will not naturally grow in this sedimentary, finely comminuted soil and subsoil covering the prairies. Others attempt to explain prairie phenomena by atmospheric and climatic influences marking out certain zones of moisture and dryness by isothermal lines.

Foster argues that where moisture is equable and abundant, there forest growths take place and reach their grandest development; where it is unevenly distributed, there we have the grassy plains; and where it is mostly withheld, there is the sterile desert. Where the ocean breathes its moist atmospheric breath over the land, there forest growths spring up, or green grasses if in less degree, or waste saharas if the moisture of its breathing is taken away. The pampas of South America and the verdureless plains of the West would seem to confirm him in his well-settled conviction.

Lesquereaux, with force and plausibility, argues that all our prairies originate from causes similar to those which form our peat-bogs and beds, and that they are in fact incipient, dried-out peat-beds, drained while in process of growth and before completed. In his own language he

says, "that all the prairies of the Mississippi valley have been formed by the slow recession of the sheets of water of various extents, first transformed into swamps and by and by drained and dried. The high rolling prairie, the prairies around the lakes, and those of the bottoms along the rivers, are all the result of the same causes and form a whole in an individual system."

I have already said that no one of these theories is sufficient to explain all the phenomena noticed in making an examination of the prairies. As in most cases in theoretical geology, all of them contain some truth, and may be applicable to localities more or less extended. The burning of the forests in some cases, doubtless, has changed timber land into prairie, and prevented timber from invading tracts of the prairies. But these sweeping autumnal prairie fires are not sufficient to account for the origin of our wide prairies, else prairies would be found scattered through all the timbered regions of the continent. Neither are these atmospheric causes sufficient, for the observations of meteorologists show the annual precipitation of moisture in the form of rains over our Northwestern prairies quite as evenly and extensively as in the timbered regions of the eastern and northern part of the continent. I suppose the chief cause of the treelessness of the prairies is found in the soil itself. It is very true that trees, whose habitat even seems to be the damp, alluvial soil of our river banks, will flourish and grow when planted upon the prairies; but much of this adaptability comes from the artificial process of planting, which seems to fit the soil for their reception and growth. Even vines, Indian corn, and many other kinds of vegetation, will flourish when thus artificially planted, but never would grow naturally of their own accord upon our grass-sodded prairie land. The prairie soil is naturally adapted to the growth of prairie grasses; and the prairie grasses not only resist the growth of trees, but actually kill them out. Indian corn would never grow naturally upon our prairies; but under the hand of cultivation they are the grandest corn lands in the world.

Trees do not naturally cover the prairies, but under favoring circumstances, and when planted by man, they grow and flourish luxuriantly. By destroying the grasses and sod the roots of the trees strike deep into the nourishing subsoil, and forests easily spring up. The prairie soil is the sifted silt of the slow-receding waters. It has certain anti-septic qualities, and is permeated by ulmic and other acids, making it at first sour, compact, and pottery-like in closeness and hardness. The prairie grasses first cover such a surface and naturally flourish in such a soil. Having once taken possession, they more than hold their own in the struggle with the trees. The trees kill many grasses with their shades; but these grasses bind and smother the roots of the trees, and kill the monarchs of the forest.

These properties in the soil and these sour grasses are all unfavorable to forest growths, and it is only when their deleterious influences are counteracted by the sweetening influences of cultivation, or other counter-acting causes, that healthy and vigorous trees replace the grasses. Cultivation does destroy this sourness in the soil; and successive vegetable

growths, living and decaying with the seasons, make our black, fat, prairie mould. If all the cultivated prairies of the State were suffered to relapse into uncultivated wastes, I believe the grasses would not again take possession; but that brambles and hard-wood trees would eventually cover the land with thickets and a forest growth of hard woods.

In this part of the State much of the alluvial bottoms subject to overflow, and constituting the flood-plain of the rivers, is covered with timber. There are, however, alluvial prairies along these streams, timberless and for the most part sandy and coarse-grained, and entirely different in composition and texture from the usual Illinois upland prairies.

The swamp lands, swales and boggy lands scattered through these counties afford a fine illustration of Professor Lesquereaux's theory of the gradual transformation of swampy, boggy ponds, marshes, swales and shallow margins of rivers and lakes into the black, spongy moulds of our richest prairies. Aquatic vegetation, the gradual encroachment of the land into ponds and lakes and swamps, the slow drying of flat, wet prairies and sloughs, and the gradual filling up of water-logged and water-soaked basins by successive growths and decays of aquatic vegetation, is building up rapidly sour-soiled, treeless prairies.

The processes are similar to those forming the peat-beds. The processes are modified by varying conditions of dryness, and a peaty-soiled prairie is formed, instead of a bog or bed of peat. Around the Winnebago Swamp or Lake Koshkonong we may actually see the formation of the prairies taking place in the historic period. Here it is a contest between the land and the water.

But the high, rolling prairies, with, in many instances, thin soils covering the coarse drift materials below, do not show so plainly the same sort of originating causes. They are interspersed with numerous small groves of timber. These grow along the alluvial mixed soils of the streams, and upon the ridges and patches thrown up and beaten together by the waves and currents of the broad lake-like expanse of water which covered this part of the State immediately subsequent to the glacial ice period. A few of these drift ridges and gravely-subsoiled elevations are treeless, owing perhaps to fires or other local causes.

Excessive humidity of these high, rolling, somewhat sandy prairies does not exist, and cannot satisfactorily account for their treelessness. Neither do they bear in their soils and subsoils the evidence of having once been swampy, marshy plains.

When the waters of the broad, shallow, fresh-water sea, once extending south and west from Lake Michigan, were slowly drained off, either by the breaking away of southern water barriers or the slow upheaval of this whole region, parts of the bottom were undoubtedly left as broad, shallow marshes, swales and bogs, which assumed, in due course of time, a peaty character; but other parts must have been left comparatively dry and covered with a fine, impalpable sediment, constituting the basis of our present prairie soils.

Such must have been the primeval condition of much of the Grand Prairie of Central Illinois.

The swamp and peat lands afford fine examples of the former condition of things; the rolling prairies, dry and sandy, afford just as fine illustrations of the latter condition of things; and many places are combinations of both.

The treeless character of the marsh-built prairies is satisfactorily accounted for by Prof. Lesquereaux's theory of the origin and formation of our prairies.

The treeless character of the elevated prairies must be accounted for by the nature of the soil itself, and the natural tendency of an herbaceous, rather than of arboreal vegetation, to gain and keep possession of the territory where once it has obtained a foot-hold, aided perhaps by fires and other local causes.

These views of mine may contain erroneous suggestions. This is one of the vexed problems in a great science. No one can, perhaps, solve this problem until wider observations and closer study shall have given more data for scientific conclusions. My own opinions are formed from observations of the prairies in this part of the State.

As already intimated, I am satisfied no one theory will explain all the phenomena as to the origin and formation of our prairies. Combined causes, operating with different degrees of force in different parts of the great prairie regions of the country—sometimes one cause predominating, sometimes another, and sometimes all together—are more in harmony, it seems to me, with the effects left for our observation.

These thoughts suggest the practical conclusions which horticulturists and agriculturists may draw from the character of our treeless prairie soils. The lesson to be learned is perhaps this: In the first place select one of nature's orchard spots in which to plant trees and vines and forests, if that be possible. A light soil, porous subsoil, sheltered, sunny exposure, and well-drained slope or hill-side, is the favored spot. Then plant in proper season, of the best and hardiest varieties, in holes dug big as little cellars. Take care of the young trees, feed them with fertilizers and good cultivation, wage war with their insect enemies, and in due time an abundant fruitage, even on the prairies in this climate, will be the result.

If nature has not made for you such an orchard or forest spot, then you must make it yourself. Do artificially what nature has left undone on the treeless prairies. Drain and underdrain, and best of all tile-drain your level, water-soaked soil. Plow and underplow; manure and feed with fertilizers; throw up the earth from below that the kissing sunshine and the frosts may pulverize and sweeten it; plant shelter-belts to modify and sift the blistering winds; and in this way an orchard or vineyard or grove may be made to grow and blossom and bear abundant fruitage. Cultivation will banish the primeval grasses and make the treeless plains bloom with blossoms, green in groves and rich in fruitage; and we will hear no more about these treeless prairies being unfit for Eden gardens, where men shall sit beneath their vines and richly-laden apple-trees.

The cultivation of trees has kept pace with the progress of civilization in all ages of the world. In the childhood of the world, when the

race was young, and primeval and prehistoric man lived in his rude caves, the apples and fruitage of the earth were small, hard and sour. Now we have the Golden Russet and Bellflower, the melting pear and the delicious peach. I know of but one better index of a grand development. From the wild, half-animal shrieks of savagery and barbarism, up to the divine sweetness of a great *prima donna*, and the power and fire of a god-like eloquence, the wonderful history of articulate sound would portray the grand development of Humanity.

In the flowering and fruitage of our ripening civilization this wonderful development of the human voice points out no better advancement in civilization than does the improved fruitage of the earth under the hand of cultivation. One is progress itself; the other keeps pace with it in even step. (Applause.)

THANKS.

At the close of the address Mr. GALUSHA said: *Mr. President*, we are under great obligations to Mr. Shaw for coming here and reciting before us these interesting and instructive chapters from the Great Book of Nature, of which he has evidently been an earnest and painstaking student. I move a vote of thanks by rising.

The entire Society and audience rose as the President called for the vote.

The Society then adjourned till to-morrow morning.

THIRD DAY—MORNING.

Order was called by the President at half-past nine o'clock on Thursday morning.

Prayer was offered by Rev. Mr. GIBSON, of Marengo; and then the regular programme of business resumed.

REPORTS UPON PLUMS.

The following Reports from the Committee on Plums were read by the Secretary:

D. B. WIER, of Lacon, writes:

NEWMAN'S PLUM.

I have had this valuable Plum in fruit five successive seasons without a failure of a good crop. I am confident that these crops were not accidental, as it withstands the plum-curculio better than any variety planted here. I received the trees from the Hon. P. G. Berkmanns, of Georgia. It is a typical variety of the Chickasaw (*Prunus chिकास*), a

slender grower, but so far as I see perfectly hardy in tree and fruit-bud. It ripens its yellowish-red fruit from the middle of August to September first, or a little over a month later than the Wild Goose, and just before the Miner. It is a beautiful tree in flower, leaf and fruit; the fruit is about two-thirds that of the size of the Wild Goose, and like it oblong. In quality it is superior to all others of the species Chickasaw that I have fruited, and I have fruited all of this species that have been named. The Newman and the Wild Goose are all the plums that I can recommend. The Wild Goose failed the past season in giving a good crop—the first failure during ten years here. There are *too many* of the Miner plum; that is, in all this region there were a great many varieties sent out as “Miner;” the trees look almost exactly alike, but the fruit differs; some of the varieties are quite good, but they are mostly very poor, and I have never seen as good fruit grown here as that shown as grown near Galena on the original trees. The seeds of this class come up readily under the trees, and in this way when taking up supposed suckers many seedlings are dug.

In the course of trade I have a continual call for trees of the old Damson type; but my experience is that these will not do to plant for market. It is true that some trees of this class do remarkably well, bear immense crops, but the careful observer will find that, as a rule, these productive trees are growing in crowded door-yards, where all is bustle and life—chickens, people and dogs, and other domestic animals, and the timid plum-curculio is scared away. I have observed varieties of the finer European plums giving like results under similar surroundings.

ARTHUR BRYANT, Jr., of Princeton, from the same committee, contributed the following:

PLUMS.

The subject assigned to me to report upon is one in which I have but little practical experience, especially the *successful* part of the matter. And what does not at all relieve me in my unfortunate situation, I find that my neighbors are all in the same predicament, so that I can neither borrow nor steal from them to help me out. In my section of the country plums have been planted more or less ever since the country was settled; but for some reason we find no old trees, and but few of later-planted ones, doing or even growing well. From some cause the trees in the most favored localities seem to have been short-lived and quite uncertain even in growth, to say nothing of fruitage. But I think that the plum, on not too rich soils and with the necessary care, can be made fairly remunerative. In the first place trees grafted on good hardy stocks should be chosen, probably those grafted on native stocks are the best. Peach or French plum stocks I consider of but little value for this latitude; they may answer well where the peach is hardy, but will not answer here.

Plant on good soil, but do not stimulate too rank a growth; prune what is necessary to keep the trees in good shape.

The principal enemies to the successful culture of the plum are the curculio, black-knot, and in some seasons the leaf-blight, which denudes the trees before the wood is ripened. I know of no remedy for the leaf-blight; probably a good, well-ripened growth would lessen the tendency to a return of the disease. For black-knot, cutting back the diseased part has seemed the only remedy.

The curculio is the worst enemy that the plum has in this section of the country, and one that is sure to destroy the crop if some measures are not taken to prevent. Some have succeeded with a limited number of trees planted in their yards or where there was a great deal of passing to and fro. Probably the most effectual remedy is to use sheets and jar the trees two or three times a day while the fruit is setting, as has been frequently recommended by this Society. Within the last two or three years quite a number of persons have been successful in driving away the curculio by fumigating the trees with coal-tar smoke. This was done by using a kettle with fire in it, a little coal-tar poured on and set on the windward side of the trees so that the fumes of the burning tar would pass among the branches.

Enough of the tar or soot seems to adhere to the branches to drive the insects away.

So far as varieties are concerned, I would plant some of the best of the old varieties; perhaps Lombard is the best for this section. With me the Miner and Wild Goose, thus far, have not given any satisfaction. I know but little of the new varieties and would advise any one to "go a little slow" on them.

DISCUSSION UPON THE REPORTS.

Messrs. CROW and THOMPSON testified that the Miner blooms profusely, but bears no fruit.

MR. WOODARD said that the prolific trees of Miner at Galena are in red-clay soil.

PRESIDENT PERIAM said that a friend of his in Central Illinois brought his Miner plum-trees into bearing by taking out a ring of bark around them about one-sixteenth of an inch wide.

MR. GARRETT handed the Secretary, who read, the following question:

Has any member of this convention the De Soto plum? If so, is it a good bearer and free from damage by curculios?

MR. SCOTT.—I have had the De Soto in bearing five years; it is a good plum and the trees bear full crops; last year one of my trees broke down from weight of fruit. I recommend it for trial. The Miner bears better with age than on young trees; the trees grow very large and spreading, like apple-trees. The old, large trees of Miner at Galena stand in grass, in a stiff clay soil and on a high ridge; these are productive, though trees are seldom productive elsewhere, and I think I will cut

mine down. De Soto does uniformly well at Galena. It is more like the European type than like *Prunus chicasa*. I have never seen it anywhere else.

MR. GARRISON.—A German in my neighborhood had Miner trees which would not bear, and he drove plenty of nails into them, after which they did bear. Did the nails induce the fruitfulness?

THE PRESIDENT.—Driving nails into trees has been recommended, as though the iron rust affected the sap and in this way produced fruitfulness; but I suppose the result was produced by checking the flow of the sap which the nails produced—the same as removing a narrow ring of bark.

REPORT UPON ORCHARD CULTURE.

BY SAMUEL EDWARDS, MENDOTA.

The Secretary read the following :

Mr. President and Members of the Horticultural Society of Northern Illinois :

The apple is appropriately termed the "King of Fruits" for the temperate zone, and its successful culture one of the most important subjects which can be brought before your Society.

For one, the writer, after thirty-seven years' experience in orcharding on our prairies, must frankly admit that the more he does in this direction the less he knows, and about all the advancement made is in learning to avoid the mistakes of former years.

Where there is a choice of location, give the preference to knolls; if level land, a ridge should be made by repeated back furrowing on which to plant each row of trees.

Most experienced orchardists prefer setting trees closer than is recommended in our books, for the protection afforded, thinning them out when they need it. Trees are comparatively short-lived here, and in my opinion it would be a serious mistake for us to set apple-trees forty feet apart, as is advised by some Eastern writers.

The proper selection of varieties—those known from experience to be well adapted to the vicinity or similar soil and climate, is one of the most important matters to be considered by planters. For home use, we make a selection of many varieties for which some member of the family may give preference which it would not be advisable to plant in an orchard for market.

Commercial orchards should have but few varieties, all of which are proved to be good and regular bearers, of good selling quality, and for most localities in Northern Illinois a large majority of them should be of late keepers.

Several varieties have been originated by cross fertilization in Minnesota and Wisconsin, which, with the Salome and Wythe, of our own

State, are of finer quality than other late keepers which have proved successful here, and it is hoped that they will be of great value to us.

On the subject of shelter a variety of opinions are entertained, mine is, that it is indispensable for preventing fruit from being blown off.

For five or six years from planting the surface should be kept mellow by frequent cultivation the fore part of the season; corn, small-fruits or any hoed crop are suitable for growing in an orchard. Mulching during hottest weather is advised when practicable.

Some having met with good success by seeding to clover and pasturing with hogs, this plan was highly recommended a few years since, and adopted by many, a goodly number of whom, having small orchards and large numbers of swine, soon had the surface as bare of herbage as a traveled road, in many instances the bark stripped from trees. After in this way indulging in too much of a good thing, the masses were ready to pronounce it a failure, and our horticultural societies, which recommended it, arrant humbugs.

So far as my observation goes, those who have kept a reasonable number of hogs in their orchards for the amount of feed afforded still approve of the practice.

All vegetation or litter near the bodies of trees is liable to harbor the beetles, which deposit eggs for borers in summer, and mice in winter. It should be kept clear in May, June and July, again late in the fall, and a mound of earth raised a foot high with a sharp-pointed top at the body of the tree, just before winter, to be leveled in spring. Various washes recommended as preventives of the deposit of eggs for borers have been tried by me—at present I have most hope of efficient protection from using a weak solution of carbolic acid with strong soap-suds, as recommended by M. B. Bateham, of Ohio, to be repeated after each rain during the season of danger. Trees should be examined for them in April and September each year. They are the most to be dreaded of any insect enemy to the apple-tree with which we have here been afflicted. The canker-worm has thus far failed to visit us, and I pray to be excused from forming his personal acquaintance.

The oyster-shell bark-louse, which was formerly so much dreaded by us, is rarely if ever seen of late, for which, probably, our Society should pass a vote of thanks to Dr. Shimer's acarus.

The codling-moth damages a great part of our apples most seasons; the various devices of bands and traps would probably rid us of them to a good degree, if concerted action could be secured—a consummation devoutly to be wished, but difficult, if not impossible, of accomplishment. Winter is a good time for destroying eggs of tent-caterpillars and leaf-rollers, and through the growing season frequent examinations of trees should be made for this class of enemies.

The fertility of the soil should be kept up by the application of some appropriate manure, of which that from the barn-yard and wood ashes are as good as any readily attainable; winter is a good time for applying it. Extensive pruning has never seemed to me a judicious practice.

To induce bearing by barren trees, of business size, it is likely many will make trial of removing a ring of bark one-fourth to half an inch wide around the body of the tree in April, as has been practiced on an extensive scale for several years, with satisfactory results, by J. B. Spalding, of Springfield, whose statement at the last meeting of the State Society occasioned much discussion, as I hope it may with you.

With judicious management in the selection of varieties, planting and care of an orchard, also in gathering, handling, storing and marketing apples, they pay as well or better on an average of years than most branches of farming.

The trees are often left uncared-for, merely allowed to stand in stiff blue-grass sod, nurseries for caterpillars, borers and all other insects, without any molestation; the fruit is shaken and poled off, thrown carelessly into baskets, emptied thence into bags for transportation to market, where if sale is found it is at a low figure and the producer is disgusted with the business.

Even where properly selected and handled, they generally sell at low figures in the fall; they were forty to fifty cents per bushel in Mendota last October, now one dollar to a dollar and a half.

In my opinion it is advisable to grow, as far as possible, all fruits and other products called for in our home markets, even if they succeed but moderately well.

Mr. MINKLER, from the same committee, contributed the following:

CULTIVATION OF ORCHARDS.

Mr. President and Members of the Horticultural Society of Northern Illinois:

The subject assigned me is the Cultivation of Orchards. I shall confine myself to the apple orchard.

The apple that was once considered a luxury has become one of the necessities of life as food, and when freely used is conducive to health as well as comfort.

In planting an orchard, the first thing to be taken into consideration is the site. The orchard, of course, should be near the dwelling; but if the ground near the dwelling is not suitable, and cannot be made so by draining, it would be advisable to choose a site more remote from the dwelling. The land should be dry; if not naturally so, should be made so by draining or ridging, for apple-trees will not endure wet feet.

Exposure.—I prefer a northern exposure to a southern one, for this reason, that when we have early and late frosts the wind, of course, is in the north, consequently the frost settles on the southern slope, because it is still there; choose the highest ground on the farm.

Preparing the Ground.—The ground should be in good tilth, as for corn, and if plowed deeper all the better, even if trench plowed. The proper distance to set trees is twenty-eight to thirty-two feet, roots spread

as well as the top. Trees set two rods apart each way; these roots will meet in eight years. I have trees set that distance that the branches have long since kissed each other.

Digging the Holes.—Did I say digging the holes? The holes should be the size of the orchard; *i. e.*, the ground should be made mellow as deep as the roots are to go; trees should be set four inches deeper than they stood in the nursery, for the reason that the ground settles and the tree does not.

Selecting the Trees.—Do not be governed by the usual palaver (five to seven feet) as used by the tree peddlers; but select good stocky four or five-year-old trees, with trunks four and five feet, with branches evenly distributed on all sides; avoid crotches or forks. Go to your nearest nurseryman, if he is reliable, and if you can have your choice in the trees for a few cents addition to price all the better for you. In setting trees, always range by your stakes, not by the trees you have set, if you do you will be sure to go crooked. In setting be careful to have no vacancies about the roots, use your hands freely, then pack the earth well around the roots, yea, *stamp* it well and finish with loose soil, then mulch; this is indispensable; it consists of putting any old straw or stack bottom, if half rotten all the better; this should be four inches deep and reach out three feet each way around the tree. The object is to retain the moisture in the ground. The next thing is to stake the trees; this is done by driving the stake on the southwest side of the tree, one foot from the tree, then take your straw band, twisted hard, put it around the tree, then put the strands together, twist again, then part the strands and tie around the stake. I should have said above, to lean the tree in setting a little to the one-o'clock sun, also put your heaviest branches on that side; the object in staking and leaning the tree is to prevent it from leaning towards Lake Michigan. If your trees get to leaning that way, the sun will surely scald the bark on the southwest side, and your tree is gone; as soon as you get the branches to shade the trunk you are safe.

Varieties.—Be careful not to get too many varieties, say about four summer, four fall and six or eight winter, and this would be too many if you were sure they would bear each year. I will not name the varieties, for you are to be governed altogether by your locality.

Cultivation.—The orchard should be cultivated at least eight years, or till it comes well into bearing in any hoed crop, or sown to buckwheat and let it fall back on the ground; care should be taken not to plow too near, or too deep near the trees; when you seed use red clover. It is advisable to shorten in the branches two-thirds the last year's growth, for the reason that the tree has lost roots in being taken up, and that equalizes the top and root.

Protection from Rabbits.—Mr. D. B. Wier says a rabbit may gnaw all the bark off for six inches and the tree will not die. I say it *will* die. So doctors disagree. But I think prevention is better than the cure; you have a remedy always at hand: take an old pail, or nail keg will do, take from the back-house vault and reduce it to the consistency of paint, and with a swab flirt it on the trunks of your trees in the fall and I will

assure you that the rabbits will not touch them ; one application will be sufficient for one winter. It is an excellent plan to wash the trunks of your trees once a year with strong lye.

Trimming.—If trees are carefully watched, to take out such branches as are liable to cross each other, there will be but little trimming necessary.
S. G. MINKLER.

REPORT UPON HOME ADORNMENT.

Mr. B. O'NEIL, of Elgin, presented the following report :

Mr. President and Gentlemen of the Horticultural Society of Northern Illinois:

Once more we assemble together to exchange ideas and recount our failures and successes of the past year, and to imprint our foot-marks on the page of time, and thereby leave to our progeny the foundation for a higher development. Time is fleeting and all the ingenuity of man cannot bridle it. If we come together merely for the advancement of our own interest, then our meeting is a failure ; for selfishness belongs to the order of dog, and though the disciples of the evolution theory may try to establish an affinity between bimana and the dog, still we can never reconcile an affinity between the latter and the Deity. This Society should have a higher object than the recounting our own experiences among ourselves. We should endeavor to educate the public in the principles we champion. We pride ourselves on the smartness and ingenuity of the nineteenth century, but I think we have lost a great deal of the common sense and patient industry of our forefathers. Our children learn a smattering of botany in our schools, they learn all about pistils and stamens, and rhizomes, and pollen, but I think it would be a great deal more profitable to shoot some common sense into their heads, and tell them the medicinal properties of clover, and May-apples and poke ; for what is the eclectic practice of medicine (thanks to Wooster Beach) but a modification of our grandmothers' mode of doctoring?

Gentlemen, you have asked me to talk of Window-gardening, and while I stand by the window, arranging the different kinds of plants that contribute so much to make the home look cheerful and joyous, my mind wanders into space, and through sympathy I find myself communing spiritually with that class of hard and horny-handed sons of toil—our farmers ; and, soliloquizing, I exclaim, surely this is the widest field for our missionary labors. We have spent so much time in fixing and decorating the windows and the yards of our city friends that the farming community commence to think they can never enjoy such a luxury until they get rich enough to come and live in the city. Well, we cannot blame farmers so much for this, because through the force of habit and custom farm life is an eternal drudgery ; it is the nearest approach to prison life in this country. Is there anything in reality why it should be so ? I think not ; for British farmers, with their high rentals, as a general thing have pleasanter homes than American farmers ; and if we step

across the British Channel into France or Belgium, the surroundings of the farmer's residence is on a palatial style in comparison to those of our American farmers. The French and Belgian farmers take as much interest in the cultivation of fruits, vegetables and flowers as they do in general farming. When a friend comes to visit the French or Belgian farmer, after a social time in the house an inspection of the vegetable and flower garden is the next thing in order, then the stock, and so on. Now, why can't we form ourselves into a committee of the whole and advise our farmers to imitate the French and Belgian farmers. I think it would pay to send Mr. Scofield among them as a kind of a missionary. He would tell them how to plant, when to plant and what to plant for; and then if we could send Mr. Hunt along he would tell them all about our first parents and the garden of Eden and about the daisies and pansies and the asters and the hollyhocks and all the other flowers our First Parents used to grow; and last, but not least, we could send Mr. Slade along and he would tell them all about bees and drones and greenbacks. (Laughter.) A great many farmers would say, I would like all this, but I am not a landscape gardener and don't feel like employing one. To such let me say, you do not need a landscape gardener; only lay the foundation right, for it is just as easy to build on a good foundation as a poor one.

Now let me give you a bit of information, if you would like to follow my advice: first, subscribe for a good agricultural and a floricultural journal; when you are adding to your foundation, and if you are in doubt about anything, drop the editor a few lines and ask his advice, he will gladly give it to you; if you are going to put up a new house or put an addition on the old one, put in a south bay-window in your sitting-room, so as your wife can have a few nice winter-flowering plants, and in front of this window will be a nice place for a few flower beds; don't have the chickens and ducks and turkeys and geese keeping guard around the house, like the Huns and Saracens; your wife will have enough to do besides attending to this feathered militia. Whenever a grove of shade trees can be improvised to the northwest of the house, this serves admirably for a wind-brake; the orchard should be between this grove and the house, and a fence should be run across between the orchard and house, so as hogs and poultry could be turned loose in the fall and spring months; orchards should never be located in front of a dwelling, the drive-way should commence from the highway, and should run about an angle of forty-five degrees, with a graceful curve at both ends, and this drive could be continued direct from the house to the barn. Evergreens judiciously clumped around a farm house add very much to appearances, but I do not like this belting all around, it looks too artificial; it should always be the endeavor of the artist to portray nature; the weary mind and love-sick heart delight to drink in nature's fantastic grandeur—even Cupid can poise his arrow all the surer under the overhanging branches of the sheltering trees; and in the shaded nooks and sparkling dells the wounded heart delights to make professions of love and receive tender caresses—and its significance need not be repeated.

It is a melancholy fact that farmers and their families, as a class, supply the largest percentage for our insane asylums, and our best scientists tell us this is due to the lack of ennobling influences among this class.

And it is another melancholy fact that the children of farmers prefer to drive a horse car or an express wagon in the city than work on the farm; and this can be attributed also in a great measure to the former cause. But, let me ask, if the surroundings of the farm home are made pleasant and cheerful; if the labor of the farm is conducted in a systematic way; if regular hours for labor and for rest are enforced, and if order and system reign supreme in every department, will not such a course be conducive to happiness and contentment?

The eminent physician will impress on his convalescent patient that happiness, contentment and rest are the most potent agents to a speedy and healthy recovery—a bouquet of flowers is one of the peace offerings of a sympathizing friend, and though some may say the life of the latter is short, still we may speak of the flowers as we would of the souls of men:

“They may look dead and passed away,
But they may bloom another day.”

(Applause.)

REPORTS UPON EVERGREENS.

Dr. W. A. PRATT, of Elgin, read a report upon the Culture of Evergreens, but did not furnish a copy for publication.

SAMUEL EDWARDS, of Mendota, a member of the committee, furnished the following, which was read by Secretary Galusha:

Mr. President and Members of the Horticultural Society of Northern Illinois:

The growing of evergreens from seed is in most instances not remunerative to any but those making it their principal business, and it is not supposed to be the mission of your Society to instruct them. In other words, it is much cheaper for most persons wanting evergreens, even for general nurserymen, to buy them of from two to four years' growth, than to grow them from seed. It is now generally known that they are as readily transplanted as deciduous trees, if the roots are not suffered to dry in the least while out of the ground. Plants less than a foot in height should be set rather closely, in deeply-pulverized soil, well watered, surface of ground heavily mulched and shaded by a screen of brush, corn-stalks or any similar material. The oftener they are transplanted or root-pruned previous to setting where they are to remain permanently the less risk in their final removal. Liberal mulching in dry soils is preferable to cultivation.

In making selections of varieties regard must be had to the soil. Pines and junipers are especially adapted to dry soils; spruces and arbutus to wet. For bleak exposures Scotch pine is unrivaled.

I have seen, in the last five years, over a thousand fine evergreens, twenty to fifty feet high, which had been planted with my own hands, nurtured with care, and almost worshiped, cut down as cumberers of the ground, on two of three tracts of land sold, seeming almost a peremptory order to recant my teachings of former years; yet you, gentlemen, will please understand me, like Galileo, to whisper, "It does move, though;" slowly, it is true, yet this very important work is progressing. My part in it is done.

DISCUSSION UPON EVERGREENS.

THE SECRETARY.—*Mr. President*, I wish to call attention to the remark in *Mr. Edwards'* excellent paper that the "oftener evergreens are root-pruned or transplanted in nursery the better." Of course, he intended to be understood to mean they should be several times transplanted or root-pruned. My practice is, and I think it the best one, to transplant once in two years where growth is vigorous, otherwise every third spring.

MR. MINKLER.—I am almost always preaching from the text—PLANT EVERGREENS! And I reiterate: plant in groups and belts for protection. Plant rows of White pines near your buildings and farm yards; wind-brakes more than pay expenses and for the ground they occupy even in the saving of feed for your animals by keeping them warmer in winter, to say nothing of increasing their comfort—which is really one of the first things we *should* take into the account; for a man has but little humanity about him who does not and will not provide for the comfort of his dumb brutes.

It is a fact, too, that fields protected by shelter-belts from the hot, drying winds don't dry up so much as open prairie land; so that the space they occupy is more than paid for by the increase in the amount of crops in a dry season.

Plant, too, for ornamental hedges. The White pine may be pruned into a compact form by taking care not to cut off the whole lengths of the two-year-old wood.

MR. GALUSHA.—I practice cutting off from half to two-thirds the lengths of the young, leading shoots of the pines—White, Austrian and Scotch—while the new growth is yet soft, when I wish to give them a close, compact growth. They then form new buds around the young shoots, and the next year there will be from three to five shoots where there would otherwise have been but one.

MR. GARRETT agreed with all that *Mr. Minkler* had said; and added, that root-pruning had the effect to thicken the growth, and at the same time prepare the trees for safe removal from the nursery.

The following question was laid upon the Secretary's desk and read:

What time of the year is best for transplanting evergreens?

In answer to the question, Mr. Bryant said spring; Mr. Woodard said April, but in autumn for Larch; Mr. Hill said just after the buds are swollen, and keep the ground moist after planting; Mr. Minkler said—Mulch the ground after planting so it will not dry.

MR. O'NEIL.—The reason why I prefer to plant just as the buds are opening is that the sap is then active, and the roots being at work will develop the buds into shoots; but it often occurs that when evergreens are removed early in the spring, especially if a dry time ensues, that a part of the buds dry up—incased in gum—and never open, so that the trees, if they live, are not symmetrically developed.

MR. BRYANT.—The earliest growing species of evergreens start about the first of May, and by the middle of May we have to stop the growth of the leading shoots if we wish to thicken the heads.

MR. GALUSHA.—I have best success in planting just as buds are breaking; and in planting for myself I begin with those species and varieties which start first, and try to get through before any have made a growth of more than two or three inches; for if the young growth is longer it will droop over, and if the weather is hot and dry, forget to lift itself up again, and thus the trees become disfigured.

Planting *may* be done at any time in safety to the tree; but if not done before shoots become much grown it is better to wait till they become woody, so as not to droop.

Of course *the roots must be kept constantly damp* while out of ground; and after planting the soil, for the first year, *must* be kept from drying, either by mulching or frequent cultivation. I have often moved large evergreens in midsummer without the loss of a tree; but such have balls of earth attached.

(Remarks by Messrs. Clayson and Ricker the Secretary failed to catch so as to report them correctly.)

THE PRESIDENT.—I have planted evergreens with success every month in the year; but, as has been said, the *best* time is when the shells of the terminal buds break so you can see a little of the green, for the roots then are ready to begin to grow. Mr. Minkler struck the key-note, *Keep the ground moist!*

MR. AUSTIN.—We must insist that evergreens be transplanted before growth commences, for not one farmer in ten will make a tree live which has grown from six to ten inches. If the ground is in good condition,

trees will do well moved early in spring, even as soon as frost is out ; I have the best success in April ; but very much depends upon the condition of the ground, and upon the weather afterward ; I have planted in a dry time in April and lost trees by drouth ; and then again in July, in a damp time and with wet weather following the planting, and all lived.

MR. WOODARD.—In this latitude April is the best month for planting, though I have succeeded in October.

MR. CROW.—I have been very successful in planting as soon as the ground is in good condition in spring, before the spongioles start ; they are almost sure to be destroyed, if formed, in the transplanting.

D. C. SCOFIELD.—I agree with what has been said by Mr. Galusha and the President. The ground should not be too wet when trees are planted ; it is better to wait, even if growth commences a little, than to plant in the mud. Trees should be transplanted every two or three years while in the nursery and then they are moved with entire safety, *provided the roots are not allowed to become dry* ; even a few minutes' exposure will often thicken the resinous sap, and as soon as this is done the trees are dead. I have seen whole wagon loads of evergreens hawked about the country, with their roots exposed to the sun and wind, and sold to unsuspecting farmers ; and every one of the trees was *dead* before it was sold. When I sold and planted trees upon the grounds of the Insane Asylum in Elgin, I was thought foolish and overcareful in taking so much pains to keep the roots constantly damp while the trees were out of the ground ; but my trees all lived, while from a lot of trees planted at the same time by another party, on another part of the grounds, who was not so particular, very many died. I never pour in water when planting trees ; but after the planting is completed, and the mulching put on, if the ground is not quite damp I pour on sufficient water—even if it takes barrels of water—to saturate the soil above and around the roots. Belts of evergreens sometimes double the amount of farm crops by the protection they afford. I have known such instances.

MR. AUSTIN.—I *do* pour in water ; and sometimes, where planting large evergreens, I even make a puddle in the hole and put the trees in it, and they *all live*.

MR. GIBSON.—I have had only six years' experience in this business, but have made failures. I use water at time of planting in a dry time in this way : I dig my holes long enough before planting to allow water to settle and then fill the holes nearly full—saturating the soil below and on all sides—and after the water has all settled away plant the trees. I have known trees planted December 25th to 30th with entire success ; the best

time, however, is just as the buds are bursting. They can be moved short distances, even if grown six inches, by taking pains to move a ball of earth with them.

THE PRESIDENT said he had known evergreens killed in about two minutes' exposure to hot, dry wind and hot sun. He warned planters against any exposure of roots out of ground except in a wet or damp time, as it is impossible to soak up or dissolve the gum produced by the thickened, resinous sap.

D. C. SCOFIELD said that farmers should heed the advice of nursery-men when buying evergreens and not trust to their own supposed good sense in this matter.

D. C. SCOFIELD presented the following report:

TIMBER PLANTING FOR ECONOMIC USES.

BY D. C. SCOFIELD, ELGIN.

Mr. President, Ladies and Gentlemen :

It is not expected that I should enter into a detailed discussion of all the varieties of timber that are used in the thousand and one economies of human industry and human want, much less to repeat the story or sound the alarm of future want of wood material which is inevitable in the near future. Not that there has not already been inaugurated stupendous schemes of Timber cultivation and forestry since the advent of, and emanating from the influence of, the Northern Illinois Horticultural Society, which began its work at Mount Carroll and at Freeport twelve years ago. Within eight years from that time more than eighty millions of trees were planted in one State alone (Iowa). Nearly all the Western and some of the Eastern States have enacted laws extending State patronage to all who would enter upon the planting of forests.

The General Government passed a law known as "The Timber Act," giving a quarter section of land to any and every settler on her domain who would plant ten acres of timber. Under these influences there have been already planted of young forest trees more than five hundred millions. Although the East and the West are in some degree awake and actively engaged in the work, yet the work began too late to save the country from terrible want for a considerable period intervening, of necessity, between the extinction of the present wood-supply and the maturing of the young forests.

Great as the planting of timber has been, yet the work has but comparatively begun. The present amount of accessible timber in the country cannot supply the necessities and wood-want of the inhabitants of these United States, independent of foreign timber, fifteen years. These are demonstrable facts, shown by actual statistics. It is therefore a matter of stern necessity that the most active measures are set in operation to supply the wants of immediate coming generations.

The question arises, what varieties of timber shall we plant? I reply, there are two considerations which should govern our action. (1) Plant those varieties which most largely enter into human economies; (2) those varieties which have the most rapid growth.

There is another consideration which must not be lost sight of, without jeopardizing your enterprise, which is *soils* adapted to the timber to be planted; this must be carefully adhered to. For this information I refer you to a work entitled, "Report upon Forestry, by Franklin B. Hough," page 507 to 510; an article entitled, "Experiments of D. C. Scofield in Tree-planting at Elgin, Illinois; also of Samuel Edwards, of Mendota, Illinois;" also, on the pages 284 to 290 in the tenth annual report of the Horticultural Society of Northern Illinois.

First: The present commercial history of the transportation of wood-products carried on over our railroads and navigable waters, where well understood, as it should be by our citizens and land-owners, is, or would be, a sufficient indicator of the "signs of the times" pertaining to the future timber-want and their duty as philanthropists and Christians in regard to it.

Long has the work been in progress in the legitimate lines of commercial operations of cutting and carrying away the most valuable of our timber, embracing the black walnut (the mahogany of the United States), the cherry and the white ash, as well as the pine lumber, to our Eastern cities, and much of it over the ocean to nearly every city of importance in Europe. What does this mean? Simply this, that these woods have been swept away within the last two hundred years from a belt of land along the Atlantic, from the Canadas to the Gulf, a thousand miles in width, until to-day parties are largely engaged on these last confines of forest country, silently but surely, in hunting out the last of these stately walnuts, cherries and ashes, yea, and oaks too, that abounded in our woodlands. Why? To be wasted? No! Human want demands it; and shall we deny this heaven-born right? Nay, never. But now comes in the question, can the wants of the coming millions be supplied by any system of timber planting? We reply most emphatically, Yes.

When the people of a great country like ours proclaim to the world that they, of a truth, are incompetent to produce, from their own hills and valleys, mountains and plains, an abundant supply for all the necessities of the hundred millions which are to tread our soil and share in the blessings of our political and religious freedom, a dark pall will enshroud our prospects, and Tekel will be written upon our escutcheon.

We may enumerate by classes the woods or timber which may be successfully cultivated and enter into our economies.

The first is the conifers: White pine, European larch, Norway spruce, Scotch pine and American *arbor vitæ* (or white cedar). For ornamentation, the various *arbor vitæ*s, hemlock and red cedars.

Second class: (1) The American white ash is used for a great variety of economies and easily propagated on any dry and rich soils.

(2) The next in this class is the black walnut, one of the most valuable trees for furniture and commercial purposes.

(3) The white and English elms, the sugar and silver or soft maple and the Western catalpa.

While there are numerous minor varieties of less valuable, yet useful woods, among which is the basket willow, that may be made profitable on favorable locations, and these should have a place in the plantation; yet the above embraces the most valuable for building purposes and all the mechanic arts. I have omitted the live or English oak, which should be ranked among the first for ship-building and should be extensively planted in sections of country adjacent to the sea-board or great inland or navigable waters.

The methods of tree-planting and where the plants may be procured, and the specific uses of each variety of timber, and the profits to be derived from their cultivation, and all that is necessary to be learned in the premises, are found embodied in the late works of Arthur Bryant, Sr, entitled, "Forest Trees for Shelter, Ornament and Profit." Address the author at Princeton, Illinois; or they may be found in the volumes of the Transactions of the Illinois State Horticultural Society.

Dr. J. A. WARDER, President of the Ohio State Horticultural Society, forwarded to President Periam a paper read by him before a recent Agricultural Convention in that State, from which, at the President's request, the Secretary read the following extracts:

As yet little or nothing has been done among us in the way of forestry. Here and there a few trees have been planted, rather for ornament than for utility. The taste for the comfort and beauty of trees is growing, however, and of the thousands who daily travel along our great highways few are they who cannot admiringly appreciate the improvement by tree planting about the village stations, the groups of ornamental trees clustering around the rural homesteads, the lines of trees along the country roads and on the boundaries of cultivated fields.

These efforts of individuals to restore the sylvan beauties of the land are worthy of all praise. They are well supplemented by the Village Tree-Planting Associations, happily suggested and successfully carried out by Mr. Northrup, of Connecticut, who should have many followers in Ohio. Your attention is especially directed to his pamphlet.

Under the happy influences of the tree planters the cemeteries of our land are everywhere becoming the quiet resting places of the dead, sheltered by umbrageous trees, instead of the forlorn, desolate and neglected fields of the past—so unworthy of the title, God's Acre (Gottes Aker), and so discreditable to our boasted civilization.

Public and private parks are being set apart for the special culture of these beautiful natural objects, and they become the most agreeable resorts, and are means of instruction for the people. All these encourage a love for trees and increase our knowledge of them, and to that extent are accessory to forestry.

In this, however, the people of our country have much to learn; the general want of familiarity with our sylvan wealth, either collectively or individually, is a matter of surprise to those who have made this matter a study.

Upon this occasion it may be admissible to refer more particularly to a single tree, which is destined to become a factor of no mean importance in the future forests of our land, and through them to solve one of the great problems of the iron road, the cross-tie question and the future supply of sleepers.

We may be pardoned for having a State pride in this tree, for though not a native of Ohio, it was here that the distinctive characters of the *Speciosa Catalpa*, the western species, were first pointed out and presented to the public.

* * * * * Though it is not pretended that we have originated or created a new tree, we have presented one to the world that had heretofore escaped the observations and notice of the botanist. A tree of which it is said (by one who knows that whereof he doth affirm), "Every day's experience establishes me more firmly in the opinion that it (the *Catalpa speciosa*) will prove to be one of the very best, if not the very best tree in the middle American States, and with a southern limit very far beyond any of our northern trees."

* * * * * Certainly we already have many warnings that it is indeed high time for us to set about doing something towards the restoration of the forests, which the necessities of agriculture and the advancing wave of civilization have so rapidly diminished within a century of occupation in extensive regions of our noble State.

The clearing of the lands was a necessity for its occupation and application to agriculture. In this matter every landowner must be left free to decide for himself and for his own acres. No man nor set of men may let nor hinder him from destroying or restoring his forests. Nor can his movements be controlled by legislative enactments, as in other countries, since the policy of our republic is that of *non-interference*. But we have also an axiom in our policy, that the best plans are ever those which conduce to the greatest good to the greatest numbers of the people, and, whenever these may be presented in acceptable form, it is hoped and believed that such propositions will receive support.

So great is the American statesman's confidence in the general good sense of the people, and in their capacity for self-government, that all great questions may be safely left to the popular tribunal.

When new propositions happen to be presented to the people for solution, however, they may sometimes need a certain amount of educational training and enlightenment to prepare them for a wise decision.

The present theme is perhaps one of that character, to our fathers and to many of ourselves, who have lifted up axes upon the thick trees and prostrated those princes of the forest which had for centuries reared their proud heads and reigned as monarchs of all they might survey. Those of us who have laboriously cleared the land of these encumbrances have triumphed in the unequal contest, and may well congratulate ourselves on having released the fertile soil from its forest thralldom, to receive the vitalizing sunshine, and to smile for us with productive farms and happy homes, surrounded with luxuriant fields of food crops for man's use, convenience and enjoyment.

Flushed with our triumphs over barbaric nature, such may ask, "Why plant more trees and again relegate these smiling fields to the bondage of the savagism of the forest times?"

No! this clearing of our fertile lands is indeed right and proper; it will go on, and it should continue for a *certain period* and to a *certain extent*. Whatever this extent may be must depend upon so many circumstances connected with the physical conditions of a wide extent of territory that the problem becomes difficult of solution and requires for its proper consideration a knowledge of many branches of natural history. It need not now be discussed; suffice it that man's experience and observations in other regions of the globe will aid us in attempting a solution. From these we learn that from one-fifth to one-fourth part of any considerable stretch of country should be occupied by trees, in order to produce the best results in the physical conditions necessary for the greatest productiveness of the soil, and for the highest development of humanity.

* * * * * It appears that in the course of seven years the area of the woodland in Ohio was reduced from about 9,750,000 in 1870 to a little more than 5,000,000 acres in 1877.

This shows that more than four million acres of woodland, nearly one-half of that returned by the last United States census, have been destroyed in the brief period of seven years! Should these figures prove to be correct, they show a frightful destruction of our woodlands, which must be followed in the future by their legitimate results of altered and deteriorated climate, diminished fertility and productiveness of the soil, in some places approaching barrenness, in the drying up of springs and streams, with irregu-

larity in the flow and discharge of our navigable rivers, and eventually in the relegation of our fertile fields to barrenness and desolation. * * * What has been *may again* and *will again* recur. The most fertile regions of the old world, when subjected to similar treatment, have reached this sad result. Under the infliction of such ill-treatment and abuse of God's gifts it is but a question of time when the sad but inevitable results must follow, and our now fertile plains be reduced to deserts.

The traveler, Champollion, when speaking of the great desert of Sahara, in Northern Africa, where he had traced the source of former rivers and streams, and had found stumps of trees covered by several feet of sand, makes the following remark: "And so the astounding truth dawns upon us that this desert may once have been a region of groves and fountains and the abode of happy millions." * * * He asks, "Is there any crime against nature which draws down a more terrible curse than that of stripping Mother Earth of her sylvan covering? The hand of man has produced this desert, and, I believe, every other desert on the surface of the earth. Earth was Eden once, and our misery is the punishment for our sins against the world of plants. The burning sun of the desert is the angel with the flaming sword who stands between us and Paradise."

The countries bordering on the Mediterranean, on all its sides, were once well wooded, fertile, fruitful regions, sustaining a dense population. With the centuries came the undue destruction of the forests, and the consequent loss of fertility, followed by diminished population. Look at the famous regions to the eastward, Palestine, the land of groves, the land that flowed with milk and honey; see the adjoining regions, now marked by the mighty ruins of Palmyra and the cities of the plain. Beyond these, see the broad fields of Persia, whence Alexander drew his mighty armies, and observe the once fertile valleys of the Tigris and the Euphrates, where stood the luxurious Babylon, the Great, but Fallen; all these once populous regions are now deserted, and literally become the habitation of bats and owls, in fulfillment of prophecy, clearly traceable to the destruction of the forests!

Even in our own favored land, here in this new world, these scars upon the face of nature already begin to appear, and in some places on the Atlantic border tracts of farming land are already turned out us unproductive wastes.

Yes! verily, my friends, it is indeed time that we were thoroughly aroused to the importance of this matter of the conservation of our forests. We should plant shade trees and groves, shelter-belts and woods; yes, and where suitable conditions exist, we should also plant extensive forests for the sake of their future prospective, but certain benefit to ourselves, and to those who are to come after us. Why will we not learn from the experiences of past ages, which is everywhere expressed so plainly in the history of nations, and *impressed* so manifestly in the *desert scars* of the earth?

Let us take warning betimes and begin now, and at once undertake *the preservation of our forests*.

Forests are the conservators of moisture, the sources of the streams. The Tree is father to the rain, was a favorite saying of Mahomet.

Then, again, we must remember that time is needed for the production of a tree. The botanists call them *perennial* plants, because they continue their existence *through* the years. Vegetables of this class do not build up their massy structures, composed of concentric layers of solid fiber-cells, with the rapidity of the fungi, some of which will evolve millions of their cells in a few hours, visibly enlarging while we behold.

Nor can the trees be compared in their periods of growth, and the quickness of their cash returns, with the familiar tillage crops of the agriculturist. The weeks and months needed for the production and perfecting of garden and farm crops are represented by the decades and centuries of years required for clothing the denuded surface with forest growths of mature and useful size. It is, therefore, high time to begin the work.

Be not discouraged, however. Trees grow fast enough. One of the classic writers of the age, who fully appreciated trees, put his own sentiments into the mouth of one of his rustic characters when he wrote, "Be aye sticking in a tree, Jock, it will be growing the whiles ye are sleeping." *

Those of us who are now past middle life, no doubt many of you now present, can point to noble trees which have grown within your own recollection; some of them

perhaps were planted by your own hands. Strange as it may be, however, it seems nevertheless true, that old men, those who cannot expect to see nor to reap the fruits of their labors in forestry, are the most energetic tree-planters, rather than those just entering upon life with a bright future opening up to them decades of prospective enjoyment, and with a reasonable expectation of life even comparable to the term necessary for the development of a useful tree. Old men are proverbially the tree-planters everywhere.

In regard to their periods of development, there is a great diversity among trees; some have a brief rotation. The coppice growths in European forestry are often utilized in periods of ten or fifteen years; in our own country, too, we have many trees of short rotation, and some of the most useful and most profitable trees are of this character.

The *Black locust* may be harvested after it has grown from twenty to thirty years.

The *Catalpa speciosa* in the same period will make good cross-ties and fence posts.

The *Ailanthus* very soon attains a useful size, and for certain purposes has been very highly commended, both in this country and in Europe. Prof. C. S. Sargent is advising its extensive plantation, and some years ago it was spoken of as the most promising tree for the arid plains of the Southwest.

The forests of *Scotch pine* in Germany are allowed sixty years to reach their useful size for fuel and for timbers.

The *Birch* there reaches its maturity in about half a century.

The *Willow* used for charcoal needed in the manufacture of gunpowder may be cut after growing twenty years or even less.

Chestnut, in its second growth, is most profitably cut every twenty or twenty-five years.

The beautiful wood of the wild cherry soon reaches a profitable size for many purposes, though for saw-logs and lumber the trees should be larger.

Many individual trees, planted by the pioneers upon the broad plains of Nebraska, within the few years the white men have occupied the so-called "American Desert," have already attained to useful size and will yield each a cord of firewood to cheer their owners. While the census reports represent the extent of woodlands in Ohio as covering about one-third of its total area, which is a full ratio for lands situated like ours, we are not informed as to its condition. The skillful forester, however, cannot fail to observe that these tracts are very far from being in a condition to yield the best results, either economically or in their influence upon the climate and water-courses of the adjacent regions, and he finds them much less satisfactory in regard to their own improvement and perpetuation by succession.

Nearly all our woodlands have been culled severely, robbed of their most valuable products and species; they are rarely in a condition for natural reproduction. In many cases they have been carefully cleared up, aye, cleaned up, by the removal of their undergrowth, both of bushes and of young forest trees, and they are even deprived of nature's own favorite carpeting, composed of the fallen spray, the leaves, the logs, with the mosses and lichens that feed upon these decaying tissues. All these make up an admirable mulching material that prevents evaporation, and which receives and retains the fallen rain, that quietly sinks into the mellow soil beneath, but which, when falling upon the bared surface of cleared lands, quickly escapes in rushing and destructive torrents. Some very neat and would-be careful and economical farmers, after thus cleaning up their woodlands, attempt to render them profitable by laying them down to grass, and then use the woods as pasture fields; very beautiful they are considered by the poet, but not by the forester, who sees in all this but the garnished tomb of the trees.

Yes, my friends, the time has indeed arrived when we, as a people possessing a full share of common sense, ought to realize the absolute necessity for devoting a portion of our energies and intelligence to the conservation and care of our sylvan treasures, and this will be followed by planting anew the waste tracts, and untillable hill-sides and corners, or rocky ledges, with suitable trees.

We should plant forest trees for ornament to the landscape.

We should plant them for shelter to our crops, our cattle and ourselves.

Trees should be planted to guard against the failure of the water supply of the country.

Woods should be preserved for their influence in regulating the temperature and humidity of the atmosphere, for it is established by long-continued observations made at the forestal stations of Europe that the woods *are cooler in summer and warmer in winter*, and that they contain more moisture when compared with tracts of open lands in the same regions.

Finally, we should plant forests, were it even for their use and for the valuable products they yield for our consumption in the multifarious demands of civilized life.

FINAL RESOLUTIONS.

The Committee on Final Resolutions presented the following report:

Resolved, That the thanks of this Society are due and hereby tendered to the City Authorities of Elgin for the use of their hall for the meetings of the Society; also, to the citizens of Elgin who have so cordially entertained members of the Association; and to the proprietors of the Waverly House for reduction of rates to members.

Resolved, That for the faithful and energetic labors of the officers of this Society during the past year we tender to them our most hearty thanks.

Resolved, That the South Park and Lincoln Park Commissions, and Edgar Sanders, of Chicago, and B. O'Neil, of Elgin, for their liberal contributions of flowers and plants, are entitled to the thanks of this Association.

Resolved, That by the readiness with which the several railroads mentioned have extended the courtesies of reduced rates to members of the Society we recognize their appreciation of our labors to improve and beautify our land; and we extend our thanks to the officers of the following roads: Chicago & North-Western; Chicago, Rock Island & Pacific; Chicago, Burlington & Quincy; Illinois Central and Chicago & Pacific.

Resolved, That the thanks of the Society are due and most heartily tendered to Prof. Cyrus Thomas and Hon. James Shaw for their very entertaining and instructive addresses.

(Signed)

JAMES CROW,
H. D. EMERY,
A. BRYANT, JR., } *Committee.*

The resolutions were unanimously adopted.

The Society then adjourned, to meet at Franklin Grove, at the call of the President, in January, 1881.

HORTICULTURAL SOCIETY OF NORTHERN ILLINOIS.

ANNUAL MEETING FOR 1881.

The fourteenth annual meeting of the Horticultural Society of Northern Illinois will be held at Franklin Grove, on Tuesday, January 25th, and continuing three days.

Railroads and hotels will give liberal reductions of rates; the proceedings will be varied, interesting and instructive, and no pains will be spared to render the meeting equal to the preceding ones in all respects.

W. A. PRATT, *President.*

D. W. SCOTT, *Cor. Sec'y.*

HORTICULTURAL SOCIETY OF NORTHERN ILLINOIS.

OFFICERS AND COMMITTEES FOR 1880-81.

President.—Dr. W. A. Pratt, Elgin.

First Vice-President.—Jonathan Periam, Chicago.

Second Vice-President.—A. R. Whitney, Franklin Grove.

Third Vice-President.—Arthur Bryant, Jr., Princeton.

Corresponding Secretary.—D. W. Scott, Galena.

Recording Secretary.—O. B. Galusha, Morris.

Treasurer.—L. Woodard, Marengo.

COMMITTEES.

Cultivation of Apple Orchards.—Samuel Edwards, Mendota; A. R. Whitney, Franklin Grove; S. G. Minkler, Oswego.

Entomology.—Prof. Cyrus Thomas, Carbondale; Miss Emily A. Smith, Peoria; D. B. Wier, Lacon.

Gathering and Keeping Apples.—James Crow, Crystal Lake; S. M. Slade, Elgin; J. S. Rogers, Marengo; D. J. Piper, Foreston.

Cherries—Culture and Varieties.—H. C. Graves, Sandwich; H. Dunning, Jefferson; F. C. Johnson, Kishwaukee.

Grapes—Culture and Varieties.—C. H. Atkins, Arlington Heights; J. B. Klump, Willow; D. W. Scott, Galena.

Vegetable Gardening.—E. C. Hatheway, Ottawa; W. L. Robbins, Carpenterville; H. W. Austin, Austin.

Greenhouse and Window Plants.—P. S. Peterson, Chicago; H. W. Williams, Batavia; B. O'Neil, Elgin; H. Grommer, Galena; Frank Ludlow, Naperville.

History and Progress of Horticulture in Northern Illinois.—D. W. Scott, Galena; L. K. Scofield, Freeport; H. D. Emery, Chicago.

Vegetable Physiology.—Dr. L. S. Pennington, Sterling; Mrs. C. S. Harris, Galena; Byron D. Halstead, New York.

Geology and Soils.—Hon. James Shaw, Mt. Carroll; Dr. Joseph Teft, Elgin; E. H. Beebe, Geneva.

Ornithology.—A. L. Cumings, Galena; C. M. Douglas, Waukegan; Jesse Whitney, Franklin Grove.

Landscape Gardening.—Hon. G. P. Lord, Elgin; J. P. Bryant, Princeton; Frederick Kantz, South Park, Chicago.

Small-Fruits, Embracing Berries.—Hon. L. Ellsworth, Naperville; G. H. Clayson, Nunda; D. B. Wier, Lacon; Hugh Todd, Elgin; Frank Webster, Waterman.

Plums—Culture and Varieties.—L. K. Scofield, Freeport; A. Bryant, Jr., Princeton; Geo. W. Garrett, Roscoe.

Timber Planting for Economic Uses.—Robert Douglas, Waukegan; A. Bryant, Sr., Princeton; D. C. Scofield, Elgin; Henry Hausen, Franklin Grove; Thomas Gilkerson, Marengo.

Culture of Evergreens.—S. G. Minkler, Oswego; Samuel Edwards, Mendota; L. E. Rogers, Marengo; D. Hill, Dundee.

LIST OF MEMBERS

FOR 1880-81.

NAME.	ADDRESS.	BUSINESS.
Atkins C. H.	86 N. Clinton st., Chicago.	
Austin A. B.	Downer's Grove.	Nurseryman.
Austin H. W. & Co.	192 Lake street, Chicago.	Pumps and Farm Implements.
Barnes H. B.	24 South Canal st., Chicago.	Farm Machinery.
Bradley David.	56 Desplaines st., Chicago.	Treasurer Furst & Bradley Mfg. Co.
Bristol E. S. & Co.	30 So. Canal st., Chicago.	Farm Machinery and Seeds.
Britton G. H.	Udina.	Propagator and Dealer in New Varieties Potatoes.
Bryant A., Jr.	Princeton.	Nurseryman.
Buchanan, Kobs'n & Co.	137 Kinzie street, Chicago.	Grass and Field Seeds.
Ruckland R. A.	Ringwood.	
Clayton G. H.	Nunda	Small-fruits.
Colby C.	Benton Harbor, Michigan.	Fruit Packages.
Corbett W. W.	Chicago	<i>Farmers' Review.</i>
Crow James.	Crystal Lake.	Fruits and Greenhouse Plants.
Cummings A. L.	Galena.	
Deering William.	Plano.	Manufacturer Marsh Harvesters.
Dickinson Albert.	110 Kinzie street, Chicago.	Grass and Field Seeds.
Dunning A.	Jefferson.	Nurseryman.
Dysart Samuel.	Franklin Grove.	
Ellsworth Lewis.	Naperville.	Nurseryman.
Emery H. D.	Chicago.	<i>Prairie Farmer.</i>
Galusha O. B.	Morris.	Proprietor Eclectic Small-fruit Nursery.
Garrett G. W.	Roscoe.	
Garrison J. H.	Greenwood.	Grower of New, Choice Potatoes.
Gilkerson Thomas.	Marengo.	Nurseryman.
Glenn T. H.	118 Monroe street, Chicago.	<i>Prairie Farmer.</i>
Graves H. C.	Sandwich.	Nurseryman, Root-grafts and Seedlings.
Hallett T.	Galena.	
Harris Mrs. S. C.	Galena.	
Hansen Henry.	Franklin Grove.	
Hill D.	Dundee.	Nurseryman.
Hintz W. H.	Elgin.	
Hovey & Co.	56 E. Madison st., Chicago.	Flower and Vegetable Seeds.
Johnson F. C.	Kishwaukee.	
Klump J. B.	Willow.	
Lord G. P.	Elgin.	
Minkler S. G.	Oswego.	Orchardist and Nurseryman.
Norris William M.	Marengo.	Nurseryman.
O'Neil B.	Elgin.	Greenhouse.
Pennington Dr. L. S.	Sterling.	Farmer.
Periam Jonathan.	Irving Park.	
Peterson P. S.	164 LaSalle street, Chicago.	Nurseryman.
Piper D. J.	Foreston.	Fruit Grower.
Pratt Dr. W. A.	Elgin.	Nurseryman and Fish Breeder.
Prescott C. W.	Marengo.	Nurseryman.
Ricker E. H.	Elgin.	Nurseryman.
Robbins W. L.	Carpenterville.	Fruit Grower.
Rogers J. S.	Marengo.	Nurseryman.
Scotfield D. C.	Elgin.	
Scotfield L. K.	Freeport.	
Scott D. W.	Galena.	Nurseryman, etc.
Slade S. M.	Elgin.	Nurseryman and Fruit Grower.
Tefft Dr. Joseph.	Elgin.	
Thomas Cyrus.	Carbondale.	State Entomologist.
Thompson George.	Geneva.	
Todd Hugh.	Elgin.	
Vaughan J. C.	40 LaSalle street, Chicago.	Dealer in Seeds and Bulbs.
Webster Frank.	Waterman.	
Whitney A. R.	Franklin Grove.	Nursery, Orchard, Cider and Vinegar.
Wilcox Sylvanus.	Elgin.	
Williams H. W. & Son.	Batavia.	Nursery and Greenhouse.
Williams John.	South Haven, Michigan.	Evaporator.
Woodard L.	Marengo.	Small-fruits.

WARSAW HORTICULTURAL SOCIETY.

PROCEEDINGS FOR THE YEAR 1879.

REPORTED BY JAS. T. JOHNSON, *Secretary*.

ORCHARDS—PAST AND FUTURE.

READ BEFORE THE WARSAW HORTICULTURAL SOCIETY, MARCH 19, 1879, BY JAS. T. JOHNSON.

Mr. President and Gentlemen:

As requested, I give you a few thoughts on the subject assigned me—Orchards, past and future—and while I may speak of all the various fruits of the orchard and garden, I shall speak chiefly of the Apple. The first division of our subject is of some importance in furnishing a long line of landmarks to aid us in our endeavors to avoid the breakers upon which others have been wrecked, but the orchard of the future is what chiefly interests the public.

The last quarter of a century (which is only a few years more than the age of our Society) has witnessed a vast increase in the area of land given to orchard culture, and also in the ardor and zeal with which men have sought a more perfect knowledge of the business, until now we trust we can see a general awakening all along the line, and that ere long we "shall reap, if we faint not," the grand results of intelligent labor.

Then, in regard to the orchard of the past. We deem it only necessary for us to say that history indicates its existence in all ages from the time of our father Adam, and that its culture has steadily increased in importance from that until the present time. And we make the broad assertion, that to-day it is one of the most pleasant, most profitable and most gratifying of all the pursuits of our rural population, well knowing at the same time that we make this assertion in the face of the fact, now patent to all, that we have legions of enemies to contend with—that insects infest all fruits grown either in the orchard or garden. Besides, we have climatic and atmospheric difficulties which beset us upon every hand. Yet when we consider the importance of the fruit interest of a world we are made to exclaim with the lamented Greeley, "we *must* fight our paltry adversaries more efficiently," we *must* have a more perfect knowledge of our business, we *must* have the orchard of the future.

The long experience and persistent study by members of our Society has brought out many important facts, and the same persistent study and effort will demonstrate other facts which must enable us to avoid much of our present annual loss.

The history of orcharding in our State began with the French settlers at Kaskaskia nearly two centuries ago, the first orchards being raised from seed planted at that place by Father Marquette and his followers, about 1683. But for the first century and a half succeeding this the orchards of Illinois (if orchards they could be called) only consisted of a very limited number of sadly neglected seedling trees, mostly of apples.

And it was not until about the year 1818 that grafted fruit began to be introduced into the State of Illinois. But even then and almost up to the present time orchards have been planted at the risk of many sad mistakes, as to what to plant and how to cultivate or manage. More than one thousand varieties of the apple alone have been tested and found worthless, or nearly so, and still further investigation is necessary before we are able to say how many other varieties must be discarded before we arrive at a definite conclusion as to what we shall plant in the future orchard.

Since the organization of the Warsaw Horticultural Society the increase in the planting of orchards has been truly wonderful in the vicinity, while the increased cultivation of small-fruits and flowers has been even more marked; and although we have met with many, very many losses and discouragements, still the love of the good, and the admiration of the beautiful, is so great that sooner or later we must overcome all. We cannot afford to turn back; the future orchard must needs be planted. Then, what shall we plant? This depends to a great extent upon our location and business. If a general farmer, your orchard may be less in extent, and different in the varieties you cultivate, from that of one whose chief business is that of an orchardist. Again, if you are near a great market for fruit, you can afford to plant more of early or perishable kinds than you could if distant from any large market.

Our best early apples are Red Astrachan, Early Harvest, Summer Pearmain, Benoni, William's Favorite and Golden Sweet. Our best fall apples are Maiden's Blush, Rambo, Mother-and-Bailey Sweet. Our best winter apples are Ben Davis, Janet, Jonathan, Red Canada, Wythe, Grimes' Golden, Kentucky Sweet and Broadwell. This will give you a good succession of apples, and of kinds that are known to grow with a good degree of success in this region.

Our future orchard should contain also pears, peaches, cherries, grapes, and all the small-fruits which are found to succeed in our locality, so that we may be able to eat of all the good things which Nature has placed within our grasp. Then the future orchard should be selected with special care as to kind and quality of tree; should be planted with equal care as to style and distance; should receive thorough cultivation and training until the trees become established and formed.

In planting or in pruning I would have neither low heads nor narrow rows. I would give apple-trees four or five feet of body before heading, and plant not less than thirty feet apart in the rows. Then I would play the "Yankee" more, that is ask questions, find out what others have learned in the business, and then I would profit by their experience.

MARCH MEETING.

The March meeting was held March 19th, 1879, in Warsaw, Mr. C. N. Dennis, of Hamilton, acting as Secretary *pro tem*. This was one of the best meetings ever held by the Society; the room was filled with the most extensive farmers and fruit growers of Hancock county, and each individual seemed to come with something of interest for such an occasion. Specimens of fruits in their season were numerous and in fair condition. Cider of excellent quality, made from the Virginia crab, was on exhibition by Mr. Geo. O. Hilton, of Lee county, Iowa. Each member of the Society was treated to a volume of the National Report on Agriculture, and also a volume of the State Report on Agriculture.

Letters were read from Hon. Sam'l Douglas, V.-P. Ill. State Board of Agriculture, and also from F. G. Wilson, of Sangamon county. Mr. Wilson said he read our reports with deepest interest; that the information gained from the Warsaw Society was a benefit to the entire State. Mr. Wilson again called attention to his theory of ringing the apple-tree;

said the first cut around the trunk of the tree must be deep enough to enter the sap wood of the tree; the second cut should be light, only sufficient to raise the bark; a very narrow belt around the tree, if done a few days before blooming, he was confident would give good results.

After further discussion it was decided to hold the floral fairs this year at Warsaw and Hamilton, in May and June, as the season may best suit.

Committee on Floriculture report as follows:

Miss Hattie Dorman said: My house plants all frozen; half hardy garden plants promise well, such as pansies, sweet williams, dianthus, etc.

Mrs. M. E. Dennis said her out-door plants are all right; house plants are doing well, but have small black flies on them.

C. N. Dennis said out-door plants had been some hurt by recent severe weather.

REPORT ON ORCHARDS.

BY A. C. HAMMOND.

Notwithstanding the low temperature of the last half of December and January, it was hoped that the mature condition of the wood and buds would save our fruit-trees from serious injury; but contrary to all expectation, we find apple-trees—especially those over ten or twelve years of age—more seriously injured than ever before.

The injury is mainly in the albumen or inner bark of the trunk and larger branches; sometimes on one side of the tree and then on the other, and again the entire trunk will be black, in which case the death of the tree will surely follow. Orchards that were well cultivated and in a thrifty condition, and those that were weakened by overbearing, seem to have suffered most, but this is not universally the case, as one tree will often be found badly injured and the next one perfectly sound. This would indicate that the low temperature was not the only cause of injury; but what other causes may have combined to produce it I am unable to understand.

A peculiar feature of this disaster is, that the reputed tender varieties, such as Rambo, Maiden's Blush and White Bellflower, are less injured than Ben Davis, Janet and Little Romanite. In my own orchard Janet has suffered more than any other variety.

The canker-worm threatens to be very destructive in some orchards this season. I herewith present specimens of the moth—both male and female—taken from the orchard of Capt. Hill, where they are so abundant that they will defoliate the trees and destroy the crop unless checked by artificial means.

A. C. Hammond showed specimens of canker-worm—moth and eggs.

C. C. Hoppe showed a completely petrified moth.

Mr. Ames wanted to know if cold would kill insects.

Mr. Hammond said cold never kills the eggs; the insects are sometimes killed.

Whitaker said the insect will sometimes freeze and thaw again, and not be killed. He predicted that the injury to trees from cold the past winter would prove extensive. The natural condition of the tree was to have the roots frozen, but the past winter had frozen the tops, while the roots were protected by a heavy bed of snow.

Mr. Piggott thought some trees were more injured than others, because more full of sap.

Mr. Spitz thought most kinds were hurt this winter, but some showed the injury nearer the surface than others. Apple-trees at two years old were not hurt, while peach-trees of all ages were injured.

Mr. G. O. Hilton, of Lee county, Iowa, had found no damage to his nursery stock, except the Red Canada, which was some cracked below the snow-line. He had seen them in this condition before, and had known them to make good trees afterward.

Mr. Chittenden thought gradual cold would not crack trees, while sudden cold would.

W. S. Grover said the cold of this winter had opened the old cracks of four years ago.

Committee on Small-fruits report more or less killed back, depending on the locality.

Mr. Stracke said Concord grapes were not hurt, but all tender varieties had been.

The essay on the subject of "Orchards, Past and Future," was read by James T. Johnson, and on motion of Messrs. W. N. Grover and C. N. Dennis was asked for publication. Several members recommended the essay as eminently sound and practical.

G. O. Hilton, Esq., was made an honorary member of this Society. After tasting the various fruits on exhibition, adjourned.

MARCH MEETING.

The Society met at their rooms in Marsh's building on the 23d inst.

The attendance was good, the proceedings interesting throughout, and it is a matter worthy of note that these meetings are constantly growing in interest and in usefulness.

The standing committees report as follows:

On Horticulture—C. N. Dennis said spring planting of flowers was progressing favorably, and with an increase of interest in the cultivation of new varieties.

On Entomology—B. Whitaker reports, that the hibernation of insects being, for the most part, in the earth, we may expect that many were preserved by the deep snows of the past winter. We have now (23d of April) the second visitation of gnats this season, both species of which are indigenous to the mud and water. The month of March may have destroyed some of our insect enemies.

On New Fruit—A new apple, the "Salome," from E. C. Hatheway, of LaSalle county, Ill., was laid before the meeting. Mr. Hatheway said the fruit of this variety did not color up near so highly this year as it had in other years; wet weather had made the difference; it was usually a fine red color; he had kept it packed in barrels all winter, and had not found one unsound "Salome," while he had been compelled to dispose of all his other apples, and all had been treated alike.

Mr. Hatheway asked for a full and fair test. He wanted an HONEST opinion in regard to this apple; he wanted *no flattery*; he would have the opinion of solid men (horticulturally speaking), and if, all things considered, it did not deserve to be disseminated, it should not be done by him.

The apples were cut, and fully tested as to quality, and Messrs. Grover, Dennis, Brown, Hilton and others (all practical orchardists or nurserymen) expressed the opinion that they were not fully prepared to recommend this apple on so short an acquaintance. A number of these apples were laid aside for further examination in next month.

Mr. Hatheway claims for this apple good bearing, good keeping, good eating and good cooking qualities, and that it never drops prematurely from the tree.

On Orchards—E. McCune reports the Yellow Bellflower, Ben Davis, Winesap and other winter varieties of like characters as being on the eve of a fair bloom. The prospect for apples is ordinary; apple-buds for the most part are all right, but the trees are (many of them) in bad condition. G. O. Hilton said there was a good prospect in southeast Iowa for most all winter varieties, while summer varieties, especially those which overbore last year, will be short. Many trees were injured by the winter. William Gray, of Wythe, and J. T. Johnson, of Wilcox, report their orchards in a favorable condition.

On Small-Fruits—Mr. Dennis said (for the most part) berry-bushes were killed to the snow-line, but as the snow was deep we will have some berries. Strawberries were all right.

Messrs. Gillham, Hilton, Safford and others had (after all) some peach-blooms.

On Young Trees—Some early cherries may be expected, but in the main the early cherry crop is killed. Morellos promise well.

Mr. Fletcher would have berries on his last year's setting of raspberries. Mr. T. H. Brown's red raspberries were wholly uninjured. Mr. Safford would cut back all young trees that were injured by the winter, and thereby secure a growth of good sound wood.

Fruit Display—Geo. O. Hilton, of Lee county, Iowa, added to the Society's usual fine collection a large display of apples, to which members did ample justice during a recess for sampling.

MAY MEETING.

For this very busy season the meeting held on the twenty-first of May, at the rooms of Marsh & Marsh, in Warsaw, was well attended.

Apples shown in good condition were Ben Davis, Winesap, Janet, Wythe, Red Canada, Ladies' Sweeting and "Salome." This is the season of the year to test the keeping qualities of apples, and we (the Secretary) feel compelled to say that any apple that will keep through May as firm and sound as other apples in December is well worthy of further trial, and this is what we find the new apple "Salome" is doing. There was not a defective Salome to be found.

On Floriculture—Miss Hattie Dorman, of Hamilton, said roses and all other flowering shrubs (after being cut back) are in thriving condition

with promise of abundant blooms. Perennials are looking well. Annuals were not very forward on account of the very dry weather. House plants in good condition.

H. D. Brown said all the fine roses had been killed the past winter to the snow-line, but new wood had done well and fine specimens of roses may be expected.

C. N. Dennis recommends the climbing rose, *Prairie Queen*; it had stood the winter finely.

J. T. Johnson reported a small dark-gray beetle working on the terminal buds of the hard maple, the linden, and some other trees, and the leaf-lice working on the apple, both fruit and foliage.

On New Fruits—Mr. Dennis said the *Crescent Seedling* strawberries are doing well; they are vigorous and prolific; the *Crescent* plants have double the fruit of the *Wilson*.

The Sweet Home raspberry was spoken of as being hardy and prolific. Ripe strawberries were on the tables from the grounds of the Secretary. They were the first home grown of the season.

On orchards and orchard crops, A. C. Hammond, Esq., from committee, handed in the following report:

ORCHARD REPORT.

The prospect for an apple crop is much less favorable than two weeks ago. Notwithstanding the favorable conditions that have prevailed many varieties have nearly all dropped from the trees. *Winesap* and *Bellflower* will as usual be a failure. *Ben Davis*, *Jonathan*, *Grimes' Golden*, *Red Canada*, and possibly a few other varieties, are a moderate crop, although they have yet to run the gauntlet of canker-worms, codling-moths, scab, high winds and hail storms.

The canker-worm is the most troublesome enemy we now have to contend with, and unless vigorous measures are adopted to check their ravages, or they are carried off by natural causes, they will prove as destructive to the orchards as the chintz-bugs did to farm crops a few years ago.

The effect of the terrible cold of the past winter can now be seen in the orchard. Many trees dead, others dying, and yet others so badly injured that a protracted drouth will prove fatal to them. In my orchard about five per cent. are dead and dying, and as many more so badly crippled that they may ultimately die.

The present probability of a fruit crop is about as follows: Peaches, pears and cherries will yield next to nothing. Early apples, in about the same condition; but a few varieties promise to produce a fair crop.

W. N. Grover had had a moderate bloom on his *Janet* orchard, but after such a winter as last he was prepared to hear of blasted prospects.

C. W. Ames said his apple-trees were in a much better condition than last year; most of his trees were still full of fruit; his apple orchard never looked better.

Joseph Bolt said his *Ben Davis* were very full; they bore every year, but heavier some years than others.

If rain comes soon, strawberries may be a middling crop; all other berries will be scarce.

Mr. Safford will have *Lawton* blackberries.

Messrs. Isaac Bliss and A. C. Hammond would both have the *Snyder* (full), while both *Lawton* and *Kittatinny* were a failure.

Mr. Fletcher would have a crop of Davison's Thornless raspberry; they were not injured on his grounds.

Mr. Bolt said on high lands the blackberry had stood the winter better than on the low or flat lands.

On vegetables, C. C. Hoppe reports prospects now good.

On nurseries, H. D. Brown reports all the Ben Davis over one year old sold. The weather is too dry for young grafts. Peaches of the yellow kinds were mostly injured by the winter.

C. N. Dennis said in nursery apple-trees were unhurt, peaches were in a sad plight, small-fruits were some injured, but as a whole nursery stock is in fair condition, but making poor growth.

The Society will hold a grand floral fair and basket picnic at City Hall, in Hamilton, in June. Arrangements will be made at once. All are requested to be present and lend their assistance. Miss Emma Smith, Professor of Entomology, will be present and lecture.

Essay (special) on garden products was read by H. D. Brown, of Hamilton, and recommended for publication.

Several members objected to fencing gardens to keep out chickens.

I. H. Brown said chickens were a benefit to gardens and should only be kept out at times.

Mr. Hoppe keeps burnt bone dust, meat, grain, or whatever his fowls want. His fowls do no harm in the garden.

Mr. Ames would raise tomatoes enough for the chickens as well as for the family. If full fed, chickens will do no harm.

Mr. Bolt would keep blackberries out of the garden.

Mr. Chandler said it was best to give room for gardening, without being too much cramped by fencing, so you may cultivate in rows and with horse power.

Adjourned to meet at City Hall, in Hamilton, next month.

JUNE MEETING.

This, the largest meeting ever held by the Society, foreshadows fully the great and growing necessity for a good county fair in old Hancock, and which should be looked after without further delay.

THE DISPLAY.

On entering the hall we passed an arch of mountain ash, in full foliage, a very tasteful arrangement. Along the center of the hall were tables of rich bouquets, rustic and ornamental flower stands, frames and trellises covered with rarest flowers and plants of rich and beautiful foliage.

In the center was a handsome and attractive display by our young friend V. R. Faught, of Montobello, a very ingenious arrangement of rustic work and flowers; in this admirable arrangement nature and art were most happily blended. His "Old Cabin Home," cradle of flowers, etc., etc., were much and very justly admired.

A beautiful and very large collection, by Mrs. Dr. N. Lyon, occupied the entire front of stage, and we could hardly imagine a more delightful scene; the central figure, a pyramidal flower-stand, covered with choice and rare plants and flowers, was surmounted by an aquarium of fishes, and all overtopped by a very ingenious little fountain in full play.

Going back to the entrance, and coming along the east wall, we found a very full collection of the many varieties of beautiful ferns.

Then came a fine collection of lilies, conspicuous among which were those beautiful "callas."

Next were two long tables of rare and beautiful plants from the greenhouses of C. Laisle, of Keokuk, Iowa, while at the extreme right was a table devoted to fruits, grains and vegetables, of which there was a good display.

Among the apples of '78 still in fair condition were Ben Davis, Wythe, Janet, Red Canada, Ladies' Sweet, Forest Crab and "Salome," while the Carver Seedling, a fine new raspberry, a berry originated in this vicinity, was much admired as the central figure of this table.

Returning once more to the entrance and taking the west side of the hall we found a grand display of the many varieties of the cactus, the *Yucca filamentosa*, and many other rare and beautiful plants and flowers in endless profusion. This space was taken by Mrs. C. N. Dennis, Mrs. S. A. Clapp, Mrs. Potts, Mrs. Dr. Githens, Mrs. U. N. Cutter, Mrs. Conable, Miss Hattie Dorman and many others whose names have been mislaid by us. This side of the hall was very attractive and we only regret our own inability to do justice in the descriptions.

As a whole the entire arrangement of the display was tasteful and beautiful, and to the many ladies and gentlemen of the city and vicinity the officers and members of the Warsaw Horticultural Society will ever feel grateful for their untiring efforts in making this the best and most successful fair ever held by the Society.

BUSINESS.

After dinner Mr. President called order, and the divine blessing was invoked by Rev. Mr. Russ. On motion all business not strictly necessary was omitted. The President and Secretary were authorized to make the usual fruit exhibitions of this Society for 1879, and Messrs. C. N. Dennis, C. C. Hoppe and the President and Secretary were appointed a committee to take into consideration the propriety of an excursion during the present year by this Society and to report at our next meeting.

Prof. T. J. Burrill, President of the Illinois State Horticultural Society, was introduced and further entertained the meeting, but owing to the overcrowded condition of the audience his remarks were very brief. (Prof. Burrill lectured again at seven o'clock, but we were not present.) This gentleman paid a high tribute to the Warsaw Society and to the hospitality of our citizens here.

On motion, a vote of thanks was tendered the citizens of Hamilton and vicinity; to the two fine brass bands of Elvaston and Hamilton; to

the Glee Club of Hamilton, and to one and all who have so earnestly worked and generously contributed to the success and pleasure of the occasion.

AUGUST MEETING.

The meeting for August was held at Wild-Cat Springs, Hamilton, one of the grandest and most inviting spots in the vicinity of the lower chain of rapids on the great "Father of Waters." But having on a former occasion described this romantic spot we will only add that these springs need to be seen to be appreciated, and the people of Hamilton are justly proud of this magnificent resort.

The day was delightful, the air pure and balmy, and all nature had on its most beautiful robes. The attendance was excellent, the old, the young and the middle aged were fully represented, and all expressed themselves gratified and delighted, while the sumptuous basket dinner provided was most heartily appreciated.

A splendid collection of fruits of the season was laid on the tables by members and nearly all correctly labeled. Folks who attend these meetings soon learn the correct names and true character of all the fruits grown in this region, besides a vast amount of useful information pertaining to agricultural pursuits; in fact, our Society meetings are a great school for the fruit-grower and farmer.

Jonathan Periam, of Chicago, editor of the *Prairie Farmer*, delivered the following address:

OUR YOUNG FOLKS.

The child men and child women of to-day are those who are to rule the destinies of the nation in the field—the former the workshops and the latter the household of the land—during their day and generation. How to rear them so they may best work for the weal of themselves and their fellows is a problem that has been struggled with by the master minds of every day and generation from the earliest era of civilization. It is yet to be an unsettled problem; for with each succeeding generation in the progress of enlightened civilization new questions arise to be grappled with, new wants grow out of altered conditions of society; and since the era of printing each succeeding generation has raised a higher and higher standard of excellence in art, science, manufactures and literature, until now we begin to imagine where it is all to end, and if indeed there is any limit that the mind of man may not ultimately grasp.

In a moral sense, Solomon uttered a sentiment which is as true to-day as when spoken: "Train up a child in the way he should go, and when he is old he will not depart from it."

That god-like Pagan, Socrates, from a different standpoint, spoke an undying sentiment when he said: "Teach a child in youth that which he is to follow in mature age." If we train our children to a love of the good and the beautiful, we may be pretty well assured that they will make men and women as near perfect as mere human nature may be capable of.

The earliest impressions a child receives are those to which the memory in after years clings with the fondest tenacity. The man (or woman) in old age, when memory fails in all else, clings to the recollection of the brook wending through the valley where he was born. He sees on the hillside the great trees where he used to play, the brook

where he fished, the green fields where he chased butterflies, the deep forest where he used to wander after nuts, the vine-clad porch of the cottage where he was born, the great kitchen with its ample fire-place; all come back in old age with the vividness of childhood, and in second childhood he again lives over his youth. Thus the more pleasant will be the future remembrance of infant days. Unfortunately the remembrance of all cannot be of bubbling brooks, green fields and shadowy groves. The orchard with its ripe fruits, the garden with its state of vegetable wealth does not invite the city child to pluck and eat, yet there are few but have their holidays in the country with loving friends, and to these the associations must be doubly sweet; yet it is a singular fact that in old age the mind of the child reared in cities seldom reverts to these holidays. They are but the impression of a day, and come and go like a fleeting cloud before the sun.

Do we really appreciate as we ought, when we have the country always before us? I think I may say we. For the last forty-one years I have lived near, and have seen grow up the great city of the West. For the last nine years my daily labor has been in that city. Yet I have never had my home there. When the labors of the day are over I joyfully go to my country home, and always find content.

To the age of sixteen I was raised in a city, and near to the greatest city on the continent; yet in my youth I was always, when leisure allowed, wandering in the fields, and the most pleasant reminiscences I have of my youth are the days I spent on the farms of friends near by my home. They seem yet to me like gala days to be marked, as did the ancient Romans their pleasant days, with a white stone.

We all love our homes; we always seek to make them as pleasant for our families and children as possible. Yet few of matured age are even able to reach their ideal, and few children appreciate as they should the efforts made by kind and enlightened parents for their happiness. My ideal is that each should have something to do that is pleasant, so far as labor is concerned, and there is no reason why it should not be pleasant, or in other words, we should make necessary labor a pleasure. The child should be early taught that all labor is honorable, and idleness only is disgrace. Do I mean by this that there should be nothing but work for our youth? Yes, nothing; absolutely nothing but work, and rest. What is play but work? Nothing else, and hard work too, as hard as is necessary for youth, and calling into active exertion every sinew and muscle of the body, and tiring the dear creatures out, so that when they lie down at night their sleep, like the sweet sleep of the just, is forgetfulness of all, save breathing; deep, innocent dreamless sleep. The child must be taught, else it can never in this day compete with others when grown to man's or woman's estate.

When I was a boy study was the hardest kind of work. Even that now is changed to play. For we have models and blocks to teach the alphabet, pictures to illustrate graphically written lessons in geography and history; and now we have object lessons, so that much of the rough edge is taken away from figures and even grammar. Dry old grammar may be made pleasant. The child grows up nowadays and graduates, he hardly knows how. Invention has done as much for the youth as for the man. In my school-boy days it was hard drilling—study, study, study, committing to memory—storing up a routine in the mind, to be released in after years, when the stern realities of life must be encountered.

Why let them make play of our labor in youth? Teach the child to be a gardener. Give the boy a garden of his own, however small, in which to employ his leisure, and if he produces anything pay him for it. See how ambition will take hold of him, and how quickly he will produce something to add to the enjoyments of the table. Instruct him in grafting and planting, and let him rear a choice tree, a vine and small-fruits of his own. Pretty soon he will be instructed in botany and in entomology, and learn more of noxious and beneficial plants, and noxious and beneficial insects, than from years of study in books alone. Buy a few choice seeds, plants and bulbs for the daughters of the household, and if they rear a surplus let them dispose of it as they will. It will teach them many lessons that in after life may be useful in making other homes happy and pleasant. A taste for experimentation will follow, and after generations, as they come and go, will reap the benefit of a love of the study into cause and effect. I would have the rudiments of botany, entomology, chemistry, in short the rudiments of

science, taught in all our schools, so that children might be interested in all they see going on about them, in the fields and the woodlands, in this constantly recurring miracle of life and death, and resurrection with each returning year. That each may inquire for himself or herself how the bud forms the blossom, or the branch; why the blossom sets its fruit, which the influence of the dew upon the leaves and the rain at the roots swells into luscious or grateful fruit, kissed into blushes by the ever-blessed and radiant sunlight. I would have them to know how and why the tiny seed carried its root down, down, and its top up, up, giving us of its wealth of vegetable bounty, or, as the years go by and generations pass away, what was but the acorn of the autumn nestling in the moulds at length becomes a giant of the forest, in whose branches the crow may build her nest when this civilization may have passed away, and another, and perhaps more enlightened one, has succeeded it. Why not? I have quoted it before and I may do so here, to illustrate how our good horticultural poet, Hempstead, in a tribute to our good horticultural friend, Edwards, said of the giant trees of California:

Dazzle, O august Pantheon! stone Athenian Parthenon!
 Never nobler piles have slept beneath the kisses of the moon.
 With your gates of bronze, and flashing dome, and marble column,
 And your every work with phantoms of departed glory solemn;
 Rise, O Monoliths of Luxor! from your graves of yellow sand,
 And beside the Seine and Tiber tower above a wondering land.
 Yet, your domes or pointed columns, glittering shafts of polished stone,
 And there—but noisy rills beside the rushing Amazon.
 They were green when in the rushes lay and moaned the Hebrew child;
 They were growing when the granite of the pyramids was piled.
 Green when Prencic hosts at Canæ bound the victor's gory sheaves,
 And the grim and mangled Romans lay around like autumn leaves;
 From their tops the crow was calling when the streets of Rome were grass,
 And the brave three hundred with their bodies blocked the rocky pass:
 In their boughs the owl was hooting when upon the hill of Mars
 Paul rung out the coming judgment, pointing upward to the stars;
 Here, with loving hands transplanted, in the noonday breeze they wave,
 And by night in silent seas of silver around moonbeams lave.

Now our young folks may be likened to a tree. If planted in good soil and carefully tended, they grow up vigorous and healthy. So our youth, with careful training, grow up into noble men and women. It makes no difference what the station in life be. Real happiness comes out of the inner self, and it depends upon culture received in youth, and none are more truly happy than those who have lived their lives on the farm, surrounded by the simple comforts their own hands have gathered about them. They are above mediocrity; owning the soil upon which they live, they call no man master. Far from the vices of cities, they live innocent and pure lives. Their children are happy, wanting but little and despising the gaud and glitter of false fashion. Their labor is indeed exacting at some seasons of the year, but at the same time it is blessed, and while resting at night, earth, air and water are working for them. There is one thing indeed which all mankind have in common, a longing to get out in the green fields, or into the deep woods. Day after day the railways of our cities carry out train-loads of men, women and children to rusticate for a few hours under the trees in the country. So the same spirit moves you, but with this difference: you have the trees and the green grass, and the singing birds and beautiful flowers along with you. They are natural and pleasant adjuncts of your pleasant life, and like our young folks always beautiful. They are the most beautiful natural objects, these emerald meadows; waving fields of golden grain ripe for the sickle; orchard lines of cultured fruits, yellow and russet and crimson; and as satisfying to the taste as to the eye; great trees, spreading their arms abroad, for herds to shelter under; gardens with their burden of vegetables waiting to be gathered, and last, but not least, lovely pastures of beautiful flowers, reminding us that horticulture has its poetry, just as with ourselves, the poetry of whose lives is bound up in our young folks.

Reports of committees show the following condition of crops, and so forth:

REPORT ON FLORICULTURE.

The Annuals had not done well because of the drouth, though the verbenas and pansies, and some other favorites, are beginning to look better since the cool nights and heavy dews. The Perennials were a failure; house-plants that had been kept in the house looked well, but those who had put them in the garden with the idea of strengthening the plants had missed it this year. The bulbs and tubers were not so much affected by the drouth. The gladioli and tuberose were thrifty and promise to bloom well. All climbers, such as the Maderia vine, cypress, etc., were very thrifty.

HATTIE DORMAN.

ORCHARD REPORT.

Hundreds and thousands of apple-trees, injured by the severe cold of last winter, died during the drouth of July, and many others are in a decline, and will eventually die. Orchards situated at the foot of the Mississippi bluff and on creek bottoms suffered most severely. In some orchards so situated half of the trees are dead.

It is a singular fact that some of the varieties considered most hardy suffered more than those reputed to be tender. As far as our own observation extends, Ben Davis and Janet have been the greatest sufferers.

The crop of winter apples will be light, but the present probabilities are that the quality will be good. Some orchards will yield half or two-thirds of a crop of Winesap of better quality than we have had for many years, and even the White Winter Pearmain, White Bellflower and Newark Pippin, that had been given up as worthless, will produce a partial crop of good fruit.

We had the pleasure last week of visiting the oldest orchard of grafted fruit in this part of the State, and probably between the Illinois and Mississippi rivers. (Seedling orchards had been previously planted by Gov. Wood, at Quincy, and by the early French settlers, near Peoria.) To Mrs. J. R. Sheriden, the lady who now owns the place, we are indebted for the following interesting particulars: About 1824-5 Abel Casto settled on the Iowa side of the river, near the head of the rapids, and planted an orchard and nursery, but his family being visited by sickness and death he became discouraged and in 1829 bought a tract of land on this side of the river, two or three miles below where Nauvoo now stands, and moved his orchard and nursery onto it.

A few unsightly stumps of these trees planted half a century ago remain, with just vitality enough to produce a few specimens of knotted and worthless fruit, but sufficient to show what the varieties are. Little Romanite, Sweet Romanite, Pennock, Yellow Bellflower, Newtown Pippin, Winter Red and Vandevere seem to predominate. A later generation of trees, planted in 1855, are of nearly the same varieties and are of no profit to the owner.

We found two old seedling pear-trees, forty or fifty feet high, on the site of the old nursery, that are worthy of special note. Although weather-beaten and scarred by the storms of fifty winters, they produce annual crops of fruit and look as though they might live and bear another half century. We also found near the house, at the foot of the bluff, a pear-tree, contemporaneous with the second generation of apple-trees, that was bending beneath its burden of ripening fruit and showing no signs of blight or disease of any kind. Mrs. Sheriden informed us that it had not failed to bear for many years. These facts seem to teach us that if by any means the blight can be prevented pear-trees will be longer lived and more regular bearers than apple-trees, and this delicious fruit be as easily grown as Ben Davis apples.

A. C. HAMMOND.
J. T. JOHNSON.

BERRIES AND SMALL-FRUITS.

C. N. Dennis made the following report :

Strawberries made a very poor crop. Early planted vines made a good stand and fair growth. Late planting very poor so far.

Raspberries, poor crop, but plants made good growth and promise well.

Blackberries, no crop and poor growth.

This year's planting has made a very poor growth, but older stock is in a very healthy condition. No new varieties except Crescent Seedling strawberries, and perhaps Red Jacket, which needs further test. Sharpless and Miner's Great Prolific are highly recommended for size and sale, but I have not felt justified in testing at the high prices asked for plants. Sweet Home raspberries I think to be the same as the Miami, or so near like it that it would puzzle Bee-men to tell the difference. The Gregg as a black-cap is in my opinion the only rival (if any) which the Miami has.

An old (new kind of) apple in this vicinity is the Sops of Wine. It is proving as a summer apple what the Ben Davis is for winter—A No. 1 in bearing and for shipping.

 SEPTEMBER MEETING.

A more gratifying meeting was never held by this Society than the one held at the residence of A. C. Hammond, of Wilcox, on Wednesday, September 17th, 1879. The occasion will long be remembered by the fortunate ones present (of whom there was a goodly number) as a live horticultural meeting.

Our host had made ample preparations for the occasion. A large open canvas was stretched beneath the inviting shade of a grove of well-cared-for fruit-trees, under which a full supply of seats and tables were arranged, and when your correspondent took his seat at the desk, with that long table of fine specimens of fruits on the one hand, that magnificent array of bouquets and cut flowers on the other; whole families of interested farmers and fruit growers before him; while just a few steps away the apple-picking and barreling was going on from those fine heaps of highly colored fruit, containing many hundreds of bushels, and the cider-making just in the background, our gratification was complete. It looked as though almost every member had done his, or her, whole duty by contributing something for the interest of the occasion. John S. Johnson, Esq., of Wythe, occupied the president's chair during the meeting with becoming dignity. Social greetings and short talks of the late excursion to the capital whiled away the morning hours until twelve o'clock, at which time members and friends partook of a superb and bountiful basket dinner.

AFTERNOON.

The Society listened attentively to an interesting essay by Mr. J. T. Safford, of Oakwood. Subject: "Our young folks, their education and training." It was recommended for publication.

Committee on entomology called up the bug question.

Mr. J. S. Johnson had seen much of the work of three kinds of potato-bugs the present season; he designated them as the ten-lined, the three-lined, and the black, or long bug.

Mr. Charles Ames had seen very few potato-bugs this year, except the old long black bug. They grew lighter in color with age.

A member had drowned all his bugs in a bucket of soap-suds and saved his potatoes. Dr. N. Lyon had done the same, only when he put them out to dry they all waked up and went to work again; hereafter he should treat them to Paris green.

Dr. Ames had his cabbage injured by the green-worm, but had found an application of salt, or of salt and tobacco, a good remedy.

Mr. Jonathan Berry had known this pest in the East. They were from the small white butterfly-moth.

Mr. C. Dennis read from the volume of State Horticultural Society for 1878 a short history of this pest and the manner of treating them to get rid of them.

NOVEMBER MEETING.

Society met November 22d, at the office of Wm. N. Grover, in the Empire building.

The Secretary read a list of questions in regard to fruits, which elicited the following answers:

Russel's Prolific and Crescent Seedling strawberries were grown successfully by several members.

The Miami was the best black-cap raspberry. The Turner, a red raspberry, was good, hardy and prolific.

Mr. Chittenden recommended the Red Dutch currant. Mr. Charles Ames would prefer the Cherry currant, if cut back before the first of April, and well cultivated. They were unexcelled for fruit or wine.

The gooseberry found no one at this meeting to champion it for cultivation. (The Secretary thinks this a sad neglect.)

President Hammond said Snyder was a good late blackberry. Blackberries ripen earlier on poor or thin soil than they will on deep soil or on highly fertilized land.

Some of our orchardists this year report from 300 to 600 barrels of cider made; most of it is put into extra good forty-gallon barrels after being heated, in order to throw off as much carbonic acid gas and other deleterious matter as was possible, in order to prevent its fermentation. This year apples made about one-half gallon less of cider per bushel than usual. Cider has been selling from five to eight dollars per barrel. The price of shipping apples has ranged from sixty cents per barrel for early apples all the way up to three dollars per barrel for latest shipments.

Fine crops of Concord grapes were reported in many instances. It was thought to be the most reliable grape for cultivation in this region. It was thought that from 300 to 500 gallons of wine per acre could be made from best Concord vineyards.

The best season for cutting fruit slips for propagation, or for grafting, is in February or later.

We had a great number of non-bearing orchards in our vicinity this year; no one would hazard an opinion as to the cause, as some orchards were loaded with the finest fruit in the immediate vicinity of those that were barren.

The codling-moth and several others of our insect enemies still visit us, and in some orchards in large numbers.

WHEREAS, The next meeting closes our official year, and is the time fixed for the election of officers for 1880;

Resolved, That the officers and members of committees from whom reports are expected be requested to come prepared with their reports, and that all friends of the Society be earnestly requested to attend said meeting and renew memberships for 1880.

Resolved, That the Illinois State Horticultural Society be cordially invited to hold its annual session for 1880 at Warsaw.

Resolved, That we will call up and consider at our next meeting the propriety of a joint session being held by the horticultural societies of Illinois and Iowa.

All of the above resolutions passed by a hearty, good, unanimous vote.

Mr. Grover kindly tendered the Society the use of his rooms for future meetings.

DECEMBER MEETING.

The annual meeting of this Society was held at the office of Wm. N. Grover, Esq., on the thirty-first day of December. The retiring President gave his annual address.

ANNUAL ADDRESS.

I find by examining the programme of business that I am expected to give to-day a synopsis of our work for the past year, and shall therefore, without preliminary remarks, proceed to the work assigned me.

The January meeting was large and interesting, and the subject of the day, "Orchard Pruning," was thoroughly discussed. An interesting report was also made by the Fruit Committee, from which it appears that about 40,000 barrels of apples and 3,000 barrels of cider were shipped from the bounds of this Society.

February meeting was a very satisfactory one. Isaac Bliss, Esq., read an interesting paper on Home Fertilizers, which led to a spirited discussion.

March meeting like the former. Special subject: Orcharding, Past and Future. Essayist, J. T. Johnson.

April. The subject, Best Method of Pruning for our Locality, was introduced by a practical, well written paper, by A. S. Gates, and drew out an interesting discussion.

May. Special subject: The Garden. Essayist, H. D. Brown. Mr. B. handled his subject well and showed conclusively that every farmer could and should have a garden, and showed the profits in dollars and cents, as well as the convenience, health and pleasure it affords.

The June meeting was held at the City Hall in Hamilton, and was probably the largest meeting ever held by the Society. The floral display was magnificent and

reflected great credit upon the citizens of Hamilton and vicinity. Prof. Burrill, of the Industrial University, added much to the interest of the meeting by his presence and address.

The August meeting, held at Wild-Cat Springs, was also largely attended by the farmers and fruit growers of the county. The address by Jonathan Periam, Esq., of the *Prairie Farmer*, was exceedingly interesting and attentively listened to by the audience. A fine collection of apples was on the table, many of which were presented for the purpose of having them correctly named.

The September meeting, held on the grounds of your humble servant, was well attended, and a pleasant and profitable occasion. The special subject, *How to Interest Our Young People in Rural Life*, was intelligently discussed by John Safford, Esq. Rev. H. R. Trickett also addressed the Society on some *Mistakes Concerning Progress*. This was an address of great merit and should be heard and heeded by every man in the community.

The October meeting, held at the residence of B. Robinson, Esq., was well attended, and one of the most satisfactory meetings of the season. Special subject, *The Labor Question*, was ably handled by J. L. Piggott, Esq.

The November meeting was a very pleasant one, and the subject of the day, *The Coming Farmer*, was ably discussed by the essayist, C. N. Dennis, Esq., and others present.

The year passed has been a prosperous one for our Society, and we now have a larger membership than ever before. Under the management of our efficient Treasurer, C. C. Hoppe, Esq., our financial condition has been greatly improved, and the treasury is now in a healthy condition.

From this brief resume we see that we have made some progress, and as evidence of what has been accomplished we refer to the thousands of acres of orchards within our borders, and the hundreds of thousands of bushels of apples, and the thousands of barrels of cider, that are yearly shipped. But what of the future? Is our work accomplished? Can we afford to relax our efforts and rest upon our laurels? No; our sphere of usefulness is widening, and new fields are opening, into which we are invited to enter and labor.

If we look around and see the hundreds of farmers' homes, dreary and cheerless, without a fruit or vegetable garden from which to draw those supplies that give health and comfort to their families, or a shade or ornamental tree, or the least attempt to make them pleasant or home-like, and the great number of farmers who, with their wives and sons and daughters, are drudging and toiling from early dawn till darkness casts its mantle across their path, without a day of recreation or thought of rest, we shall understand the work that we are called upon to do.

The primary object of our Society was to encourage and foster the planting of commercial orchards and vineyards, and we are proud to know that within its borders are some of the finest orchards in the State; but we have now reached a point in our history when we should turn our attention more to the fruit garden, floriculture and home ornamentation, and make an effort to impress upon the minds of plodding toilers on the farm that work is not the chief end of life, but while labor is honorable and praiseworthy, constant toil, without change or recreation, is degrading, dulls the intellectual and spiritual faculties, and degrades the image of God to the level of the brutes. Change rests the weary body, recreation gives health and new life, new scenes and wider observation, increases knowledge and gives greater opportunities for usefulness. Some one has said that "there is not another man in the world who obstinately puts necessary rest out of his life as does the American farmer;" and we are compelled to confess that it is only too true. One of their greatest needs is an occasional holiday, when work and care should be cast aside, that they may strengthen and refresh themselves by real downright rest. They should, now and then, take their wives and children out of this tread-mill round of life, and give them a glimpse of the great, bustling, busy outside world. Let them board one of the palatial steamers that float upon our great river and turn their faces southward, until they pass beneath the arches of the great bridge at St. Louis; then step upon the train and pass through the darkness and damp, under the city out to the Union Depot, and witness the long trains that

arrive and depart every few minutes; then visit her botanical and zoological gardens, where may be seen the wonders both of the vegetable and animal kingdom that have been collected from the four corners of the earth. Or take them to the Garden City, and stop for a day or two at one of her palace hotels. Take them out for a sail upon the lake, show them her magnificent parks, and the proud structures of marble and iron that rise on every hand. Go down under the river where she has made a pathway for her ever-increasing traffic; visit the Exchange, Stock Yards and South Water street, the great grain, stock and fruit markets of the continent; her exposition of industry, science and art, which is well worth a journey of many hundred miles; and lastly, stand upon the corner of one of her great commercial thoroughfares and for a few moments watch the tide of human life that surges by. And as they turn their faces homeward they will find new thoughts and new aspirations welling up in their minds; their views of life will be widened, and they will be better men and women than ever before. "But I cannot afford it," is the reply we get, nine times out of ten, if we introduce this subject. But by the aid of our Society this objection can, in a great measure, be obviated. We have learned by experience that a company of excursionists of one or two hundred, under the auspices of this Society, can visit any desirable point at a nominal cost, and with the assurance of receiving that attention that will make our visit enjoyable.

I would therefore recommend that a committee on excursions be added to the list of standing committees, with the understanding that, if the indications are favorable, arrangements may be made for an excursion to some point to be selected by them, in August or September.

I would also suggest the appointment of a committee on out-door home adornment, with the primary object of arousing farmers to the importance of improving and beautifying their homes, but also to embrace town, street, cemetery and other ornamental planting.

As the State Horticultural Society meets with us next winter we should make such arrangements as may be necessary to make their visit pleasant. There does not seem to be any formal action required at this time, but we should keep it in mind and before the people, and let it be generally understood that we expect to have the largest meeting and finest display of fruit ever known in the history of the Society.

As the farmers of the county seem to be making a determined effort to organize an agricultural society, it should, and doubtless will be, both our duty and pleasure to encourage the movement, and when such an organization is perfected to give it our support and render all the assistance in our power towards making its annual fairs successful. The idea seems to prevail in some places that we propose to merge our Society into a county board; this is, of course, erroneous, yet it is possible for us, without impairing our own efficiency, to render such an organization valuable aid.

The old officers made full reports, showing the Society to be in a better condition than ever before, with all claims fully paid and a handsome surplus in the treasury for 1880.

A. C. Hammond was elected President; Jos. L. Piggott, Vice-President; James T. Johnson, Secretary, and Chas. C. Hoppe, Treasurer. C. N. Dennis, of Hamilton, was elected Secretary *pro tem*.

Messrs. Hoppe and Stracke made a report on finance. The report was placed on file.

On Floriculture, C. N. Dennis reports: Last winter was very severe on out-door plants, except the bulbous varieties, and in-door or house plants did so badly that our lady friends were compelled to commence the season on short stocks; the summer was unfavorable, yet deep-rooted varieties did quite well. The season has been favorable to insect growth, many of which have been carried to the house with the plants, where they are quietly at work, and will need special attention before spring.

B. Whitaker said: Insects as a whole have not been numerous. Referred to the work of the *Pieris rapæ*, ground-lice, chinch-bug (in prospect for next year), codling-moth, curculio and turnip-fly. Mr. Johnson thought *Pieris rapæ* were being destroyed by a parasite. He fought them both in the moth and worm state.

Mr. John Gillham reports the chinch-bug and Hessian-fly as being in prospect for 1880.

Mr. Dennis said the Crescent strawberry is still gaining favor. Red Jacket strawberry was doing well and would test them further; he had a number of new German apples and pears in graft but not yet fruited.

Mr. Dennis said strawberries were injured in the bloom by late frosts, berries somewhat imperfect and a light crop. The plants during the past season of drouth made a poor growth of vine, but appear healthy. Raspberries were killed back by the winter, the berries were of good size and flavor, and the crop satisfactory. Blackberries were badly killed, the crop was a failure. Prospects for small-fruits for 1880 are generally favorable.

On vegetables, W. W. Chittenden and Mr. Hoppe report: The vegetable garden suffered greatly on account of drouth. Early potatoes did well. Early rose, snowflake and early Ohio, all tried here the present season. They would specially recommend early Ohio as being very prolific and of good quality. Late potatoes a failure; cause, drouth and long-winged potato-beetle. Early cabbage did well; late cabbage a failure; cause, drouth and insects. Beets and carrots good, on good rich soil; would recommend Danvers (carrot) for early or late planting. Onions, early planted, a good crop. Lettuce, a failure; beans, a light crop; tomatoes, a good crop where properly cultivated; would recommend planting tomatoes six inches deep if size of plants will admit. Early peas did well; recommend early peas Alpha, Blue Peter and Little Gem.

On orchard crops, Mr. Hammond said, as a general crop, a failure, but in a few small districts have paid a large profit. Pears and peaches a general failure in this region, as also plums and cherries.

H. D. Brown reported a fair crop of pears on his own grounds.

On nursery stock, Mr. Brown reports that during the winter of 1878-9 peach-trees in nursery were frozen to the snow-line. Apple-trees came through in good condition, and plants of all kinds wintered better than usual, being protected by the snow. The demand for nursery stock had been good, there was not enough of the Ben Davis apple-tree to supply the demand. The growth of stock was small on account of drouth; newly-planted stock suffered severely. Owing to late rains he thought nursery stock would winter well.

John S. Johnson offered the following excellent suggestions: What may we do in 1880, what shall we do, and what will we do? We may each raise better fruit and vegetables by better cultivation, and we may note the time and the manner of doing it, and report to this Society as to our success or failure; we shall either progress or retrograde, we cannot

stand still, as that is not the law of nature; movement is the law, and we shall be governed by it; therefore,

Resolved, That we will, as members of this Society, improve ourselves and the community in which we live, each one endeavoring to better understand how plants grow, and what our soil especially needs to produce the greatest amount of a given crop to the acre. Let us have special committees to experiment upon all the crops which we produce. And, above all, let us this year fully test the theory of girdling non-bearing fruit-trees, for if it be a fact that such mutilation produces abundant crops, I want to say to my man: you can run over that tree and bruise it all you can; it will only do it good, and result in abundant crops.

Resolved, That we will, at the next State Horticultural meeting at Warsaw, make the finest display of fruits, vegetables and grains ever seen in the State of Illinois, and we will keep in a solution, for that purpose, all the fruits of the season; and let each member of this Society say that he will make such meeting a grand success, and it can and will be done.

Let every member say, I will this year plant trees for profit, for protection and for ornamentation, and will surely provide my family with the best the earth can be made to produce.

Wm. N. Grover, Esq., expressed great gratification at the evidence before us of the standing and high mission of the Society, and hoped that in our annual floral display in May or June, 1880, to be held in Warsaw, we should certainly eclipse anything of the kind ever attempted by the Society. He felt confident that our lady friends, thus apprised in time, would make this one of the grandest shows ever held in the State.

Messrs. Laisle, Brown and Johnson reported the following list of fruit on exhibition—By A. C. Hammond: Golden Russet, Grimes', Peck's Pleasant, Northern Spy, Wythe. By W. H. Jackson: Rome Beauty, Winesap. From S. G. Minkler, of Oswego: Fine Cayuga Red Streak. By E. C. Hatheway, of LaSalle county, New seedling, "Salome." By the Secretary: Winesap, Ben Davis, Janet and Bailey Sweet.

Committee consisting of Messrs. Hammond, J. S. Johnson, Brown, Hoppe and J. T. Johnson was appointed on programme for the year. Messrs. Dennis, Laisle and Hilton were appointed a committee to confer with State Society of Iowa.

Resolution by William N. Grover:

WHEREAS, This society has now struggled through fifteen years of existence, subject to all the varying fortunes usually attending similar enterprises, sometimes prospering and sometimes not, but always firmly supported and sustained by a few earnest friends, and is now in its roll of membership and financial condition stronger than ever before, and more firmly established than ever in the good opinion of the public, both at home and abroad; and whereas, we know that these results are in a very large degree owing to the earnest, intelligent and persistent labors of our President, Vice-President, Secretary and Treasurer, in the performance of their respective duties, which we wish duly to acknowledge; therefore, be it

Resolved, That the thanks of this Society be extended to Messrs. A. C. Hammond, President; J. L. Piggott, Vice-President; Jas. T. Johnson, Secretary, and C. C. Hoppe, Treasurer, for their faithful and efficient services during the past year, and that this preamble and resolution be published with the proceedings of the Society.

Adjourned to third Wednesday in January.

GALESBURG HORTICULTURAL SOCIETY.

REPORTED BY W. A. RYAN, *Secretary*.

MARCH MEETING, 1879.

The annual meeting of the Horticultural Society was held at Brown's Hotel parlors, Tuesday evening, March 4, 1879. The minutes of the last meeting being read and approved, President Standish announced the first business in order to be the election of officers for the ensuing year, and suggested the appointment of a committee on nominations. A motion by Mr. Hale to that effect was carried, and the President appointed as such committee Messrs. Hale, Mars and Humphrey.

Pending action on the report of the committee, Mr. W. A. Ryan was elected a member of the Society. On the final recommendations of the committee the following persons were unanimously elected to their respective offices:

President—Judge G. C. Lanphere.

Vice-President—Mrs. T. J. Hale.

Secretary—W. A. Ryan.

Treasurer—Mrs. J. V. N. Standish.

Executive Committee—Dr. A. G. Humphrey, Mrs. J. V. N. Standish, T. J. Hale, R. W. Hunt, G. V. Dieterich.

On motion of Mr. Hale the thanks of the Society were extended to Prof. Standish and Mr. Perry, the outgoing President and Secretary, for the highly satisfactory manner in which they had discharged the duties of their respective offices.

President Lanphere, having taken the chair, spoke encouragingly of the future of the Society. He stated the subject for discussion: "The effect, if any, of vegetable and forest growth, or human agency, upon rainfall," and called upon Prof. Standish. The Professor stated that he

had prepared a paper upon the subject, and with special reference to the effects of the wind and the course of the wind upon rainfall. He read as follows:

Rainfall.—We are living at the bottom of a very deep sea. This sea is the atmosphere that surrounds the earth. In it we live, move and have our being. It is not only life-sustaining, but life-destroying. It builds up every form of vegetable and animal life, and when death comes it seizes upon these forms and reduces them to their ultimate elements again. Our atmosphere is most fickle and inconstant. At one moment it will kiss the cheek of the new-born babe with a mother's tenderness; at the next, it comes with the destructive hurricane and the death-dealing tornado, uprooting forests, prostrating cities, sweeping as with the besom of destruction over the land, marking its pathway with ruin, desolation and death. The mighty oak, the giant of the forest that has stretched out his arms to wind and tempest for centuries, becomes but idle sport to the angry storm fiend, and strong navies, proud monuments of man's genius, are but bubbles on the stream.

Extent of our Atmosphere.—The atmosphere is a mobile and all-pervading fluid. There is no nook or corner it does not fill; no crevice it does not enter. It pervades the depths of the ocean as well as its surface. By reason of its tension it reaches to a great height. Some have estimated its extent two hundred miles. According to the law of decrease of density its height should be infinite. But at the point where the centrifugal force balances the force of gravity there must necessarily be the limit. It may be mathematically demonstrated that the air decreases in density in a geometrical ratio as the altitudes increase in arithmetical ratio. Let us look for a moment at this law of diminution of density. It has been found by actual observation that at a distance of three and a half miles from the surface of the earth its density is diminished one-half. At the distance of seven miles its density is one-fourth; at ten and one-half miles, one-eighth; at fifty miles, it is one-sixteen-thousandth of the density at the earth's surface.

Weight of the Atmosphere.—The weight of the atmosphere has been accurately computed. It will keep in equilibrium a column of mercury about thirty inches in height. Hence its weight is just equal to a stratum of mercury, covering the entire globe, thirty inches in thickness. The earth's atmosphere, therefore, weighs nearly six quadrillion tons.

Wind.—Wind is air in motion. As regards their general direction, the winds are nearly as regular as the planets in their course. As the preacher hath said, "The wind goeth towards the south, and turneth about unto the north; it whirleth about continually, and the wind returneth again according to his circuits." There are three general systems of winds: the equatorial, the middle latitude and the polar winds. Let us now trace these winds in their circuits. In the region about the equator the sun's rays are nearly vertical, and consequently the air is heated, causing it to rise into the higher regions. It thence flows northward and southward as a high current. When this northern high current reaches about 32 degrees of latitude it meets a high current coming from the north. Both of these currents at this point come down to the earth's surface, forming the "Calms of Cancer," and progress as surface currents—the one that started from the equator as a high current still continues northward as a surface current; the other, which came from the north as a high current, continuing southward to the equator as a surface current. The northward current meets a southward current at about 64 degrees north latitude. Both of these currents at this point rise into the higher regions and become high-moving currents; the northward-bound still moving northward, the other moving southward. When the northward current arrives at the pole it is precipitated to the earth and becomes a surface current until it reaches 64 degrees of latitude. At this point it rises, moving as a high current to 32 degrees of latitude, the "Calms of Cancer;" there it descends to the earth and moves as a surface current to the equator. Here the air is heated again, causing it to ascend into the higher regions, where it moves as before. A similar phenomenon is to be observed in southern latitudes. Truly the wind "whirleth about continually, and returneth again according to his circuits." Thus we see the winds have their circuits, and they depart from them but a little more

than the planets depart from their orbits. We say the course of the Mississippi and Hudson is southward. Considering their windings, the whirlpools and eddies of their waters, their direction is scarcely more definite than the direction of the winds.

Monsoons.—Local disturbances there are; but these are small, almost infinitesimal, when compared with the body of moving air. The equatorial calms form a broad belt about 5 degrees north of the equator. Between the equatorial calms and the calms of Cancer the general course of the wind is from the northeast. Between the equatorial calms and the calms of Capricorn the wind blows from the southeast. Between the calms of Cancer and the north polar calms the wind blows from the southwest. Between the calms of Capricorn and the south polar calms the wind blows from the northwest. As these various winds were considered favorable to commerce, they were denominated Trade Winds. In the northern portion of the Indian Ocean, from October to March, the regular trade winds prevail. From April to September, the wind blows in the opposite direction, *i. e.*, from the southwest. These winds are called Monsoons, because they blow half of the year in one direction; the other half, in the opposite direction.

Influence of the Seasons.—The influence of the seasons is no small element in determining the direction of local winds. In summer the land is warmer than the ocean. Hence the air rises over the land, causing the wind to blow from the sea towards the land. In winter the sea is warmer than the land, thereby causing the wind to blow from the land to the sea. On the Rhode Island coast the winds are contrary during different portions of the year; blowing from the northwest in winter and from the southwest in summer. In the State of New York the winds blow from a point from 15 to 18 degrees farther south in summer than in winter. At Washington northwest winds prevail in winter; southwest in summer. In Florida the prevailing wind is north in winter and south in summer. On the Pacific coast, at San Francisco, the winds of winter are from the northwest, while those of summer are from the southwest.

Rain.—The atmosphere is the great agent of rainfall. The winds, blowing from sea and ocean, come dripping with moisture. Hence we see why south, southeast, east and northeast winds bring rain. The atmosphere, resting on the ocean in the warm region of the torrid zone, is saturated with vapor, and this is wafted northward and southward, and meeting the cold currents from the poles the vapor is condensed and falls in the temperate zones as rain. The great reservoir whence we obtain our supply of rain is the Southern Ocean. The Mississippi, the Hudson, the Connecticut, are abundant proofs that the rainfall in the north temperate zone is more than is actually needed. The excess forms mighty rivers and is hurried back to the sea again. Whatever cause shall lessen evaporation in the equatorial regions, whether it be sun-spots, fogs or cloudiness, has a tendency to diminish the amount of rainfall in the temperate regions. It may be gratuitous, but I will venture to suggest that the want of rain for the last six months and the absence of prevailing and violent winds are due, in a large measure, to an increase in cloudiness, fog and rainfall in the tropics. Such would be the tendency according to the theory here propounded.

Unequal Distribution.—The annual fall of rain during the course of years is the same, because those causes which operate to convert water into vapor are constant and persistent. Heat, which is the principal factor in the solution of this problem, is necessarily a definite quantity in the period of years, or otherwise the earth, by its increase or diminution, would "melt with fervent heat," or be congealed with polar snows. During a succession of years, therefore, the amount of rainfall is the same; but it is very unequally distributed over the earth's surface. The following are some of the causes of this unequal distribution: latitude, elevation, mountain ranges, course of the winds. The fall of rain is greatest at the equator, and diminishes in the higher latitudes. At 60 degrees it is only one-sixth of the amount at the equator. Beyond 60 degrees, the rainfall is slight, owing to a deficiency of moisture in the atmosphere. According to Prof. Loomis, the annual fall of rain in latitude 10 degrees is 101 inches; in latitude 20 degrees, 90 inches; 30 degrees, 70 inches; 40 degrees, 45 inches; 50 degrees, 27 inches; 60 degrees, 18 inches. The number of rainy days does not correspond, in all respects, with the annual fall. The greatest number is at the equator and at 60 degrees of latitude.

Again, elevation above the sea is an important factor in determining the annual amount of rainfall. More rain falls on the summits of mountains 2,000 or 3,000 feet in height than at the base. From April to September, on the southern slope of the Himalaya Mountains, there was a fall of 610 inches, more than 50 feet. At Vera Cruz, 278 inches fell in one year; in Oregon, 90 inches; in Western Europe, 40 inches; in Central Europe, 20 inches; in Russia, 15 inches; in Northern Asia, less than 15 inches.

It may be interesting to know the annual fall of rain in the various States of the Union. For many of these facts I am largely indebted to Prof. Loomis. He says the annual fall in Alabama and Louisiana is 56 inches; Oregon, 49; Florida, Virginia, the Carolinas, Tennessee, Kentucky, 48; Georgia, 44; Arkansas and Missouri, 42; Maryland and Pennsylvania, 41; Ohio and New England, 40; New York, 37; Michigan and Wisconsin, 32; Iowa and Kansas, 31; Texas, 29; California, 18; New Mexico, 13. From these data I have estimated the annual fall in Illinois and Indiana from 30 to 35 inches.

Influence of Forests on Rainfall.—We have seen that the atmosphere by its currents is the great distributor of rain. We have seen, also, that the annual fall is modified by elevation, latitude, proximity to mountains, the course of the wind. There are other causes, likewise, which have a tendency to increase or diminish the annual amount. Whatever prevents the water from running off from the surface of the earth into the rivers has the effect to increase the annual fall. The more the atmosphere is saturated with vapor, the greater will be the deposition of rain. The dry atmosphere of the last six months necessarily prevents rainfall. Hence forests, tall prairie grass, vegetable mould, will increase the annual amount of rain. Remove the stately forests, cut close the beautiful herbage that covers the land, turn the vegetable mould beneath the surface, and you will find the annual amount of rain has been sensibly diminished. On the other hand, plant forests of trees, let our valleys and our hill-sides be covered with tall waving grass, and thereby the early and the later rains will appear. Hence in every portion of the earth where there is a dearth of forests, of verdure, *there* you will find barren wastes and trackless deserts. If a correct statement of the annual amount of rain in Illinois could be given at the time when the Indian hunter pursued the panting deer and "wooded his dusky mate," when the tall prairie grass "nodded" to every passing breeze, and the forests along our streams had never resounded to the echoes of the woodman's axe, you would find, I think, the annual rain much greater than at present. During the last seventy-five years there has been a gradual diminution of rainfall throughout New England. As a proof this, brooks that were once broad and deep have now dwindled to very insignificant streams. Many of these mountain rills and brooks which, in my boyhood, were difficult to pass, can now be crossed at a single bound. The same is true of many portions of New York and Pennsylvania. The "oldest inhabitant" not unfrequently calls attention to the fact that the *brooks are drying up*.

The French as a nation seem to take the lead in almost everything. The influence of forests on rainfall has been brought before the French Academy of Sciences and warmly discussed. Becquerel held that forests increased the amount of rain, while Marshal Vallant as confidently maintained the opposite ground. M. Mathieu, connected with the School of Forestry, proposed to himself the following problem: "To determine the amount of rain-water received by the soil of two neighboring districts, one of them covered with timber and the other arable land; and to find out whether, in consequence of the covering of trees which intercepts the rain-water, the soil of the woodland is as abundantly watered as that of the open." The conclusion was that the soil of the woodland was more abundantly watered than the open country.

M. Dausse says: Rain is formed when a warm and humid wind comes in contact with a stratum of cold air; and since the air of forests is colder and more humid than that of the open land rain must fall there in greater abundance.

In 1874 a Frenchman performed an experiment twenty feet above a group of oaks and hornbeams and in the adjacent open country, in order to ascertain the comparative amount of rainfall and the degree of the saturation of the air. The following is the summary of this experiment: For the month of February, the amount of rainfall to that of the open country is in the ratio of 18¾ to 18; March, 15 to 11¾; April, 27½

to $25\frac{3}{4}$; May, $39\frac{1}{4}$ to $35\frac{1}{2}$; June, $51\frac{1}{4}$ to $48\frac{1}{4}$; July, $40\frac{3}{4}$ to $37\frac{3}{4}$. The ratio for the six months is as $192\frac{1}{2}$ to 177 in favor of the forest.

During the following five months of the same year the degree of saturation of the air is as follows: March, 71.1 in the forest to 70 in the open country; April, 64.3 to 64.2; May, 64.1 to 60.4; June, 60.9 to 60.1; July, 54.6 to 53.8. Hence we see that the results of these experiments seem to confirm the conclusions of reason. If future observations shall harmonize with those already made it may be positively affirmed, what we now believe, that forests serve to augment the annual amount of rainfall.

Judge Lanphere said the reading of the foregoing paper brought him back, in memory, to the region of his early home in the East, which fifty years ago was covered with a heavy forest growth and also abounded in trout streams and rivulets. Twenty years ago the same country had been almost completely denuded of its forest, and similarly there was noticeable a lack of moisture and absence of the older streamlets.

APRIL MEETING.

The Society met at the residence of Mr. David Sanborn, on Tuesday evening, April 8th, after a postponement of two weeks.

Those members of the Society who came expecting to partake of the promised lunch upon "Rainfall" were no doubt fully satisfied with an excellent and substantial meal upon "Spring planting and the best things to plant." The President stated that the change in the subject was thought advisable by the Executive Committee, and suggested that the reading of the report of a committee on the same subject made at a meeting held March 5, 1878, would furnish groundwork for the evening's discussion.

Mr. Humphrey thereupon read the report detailing the list of vegetables recommended by the aforesaid committee and the best manner of cultivating the same.

Mr. Hale said he thought the report in the main a good one. There were several points, however, which did not coincide with his experience. First, in relation to the planting of asparagus. The recommendations of the Horticultural Society were made to gardeners, to those planting small pieces of ground, and not to farmers. He thought asparagus in gardens should be planted six inches apart in the rows; rows to be about eighteen inches apart; a heavy layer of manure should be forked in early in the season; thinks this is preferable to leaving the soil bare during the summer. Mr. Hale thought that those who would have good asparagus should raise their own plants, especially as the raising is unaccompanied by any great amount of labor. Plant the seed three or four inches apart, thin out plants sufficiently for growth and the second year will develop a vigorous root, when the plants should be about four inches apart; the third year they will be excellent. He agrees substantially with the report on beans. The poles should be placed first, beans to be planted with the eye downward, by pushing the thumb and forefinger into the earth.

Would recommend some other than the Wax variety; thought the early Fejee preferable; could also indorse the Egyptian Red beet. Mr. Hale recommended for late corn the Evergreen Stowell; for early, the Minnesota.

Captain Fuller's experience in the cultivation of asparagus has led to different results from Mr. Hale's. He had planted Conover's Colossal seed, and when ready to set out the roots were larger than the space mentioned by Mr. Hale. He would not plant nearer than eighteen inches in the row, the rows to be about the same distance apart. With proper fertilizing, in ten years, the Captain thought, the whole space would be occupied.

Dr. Humphrey couldn't wait ten years. He planted closer in the row for that reason.

Prof. Comstock had an asparagus bed made fifteen years ago. Rows were eighteen inches apart, plants fifteen inches apart in the row.

Prof. Standish said he had some experience in the cultivation of asparagus. Ten years ago he started a bed; planted Conover's Colossal seed; dug trenches about twelve inches deep and filled up the space with alternate layers of compost and earth; set plants in rows twelve inches apart and eighteen or twenty inches in the row. In two years he had an abundance. Since that time he has had occasion to remove the bed, and, notwithstanding that the roots were old, they are now doing well. The Professor recommended Dewing's early beet as better than the Egyptian. Henderson's Pine-apple is also good. He raised his own celery plants. Instead of pricking out he took them from the box and placed them in trenches dug twelve inches deep and of the same width, the plants being six inches apart; compost should be well worked in. This method he preferred, it being less laborious, and productive of good results. Of the different varieties he recommended, White Solid, Seymour's Superb, Sandringham, Crawford's Half-dwarf, Turner's Incomparable, and for keeping Carter's Crimson, and the best of all Sutton's Sulhams Prize. For corn, Moore's Evergreen Sweet was good, Early Minnesota also highly spoken of. Would recommend for trial Washington Market. The Triumph is, however, the earliest, being ten days ahead of the Minnesota. The Cassaba musk-melon is very fine, the Christiana is an excellent round small melon, Skillman's Netted, Hackensack and Ward's Nectar are also good. Mountain Sweet as well as Mountain Sprout water-melon the Professor thought good. Onions—Weathersfield, red, Danvers' Yellow, and Silver Skin, the last mentioned being preferable. Bliss' American Wonder should be added to the list of peas. It is an excellent early pea, grows from fifteen to eighteen inches high. Waite's Caractacus should also be placed among the early varieties; also McLean's Little Gem. For a general crop the Champion of England was thought superior to any other. Hubbard's squash ought to be added to the list.

Dr. Humphrey found no difficulty from the crowding of asparagus plants. If cut early and indiscriminately the tendency was to produce too many eyes. Judicious cutting, he thought, would check too great spread and tend to properly develop the plants.

Capt. Fuller thought no plant could be properly developed without plenty of room.

Mr. Beatty thought too much prominence was given to the question of nicety and the difficulty attending the cultivation of plants. He thought many people were deterred from planting, fearing that their effort would result only in failure. Scientific gardening should be encouraged; still any person may have fair success without following the strict rules laid down. He had obtained excellent asparagus from simply setting his plants in openings made in the earth with a spade.

The Wax beans, he thought, were planted more for looks than quality, being in his opinion inferior to many other kinds. The Marrow bean he recommended for general uses, combining as it does the good qualities of the pole and bush beans. Mr. Beatty recommended the Early Paris cauliflower and Purple Cape broccoli. He thought there must be some mistake in the report on mustard. The leaves of the white or yellow varieties were too coarse for greens. The black was the best for greens; but spinach and lambsquarter were so much better that no one now thought of sowing mustard for this purpose.

Mr. Dieterich (J. W.) had noticed a change in the color of the Black Wax beans raised by him, they having a mottled appearance.

Dr. Bacon thought it was owing to the fact that Mr. Dieterich did not save the first crop for seed.

The President agreed with Mr. Beatty on the tendency of the discussion to magnify the difficulty of cultivating asparagus. He had grown good plants without trenches. Prof. Standish stated that heretofore all the recommendations were in favor of using salt plentifully on asparagus beds. Col. Carr had deluged his plants with brine, and but half a dozen survived the flood. Mr. Hale said that for years it had been his custom to have the contents of his brine barrel poured upon his asparagus bed. He noticed no bad effect. It was, however, an important question and should be discussed.

Capt. Fuller had used last year one hundred pounds of salt without killing any plants.

Mrs. Fuller thought that salt might safely be used on the beds before the plants began growing, but its use thereafter she thought would be dangerous to the plants.

The question coming up on the adoption of the report as read by Dr. Humphrey, Prof. Standish moved that a committee of three be appointed to revise the report and present the revised list at the next meeting. The motion prevailed.

The President appointed as such committee Prof. Standish and Messrs. Dieterich and Hale.

Prof. Standish suggested that a meeting should be held for the further discussion of the "Effect, if any, of forest growth or human agency upon rainfall."

Dr. Humphrey suggested as the subject for discussion at the next meeting, "Small-fruits and bedding flower-plants," which, on motion of Prof. Standish, was adopted.

Prof. Standish moved that when the Society adjourn it be to meet on the evening of April 22d instant, at the residence of Capt. Fuller. Motion adopted.

Mr. Beatty said that he noticed that morning the appearance of the house-martin. This bird he considered a true harbinger of spring, there being rarely any severe weather after its appearance. He spoke of the peculiar habits of the bird, its sudden appearance and mysterious disappearance. For twenty-two years its earliest coming has been the 5th of April, its usual time being from the 10th to the 15th of April. Those who plant gardens by this monitor will seldom miss it.

The English sparrow being incidentally mentioned, Mr. Beatty thought the bird was destined to solve the "labor problem." A few years will give the rising generation plenty of work in keeping the sparrows from our fields.

Adjourned.

MEETING OF APRIL TWENTY-SECOND.

A meeting of the Galesburg Horticultural Society was held at the residence of Capt. Fuller, on North street, Tuesday evening, April 22d.

The minutes having been read, Dr. Humphrey explained in reference to the remark made by him "that he couldn't wait ten years to have the space in his asparagus bed occupied." The Doctor stated that he couldn't wait ten years because he desired to have the space covered in less time. He agreed with Capt. Fuller that, if a person has an abundance of ground, the plants should have plenty of room; if, however, a person has only a limited area the space must be economized.

The minutes were then approved.

Dr. Humphrey said Mr. Henry Sisson informed him that his asparagus bed had shared the same fate as Col. Carr's, having been almost completely destroyed by the use of salt.

The President called for the report of the Committee on Vegetables appointed at the last meeting.

Prof. Standish said he had prepared a report but had had no opportunity to consult with the other members of the committee sufficiently to get their views, he therefore would present the report to the Society for their consideration. He thought that our soil was suitable for the cultivation of all varieties of vegetables, and had given under each head a simple mode of culture. The Professor thereupon read the report as prepared by him.

Dr. Humphrey, in the main, indorsed the report. He thought, perhaps, there were too many varieties under some of the heads; thought a standard report should contain the fewest number of varieties possible while including the best kinds, a multiplicity of varieties tending to confuse persons unacquainted with the different qualities. Three varieties of peas were plenty; Carter's First Crop, extra early; McLean's Little Gem, early; and Champion of England, late; all planted at the same time will

give an abundance of peas through the season. The Blue Peter mentioned in the report had "petered out" with him and he had discarded it.

Mr. Dieterich thought the list of peas might be shortened and the Blue Imperial added, it being an excellent field pea. Cucumbers, he thought, should be planted five or six feet apart, so as to have plenty of running room.

Prof. Standish said that he had named the thirteen varieties of peas in the report to suit all tastes, but thought the report might be simplified by striking out from the list of early peas the Early Extra Premium Gem, McLean's Blue Peter, Laxton's Long Pod, and from the late varieties the British Queen.

Col. Carr had raised the Blue Peter with success and found it an excellent pea.

After a thorough discussion the report was adopted, as follows:

Your committee, appointed to revise the list of vegetable seeds, would beg leave to submit the following report:

Asparagus.—Conover's Colossal. Culture—Select the richest, driest soil; enrich highly with compost; cultivate deeply; plant fifteen inches apart.

Beans.—Dwarf, snap or bush: early Fejee, early Valentine, dwarf German wax. Pole or running: Giant wax, large Lima. Culture—Select clayey soil; plant in drills from two to four inches apart, two feet between the rows.

Beets.—Egyptian, Dewing's improved blood turnip, Henderson's pine-apple. Culture—A rich, deep soil, well manured the previous season; sow in drills, fifteen inches between the rows, one inch deep.

Cabbage.—Early Wyman, Fottler's improved, Winnig-taft, for family use; improved American Savoy, best of all. Culture—Cultivate deeply, manure liberally; plant eighteen inches by twenty-four inches.

Cauliflower.—Early Erfurt. Culture—Same as cabbage.

Celery.—White solid, Seymour's superb white, Sandringham, Turner's incomparable, Crawford's half-dwarf. Pink varieties—Carter's crimson, Sutton's Sulham prize, best of all. Culture—Plant in trenches or not, in the richest and best of soils, six inches in the row, three feet to four feet between the rows. Shade until the plants are well established; water freely. To blanch, draw earth around each plant.

Corn.—Early Minnesota, Moore's early Concord, Crosby's, Stowell's evergreen, Washington market, for trial. Culture—Plant in hills, two-and-a-half feet apart in the row, rows three feet apart.

Cucumber.—Early Frame, early Russian, early white spine, improved early white spine, long green. Culture—Plant in warm, moist, rich soil; in hills four feet apart.

Lettuce.—Hanson, early curled Silesia, Simpson, Boston curled. Culture—Sow in rich, moist soil, twelve inches between the rows.

Musk-melon.—Christiana, Sill's Hybrid, Cassaba, Hackensack, Ward's Nectar. Culture—A light, dry soil is the best, well manured; hills five or six feet apart.

Water-melon.—Mountain sweet, mountain sprout. Culture—Same as for musk-melon.

Onion.—Weathersfield red, Danver's yellow. Culture—A deep, rich soil, abundant compost. Sow evenly in rows, twelve inches apart.

Peas.—Extra early, Bliss' American wonder, Carter's first crop, Waite's Carac-tacus; early, McLean's little gem, McLean's advancer; general crop, Champion of England, Laxton's supreme. Culture—Plant in dry, rich soil, from four to five inches deep; rows fifteen inches to two feet apart.

Pepper.—Squash pepper for pickles. Culture—Set plants in warm, rich soil, rows eighteen inches apart, plants one foot apart in the row.

Radish.—Early scarlet turnip, French breakfast, long scarlet, Russian for winter. Culture—Sow in rich, light soil, in rows a foot apart. Cover the seed very lightly.

Squash.—Summer crookneck, Boston marrow, winter crookneck, Hubbard, Butman, for trial. Culture—Select the warmest, richest, driest soil possible. Plant in hills from six to ten feet apart.

Tomato.—Trophy, Gen. Grant; Acme is said to be the best. Culture—Plant in a warm situation, in good rich soil. Train the vines to stakes, three or four feet apart.

Potatoes.—Early Ohio, Early Rose, Peerless.

Mr. Edwards said he considered the red radish a perfectly useless vegetable, and thought it should be classed among the weeds; the white radish, however, was good.

Mr. Dieterich differed from Mr. Edwards as to the quality of the red radish. When grown in rich, moist soil he thought it very palatable.

Dr. Humphrey exhibited some fine specimens of Early Vermont potatoes, a seedling from the Early Rose, and thought it should soon take the place of the Early Rose.

Prof. Standish has found that under his cultivation the Vermont did not yield as well as the Early Rose.

Dr. Humphrey said that the experience of Eastern growers has demonstrated that the Vermont is a prolific bearer. The Early Rose has been almost entirely discarded by them.

Mr. Dieterich last year planted the Early Rose and Early Ohio, cultivating both under similar conditions. The Early Rose was the best yielder, but the Early Ohio proved to be a little the earlier. This year he planted for trial the Early Rose, Early Ohio and Snow Flake.

Mr. Hoover said that in his business during the past year he had found the Early Rose and Peachblow to be of an inferior quality and size. He hoped they would soon give place to some other varieties.

The President had tried the Early Ohio and Early Rose; the former yielded twice as much as the latter.

Dr. Bacon read from an agricultural report, made in the *Republican Standard*, of Maine, extracts showing the Early Vermont to be a heavier yielder than the Early Rose.

In answer to a question from Mr. Wiswell, Mr. Dieterich stated that he planted potatoes by quartering each potato and planting a quarter in each hill. When planted in rows, potatoes about one foot apart, the rows to be three feet apart.

Prof. Comstock had planted the Early Rose and Early Ohio. His habit was to plant the potatoes eighteen or twenty inches apart in the row; when planted in hills, to cut the potatoes so as to have one eye in each, and plant three eyes in a hill, eye upward and nicely covered. His Early Ohio yielded 340 bushels to the acre, while the Early Rose only gave 327 bushels.

The President announced the subject, "Small-fruits and bedding flower-plants," for discussion.

After repeated requests, Mrs. Standish gave the Society some very interesting and profitable views on flower plants. She said the Geranium stands at the head of bedding plants, because of its easy culture, its constant bloom, and the delicate and variegated coloring of its flowers and foliage. The Geranium may be propagated from cuttings. The Fever-

few is a very nice ornamental plant, with pure white flowers from June to September. It may be raised from cuttings or dividing the roots. When raised from the seed most of the plants will be worthless, there being no beauty in the single flowers. There is a large variety of foliage plants. With a little ingenuity many combinations may be made that will be very effective for borders. They propagate very easy from cuttings. A number of varieties of bulbous plants of the Amaryllis family are very beautiful and of easy cultivation. The Amaryllis formosissima or Jacobean Lily is a flower of great beauty. It is a tender bulb, but succeeds quite well; should be planted in rich, sandy soil. The under petals hang down, the upper curl up, and the whole flower stands nodding on one side of the stalk, making a fine appearance. Upon the approach of freezing weather the bulbs must be taken up and put away where they will be secure from the frost. The Althea is a well known ornamental shrub of easy cultivation. The double white variety is a little tender, but grows freely from cuttings, from which the double varieties are multiplied. The single varieties are raised from seed. The Colocasia has a large leaf and is very beautiful. The Tea rose is an excellent bedder, and blooms almost as constantly as the Geranium. Every person should have Tea roses. They are a little difficult to winter, but with care can be brought safely through. They should be always planted outside for summer bloom; may be wintered in cellars if the temperature be kept low and even.

Mr. Mars stated that from some cause unknown to him his Tea roses have invariably died during the winter.

In answer to questions, Mrs. Standish said she had raised the Drummond phlox. They are a good annual, but have the same fault that is found with all annuals; they are not permanent and have to be changed too often. The Verbena requires a frequent change of soil; a little sand mixed with our soil will help its growth, in fact for the proper growth of all flower plants our soil should have more sand. The earth should be mixed with compost, sand and charcoal. The Chinese Primrose is a winter bloomer; will grow out of doors, but is successful only as a house plant. The Crocus, Tulip, Liliun Candidum, are hardy bulbs, and small beds of each may be had without much trouble, and will add much to the effect in a flower garden. The Lily should be planted eight inches deep and in a place where the water will not stand; the Tulip should be planted six inches deep and six inches apart, and the Crocus three inches deep and the same distance apart. The Liliun Candidum should only be taken up and separated during the last of July or August, and should not be disturbed while growing and in bloom. The Liliun Lancifolium Album is not so hardy as the Rubrum; this is also true of the foliage plants, the light colored plants being less hardy than the dark varieties. This seems to be a principle of nature in flowers as in other things.

Mr. Dieterich said that nothing in his garden gave him more pleasure than that old acquaintance of every one who has had anything to do with a flower garden, the Pansy, or *viola tri-color*. It begins to open its modest but lively flowers almost as soon as the snow clears off in the

spring, and continues to enliven the garden until the snowflakes again begin to fall. It sparkles among its more pretentious neighbors, modest and beautiful.

Mrs. Standish thought every one ought to have flowers of some kind. A great many kinds of plants may be raised with little trouble, and every one should make their surroundings as attractive as possible, and adorn their gardens and dwellings with nature's ornaments.

Mrs. Standish recommended that a clump of Canna be set out by those who had room for them, and hoped the Park Commissioners would have some in the park.

Capt. Fuller noticed the comments of some persons who object to the action of the Park Commissioners in removing the unsightly trees from the park. He thought the good taste of a large majority of our citizens preferred a park to a forest, and indorsed their efforts to beautify the park grounds and have a park worthy of our beautiful city. It is scarcely fair to criticise a work but half performed. Let people wait until the designs of the Commissioners are fully carried out, and he ventured to assert that they would be more than satisfied.

Capt. Fuller moved that when the Society adjourn it be to meet at the residence of Mr. John Edwards, on Cedar street, at seven o'clock P. M. sharp, and the motion prevailed.

Mr. Dieterich stated that he had as yet noticed none of the house-martins mentioned by Mr. Beatty, but he had noticed some sharp weather since the bird is reported to have arrived.

MAY MEETING.

The Society met at the residence of Mr. John Edwards, on the 6th instant. A large number were present to listen to the discussion of the subject appointed for the evening: "Insects Injurious to Vegetation." Miss Emma Smith, Assistant State Entomologist, was present, on invitation of the Society, and, besides reading a paper on the Cabbage-worm, the Rose-slug and the Strawberry-worm, gave a most interesting and instructive lecture on the insect that is found abundant on the soft maple; and also made remarks upon the Carpet-beetle, that is proving to be such a pest in the Eastern States. Miss Smith seems to have a very happy way to interest her auditors, and she shows conclusively that she understands thoroughly the subject matter on which she speaks. Messrs. Lanphere, Humphrey, Hale, Dieterich, Mars and Bacon took part in the discussions of the evening, and by questions and otherwise many valuable and practical things pertaining to the interests of horticulture were elicited.

PAPER ON ENTOMOLOGY.*

BY MISS EMILY A. SMITH.

THE ROSE-SLUG.

It is no uncommon sight to see rose bushes with their leaves yellow and dried. When uncovered in early spring, they promise a good supply of roses and send forth buds in abundance, but in a short time the leaves commence turning yellow, and the roses are dwarfed and burst unevenly, and without the usual fragrance. This is such an annoyance to the ladies that I would propose giving a simple means of obviating this difficulty, and, if put into practice, will save all inconvenience the coming summer. Before combating with the enemy we would do well to learn what it is that is working such mischief. In 1840 the Massachusetts Horticultural Society offered a premium of \$100 for the most successful mode of destroying the object of so much trouble to the roses. Many persons, Harris included, commenced making investigations, and found the destruction was caused by an insect. The habits, briefly stated, are as follows: Early in the spring small black insects resembling flies somewhat, but different in having four membranous wings, can be seen flying about the roses, the females more sluggish in their movements than the males. The females when about to deposit their eggs unsheath their saw-like ovipositor, thrusting it obliquely into the skin of the leaf, depositing in each incision one egg. The eggs hatch in ten days or a fortnight after into small caterpillar-like worms. They have a small, round, yellowish head with a black dot on each side, and are provided with twenty-two short legs. The body is green, pale above, paler at the sides, and yellowish beneath. They are sluggish in their movements and eat mostly during the night, resting on the under side of the leaf during the day, although they may be seen on the upper side during the dark, stormy days. In the evening they appear and eat the upper surface of the leaf in large irregular patches, leaving the veins and the skin beneath untouched, and often appear in such numbers that not a single leaf on the bush is spared by them, and the entire foliage looks as if it had been scorched by fire. These worms cast off their skin several times, leaving it fastened to the leaves. After having reached their full size they leave the bushes by either crawling down the stem or rolling up and dropping off. When the ground is reached they burrow to the depth of one inch or more in the earth, when each one makes for itself a small oval cell, with particles of earth cemented with a little gummy silk, and change inside to the chrysalis, appearing again as saw-flies later in the season, to commence again the same round of existence the same season; thus appearing as worms twice in one summer. The insect is known to entomologists as the *Selandria rosæ* (Harris.)

From the above it is obvious the time to reach them is during the larval or caterpillar state. This can best be done by direct application to the bush infested. Many good remedies have been suggested, and considerable attention has been given as to which is the best. White hellebore used as a solution is well recommended, one-eighth of a pound to three gallons of water, well mixed, and well applied with the watering-pot. I have found, by experiment with our own rose bushes, that dusting the bushes just after a rain, or when the dew is on the leaves, with sulphur, applied dry in the powder, is an easy and effectual remedy. The insects eat the sulphur with the leaves, and sicken and die in a short time after. The application is made by means of a pair of bellows, kept for such purposes, and is preferred, since the under side of the leaf can be reached. It can be applied quite as effectually, however, by using a common sieve. The time to make the first application is about the middle of May, and, if proper attention is given, the roses will be spared the ravages of the worms, and more than repay the trouble

*The first part of this interesting paper was devoted to the natural history of the European Cabbage-worm (*Pieris rapæ*); but since almost the same ideas embodied in it are comprised in Prof. Thomas' articles upon the same subject, which are published in this volume, it is omitted here.

See page 243 of this volume.—EDITOR.

given by their beauty and abundant production of roses; and since the insect is double-brooded they should be examined late in July again, and, if any worms make their appearance, the remedy applied again until they are destroyed. They can be easily seen with the naked eye by turning the leaf over during the day time, and since they attack all kinds of roses all should receive attention alike, whether choice perpetual or single ones.

The Strawberry-worm.—The strawberry vines throughout the State are much troubled with the worm of the saw-fly known as *Emphyrtus maculatus* (Norton). During two visits, made in the past two years, at Morris, Illinois, I found the Wilson's Albany greatly injured by them, and the yield of berries unpromising. The worm has been known to appear in Illinois for some time, but only within the past five years to any serious extent. The matured insect is a four-winged saw-fly, which awakens upon the approach of warm weather from its home underground, and emerging, inserts the eggs in the stalk of the strawberry vine. In from ten to twelve days, according to the temperature, these eggs hatch into small, light green worms, much resembling the caterpillars, with the exception of the greater number of prolegs, the same as in the young of the rose-slug, as explained in a previous article. During the day time the strawberry worm is found upon the under side of the leaf, and when disturbed has the habit of curling up and falling to the ground. At night they do the most damage and come upon the upper surface of the leaf. Instead of eating the entire leaf they eat circular holes, and their presence in a field is at once detected by their peculiar manner of feeding. They also prefer the older leaves to the young and tender ones.

They complete their growth in from two-and-a-half to three weeks, and then descend into the ground some five or six inches and change into the chrysalis. This complete change is undergone by the time the strawberries commence ripening, and the harm is thus done at the most discouraging time of the year, since all applications must be made with reference to the berries partaking of the medicine as well as the enemy. Mr. Riley says they are double-brooded, but I have thus far failed to obtain specimens of the second brood, and Mr. O. B. Galusha, of Morris, informs me he has watched carefully for them, and to his knowledge they have not made their appearance twice the same season. Mr. Riley has undoubtedly studied them farther south, and similar to other insects they may prove double-brooded where the seasons are longer.

Dr. Hoffmeister, of Iowa, reported the appearance of the insect in the years '73 and '74 to an alarming extent, and stated that the blue-birds and chipping-sparrows fed upon them greedily. There have as yet no parasites made their appearance upon the worm, and remedies tried of a simple nature have failed to meet the desired effect; while such remedies as white hellebore are too expensive to be used on a large scale of from ten to fifteen acres of ground. The only practicable means of combating them effectually is by plowing up the vines while the insect is in the larval state, thus starving them and preventing the future increase; or scattering dry straw over the vines and burning them would perhaps answer, since in the latter case the roots of the vines would still live, and the loss would be the crop of berries. If the second brood would appear this could be done after the berries were ended, since Mr. Riley says they appear the second time in August. We have thus to lament the non-appearance of the second arrival. They are found in Peoria the present season quite numerous.

The following resolution was presented and unanimously adopted :

Resolved, That the thanks of this Society are due to Miss Smith for her able and most instructive lecture.

On motion of Dr. Humphrey it was voted that Miss Smith be made an honorary member of this Society. It was also voted that when this Society shall adjourn it shall adjourn to meet at the residence of Mrs. Rugar, on May 20th, to discuss the subject, "The Influence of Forest Growth and other Agents on Rainfall." The Society then adjourned.

DECEMBER MEETING.

The Society met, pursuant to call of the President, Saturday evening, the 20th inst., at the residence of Hon. T. J. Hale.

The reading of the minutes having been postponed, the President stated that no subject had been selected for discussion, and that the evening in the main would be devoted to listening to Professor and Mrs. J. V. N. Standish describe what they saw of interest to the Society in Europe.

Mr. Hale thought the Society would be glad to hear a report from Dr. Humphrey, of the recent meeting of the State Horticultural Society attended by him.

The Doctor responded. The State meeting this year had been a grand success, being similar in its character and the degree of interest taken to the meetings held eight years ago in Galesburg and seven years ago in Jacksonville. The southern district of the State was not represented this year. Some of their former representatives, men eminent in horticulture, were now dead, and as a consequence their Society was practically broken up. Among those missing from the meeting this year was Judge Brown, deceased, to whom the Doctor paid a high tribute for his good qualities as a man, as well as for his services to horticulture.

Among the good things accomplished the key-note had been struck in Ornithology, and bid fair to answer the vexed question, how to determine the injurious character of birds. Prof. Forbes, of Normal, in a paper on the subject, advocated a new method, and presented in tabulated form, as the result of his observations, a list of the various kinds of birds and the different kinds of food eaten by each, at different times of the year, from which persons can judge of the injurious or useful characteristics of birds.

The reports of fruit crops throughout the State were variable.

The next meeting is to be held at Warsaw, where it is proposed to have a four days' session, that will possess many advantages over previous meetings. Altogether the Doctor considered the meeting a very successful one.

President Lanphere then made the following remarks:

Ladies and Gentlemen,—We come here to learn, and to impart information. Each brings his store of knowledge, whether it be great or small, and adds it to the common fund; and each draws from that fund that which he needs, or which may be useful to him. We bring our experiences, in the cultivation of vegetables, and fruits, and flowers, and ornamental and shade trees; and we may here learn the kinds to cultivate, the proper time and manner of planting, the best mode of preparing the soil, the best mode of cultivation and treatment, and each may profit by the experiences of all.

But our attention is not confined to horticulture. Scientific subjects are dwelt upon, to the satisfaction and enlightenment of our members and the reading public. It is a time of great mental activity. Not simply facts, but the "why and wherefore," occupy the thoughts of men and women everywhere. Everything is questioned, even our own present existence; much more, our future existence. Authority goes for nothing. Except among a few scientists and their followers, there never was a time when dogmatic teaching had so little power as at present. We challenge everything and every-

body, and nothing but absolute truth, truth in nature and truth in life, can survive the ordeal. Our little Horticultural Society is in the current, and however humble it may be it has a right to speak and make itself heard, and it will be heard if it says anything worthy of notice and remembrance.

But it is not alone the practical, or the relatively practical, that occupies our attention; the beautiful interests us as well. Landscape gardening has always been one of the chief topics of consideration here. We seek to unite the useful with the beautiful; the beautiful in form, in color and in position. Life has its joys as well as its labor and toil. A leading object with this Society has always been art culture, and I am sure I know not where to fix a limit to that kind of culture. We may here consider, if not enjoy, the beautiful in all its forms—statuary, painting, landscape gardening, architecture and scenery; and why may we not add music as a study, and an enjoyment, and have practical illustrations of its soul-inspiring influence. Instrumental and vocal music could not be out of place here; care being taken to give to each object or subject only its proper share of attention; and thus our meetings would become truly “a feast of reason and flow of soul.”

We acquire knowledge through the senses, mainly through the eye and ear. It is best, of course, to get that knowledge at first hands, to see with our own eyes and hear with our own ears. But, unfortunately for many of us, much of our information can only be had at second hand. We cannot, in the body, travel through Europe and drink in the beauties and grandeurs that await one there, but must be content to see them through other eyes. True, the loss is accompanied by some gain. We can travel, in imagination, with the more fortunate, and see with the mental eye and hear with the mental ear the glorious sights and sounds, without the expense and annoyances that always attend travels in the body.

Europe, from the great age of its civilization and its vast accumulations of wealth, must be full of works of art, and art of every kind and character. Who has not longed, “as the hart panteth for the water brooks,” to travel in Europe and behold its wonders and grandeurs and beauties. Some persons may look upon a beautiful landscape or painting, but, from a want of sympathy, or ignorance, or stupidity, will see nothing to admire; while others, whose souls, like the strings of a harp vibrating responsive to harmonious sounds, will take in at a glance all the beauties and glories before them. Two of our most gifted and cultured members have recently made a tour of Europe. They went there to see and enjoy; and I am sure if any one could present to our mental vision the beauties of that fairy land, and enable us to realize the enchanting music there heard, it can be done, and will be done, by our learned friends, Prof. and Mrs. J. V. N. Standish, both of whom I now have the honor to invite to address us.

Prof. Standish prefatorily stated his inability to do even partial justice to the grand scenery of Europe in a dozen lectures, much less in a single evening. He had been asked to compare the things seen in Europe with those in America; our mountains with the Alps; the churches here with the cathedrals of the continent; the parks and lawns of the old countries with those of the new. Such a comparison, especially of the latter, were it possible to be made, would be unjust. The European countries have spent ages in improving and embellishing their surroundings, and everything there has a finished appearance. We, on the other hand, are young, and have just begun what it has taken Europe centuries to complete.

“Our lawns and parks do not compare with those of Europe. Their poorest generally surpass our best. Particular attention is paid to the parks in the old countries. All varieties of grasses are to be found there, as well as nearly all desirable kinds of trees and shrubbery. These are carefully watched and cultivated.

“We can never hope, with our climate, to have such parks and lawns. The atmosphere of Europe, especially in England and Scotland, continually charged with moisture, is especially adapted to the growth of grass and to perfect lawns, while our grass is often scorched with excessive heat.”

The Professor then gave an interesting account of his travels in Scotland and England. The parks in and around London are well kept and arranged, but do not compare with those of Paris, the French excelling all other nations in the beauty of their parks and lawns. He noted with sorrow the fact that Central Park, N. Y., is rapidly going to waste. It is a bad sign when the authorities of any city neglect its parks and refuse to assist in educating the tastes of its citizens.

In conclusion the Professor mentioned the Black Hamburg grape vine, at Hampton Court, called the “Queen’s Vine,” which is thirty inches in circumference and trained into a graperly which it fills.

Mrs. Standish being called upon, said she had tried to observe all the interesting things possible on her visit to Europe. The first interesting feature of the trip through England was a profusion of blue flowers growing along the route, which afterward proved to be Hyacinths of the single variety, which grew wild. The European Holly grows everywhere, and the Laurel, with its handsome, glossy leaf, abounds in the parks and adds greatly to their beauty. The parks in and around London are ornamented similar to our American parks, but they have the advantage of a finer climate. Among the bedders there the variegated Geranium grows nicely. The finest bedding was found in Paris, the French displaying better taste and greater skill in arrangement. The ribbon borders were very fine and arranged with great care and beauty. The variegated Geranium seemed also to be the favorite in France. A notable feature in Paris was the fact that all unoccupied ground was beautified in some manner, and made a very favorable impression upon strangers. At Versailles the bedding plants as well as the orangeries were very nice, and perfect arrangements were made for wintering the orange plants inside. At the artificial Swiss lake, that sprung into being in a single night, to gratify a desire of Louis XIV., there is a beautiful avenue bordered with Linden trees, which form a perfect arch. They comprise every variety of the Linden possible to be obtained, and by frequent pruning the effect is very fine.

The above is but a meager outline of the narration by Professor and Mrs. Standish, which was replete with interesting minutiae, which should be heard to be appreciated.

On motion of Mr. Hale, the subject chosen for discussion at the next meeting was, “Effects of Climate on Horticultural Pursuits.”

On motion of Dr. Humphrey the Society then adjourned, to meet on Tuesday evening, January 20th next, at the residence of Mr. David Sanborn, at seven o’clock sharp.

JANUARY MEETING, 1880.

A meeting of the Society was held at the residence of Mr. David Sanborn, on Tuesday evening, the 20th inst.

The meeting was an exceptionally pleasant and interesting one, the discussions being spirited from beginning to end.

After adjournment, the members of the Society inspected Mrs. Sanborn's collection of house plants. The display included a large variety of very fine specimens, there being particularly noticeable some fine azaleas, Chinese primroses, begonias and variegated geraniums.

The President having called the meeting to order, the Secretary read from the minutes of the preceding meeting the topic for discussion: "Effects of Climate on Horticultural Pursuits."

Prof. Standish being called upon, said the subject is a broad one and may be discussed from different standpoints according to the views taken. With one view the subject may be disposed of summarily and quickly. We may say that horticulture depends almost wholly on climatic influences. We may say the necessary elements are a deep, rich soil, well watered and well drained, sufficient sunlight and rainfall, without extremes of temperature. With these conditions and a skillful hand the waste places of our earth may be made to blossom as the rose. But it was from a different standpoint that he desired to discuss the question. He wished to tread more on scientific ground; but not so much as to be tedious. The word climate is from the Greek *klima* or Latin *clima*, which signifies to slope or incline, coming, no doubt, from the idea of the early inhabitants that the earth gradually sloped or inclined from the equator to the poles. It was afterward used to signify a belt or globe.

There are five continents—including Australia, six—all constructed on one common model—high borders and low centers, and being basin-shaped. In North America the Rocky Mountains are on the west, the Appalachian range on the east, with the basin of the Mississippi in the center. So it is with other countries—high borders and low centers. It is also a universal law that the highest borders or mountains face the largest oceans. This arrangement, especially and wisely, adapts the continents to the abode of man. What would be the effect were the highest mountains on the east coast of America? The long rains coming by the winds blowing from the east, northeast and southeast, the vapors being condensed by the high ranges, would fall upon the mountains, the winds would pass over without moisture, and the West would be a desert.

The Professor stated that the climates of Europe and America were modified by the Gulf stream, of which he gave an interesting description. He also said that an important fact in regard to climate is the unequal distribution of heat in the two hemispheres—north and south. The Isothermal equator is north of the Geographical equator. The cause of this is of an astronomical nature. The Isothermal lines north of the equator—the lines around the globe where the climate is always the

same—also run irregularly. On account of the shape of the earth's orbit the sun remains seven days longer, in each year, north of the equator than south, the north being consequently the warmer. In about thirteen thousand years this state of things will be reversed. Another cause is evaporation, there being more evaporation south than north of the equator, making it consequently colder. The coasts of California and Oregon are, owing to the Gulf stream, much warmer than the same latitude in Japan. From the same cause the Atlantic coast is colder than the Pacific by ten degrees. Among other climatic influences is variety of surface and soil, as well as high mountains and forests. In relation to uniformity of climate, Arago says that, for the last thirty centuries, Palestine has enjoyed a uniform climate of seventy or seventy-one degrees. This is not so, however, in Western Europe, where horticultural pursuits flourish; the fact being that uniformity of climate in a country is no indication of its adaptability to horticulture. England is in some respects better adapted to horticulture than America. They have better lawns. One cause is their larger supply of moisture, and the absence of our scorching heat. In Paris they also have better facilities for watering their lawns and trees. There are certain causes which produce climatic changes, and no climate is adapted to horticulture that does not possess the conditions mentioned.

Dr. Humphrey thought the subject under discussion a very important one, especially in this region, where a large number of persons make horticulture a pursuit—a means of gaining a livelihood. Climate affects the interests of these people from the growing of orchards down to the small-fruits. This is especially true of the latter. Some varieties of strawberries will not grow here at all, while they flourish in the East. Again, other kinds are grown here with success. The successful growth of raspberries and blackberries seems to be confined to special pieces of soil that possess the proper conditions. Success in horticulture does not depend wholly on the soil; heat and moisture also being essential. In illustrating, the Doctor stated that Humboldt, in his investigations, found among the mountains plants common to all climates—those usually found in the warm countries at the foot of the mountain, those common to the temperate zone farther up the side, and those indigenous to the colder climate near the top. The climatic influences prove that to be successful in horticulture requires a divided industry. No person may expect to succeed by the cultivation of a particular kind of fruit. There should be a variety, that some may succeed each year. Heat and moisture, being essential, should be supplied artificially, if no natural supply can be had. Plants have a regular development which requires particular conditions to complete.

Dr. Bateman, being called upon, said he came to listen and not to talk. It is true, though a somewhat painful fact, that people, if they would amount to much, must in a sense be specialists. This is true, because if one would know much of a particular subject he must devote a life-time to the study of it. It is painful because of the narrowing of the mind sure to follow the study of a speciality. The Doctor mentioned the feelings of sadness with which he always found himself in a large library—

conscious of the fact that even with a life of three score and ten, under the most favorable circumstances for the pursuit of knowledge, a person must leave the world knowing comparatively nothing. He gave an amusing account of the assurance with which he began to teach his first school, believing that he "knew it all," and the rapidity with which the delusion vanished. Experience teaches that our short life but brings us to the borders of the unknown in even human knowledge. But even though man's possibilities in the vast field of knowledge are limited, in comparing his present knowledge with that of years ago he felt that something had been achieved. He wondered where others could get the time for the collection of so much material on such a variety of subjects; and complimented Prof. Standish and Dr. Humphrey on their versatility in the discussions before the Society. He stated that nearly all his time was devoted to the study of the subjects taught by him in the college; and averred that the study of Psychology alone might be followed for a lifetime with profit. In relation to horticulture, he said he would state a fact that came under his observation, and allow the Society to speculate as to the cause. He was born in New Jersey, that long, narrow State, with one of the principal cities in the United States at each end, and which was finely located in reference to a sure market. Years ago it was the orchard of the East. For years peaches were a sure crop. The trees fairly groaned under the weight of luscious fruit, and in the summer of 1844 three steamers plied between the cities of Burlington and Philadelphia laden with fruit. Subsequently these orchards perished, and without apparent cause. On the other hand, when the peach orchards were prosperous the soil was scanty and the average corn crop from ten to fifteen bushels to the acre. By fertilizing, the soil has become rich, the same region of country is a perfect garden, and other large fruits grow in abundance. Good soil seems to be an essential to abundant fruits, as well as heat and moisture. There appears to be an almost spiritual affinity in plants for the particular soils upon which they feed, and if the qualities required are wanting it seems like taking oxygen from a human being.

In answer to questions by Mr. Warren Baker, Prof. Standish stated more minutely the size, direction, temperature, rapidity of the current, and shelving or roof-like shape of the Gulf stream.

Judge Lanphere said he had hoped that some one would take issue with the theory of Prof. Standish, that the long rains come from an easterly direction. The commonly accepted theory, twenty or thirty years ago, was that the greatest supply of our moisture came from the southwest, from off the Pacific ocean, and traveling northeastwardly met the winds coming from that direction, by which it was carried back and precipitated as rain.

Prof. Standish in support of his position gave an illustration of the movements of storms.

President Lanphere then read the following paper:

Productive soil is much the same the world over. It consists of decomposed rocks—primary and secondary—and of decomposed and decomposing vegetable and animal

matter. The difference in productiveness is the result of the difference in the proportions of these elements. It is the difference in the climate—in other words, the difference in the quantity of heat and moisture, and the time that heat and moisture are continued—that makes the chief difference in the earth's products. Give us the tropical heat and moisture, and for the proper period, and we can compete successfully with Cuba and Mexico in the production of the orange, the lemon and the pine-apple. At first blush we are apt to regard this difficulty, or impossibility, without artificial means, of producing all manner of products in all manner of climates, as an unmitigated evil, and in some way connected with the "primal curse"—"in the sweat of thy face shalt thou eat bread." The dweller in the temperate or frigid zone longs for the rich flavors and fragrance of the tropics, while he who swelters under the tropical heat as earnestly craves the fruits of the colder regions of the north. But when this difference of products is thoughtfully considered, when we take into account the vast results that naturally flow from it, we are compelled to regard it as causative of the greatest of human blessings.

This difference of products and our tastes, desires and appetites are the great providential levers of the universe—the trade winds and the gulf streams of the world. The wide world is ransacked to gratify our appetites, and millions of people are constantly employed in collecting and distributing the varied products of the earth. Mexico craves our apples as much as we, in turn, crave her oranges, lemons and pine-apples. That which was once a luxury becomes, by daily use, a necessity of life. How could we live without the fragrant Young Hyson, Oolong and Imperial? And better still, the rich flavors of the good Old Government Java and the stronger Mocha? If we would have the Greening and the Spitzenburg in their greatest excellence, we must send to New York for them; and we know that a correct taste and good judgment compels the New Yorker to send to Illinois for the Bellflower and that delicious apple that so forcibly reminds us of the loves of David and Jonathan. All these differences in kind and quality lead to interchange of products, and such interchange leads to discovery, to travel, to intercourse, and to the enlargement and liberalizing of our ideas. Intercourse tends to wear off the rough edge of character, to remove prejudice and takes the conceit out of us. We find everywhere something to admire, and can learn something of value from the veriest savages. This intercourse is a sort of universal solvent. Like the atmosphere that takes up, distributes and equalizes the exhalations and perfumes of the earth, intercourse distributes to all the thoughts of the race, and measurably compels each people to adopt the best habits, customs, inventions and thoughts of the most advanced peoples. If we could grow cheaply at our own doors all the varied products of the earth, the greatest incentive to discovery and invention and labor would be withdrawn, and men would retrograde into primitive savagery.

Interchange of products has led to inventions to cheapen and expedite such interchanges. It has given us the steamship, the railroad, the telegraph and the telephone. If necessity is the mother of variety of products, coupled with our appetites, it is the father of inventions. It has necessitated a vast multiplication of manufactured goods, and these in turn have led to the invention of labor-saving machinery, and generally have added to the comforts and enjoyments of life. Intercourse of products gives vigor, energy and enterprise to a people. It holds the ambitious conqueror in check, and is a bond given by humanity to keep the peace. For how can we have those much coveted products if we destroy the people who produce them?

Back of all the great discoveries and inventions, and enlightenment, and the general progress of mankind, lie these factors—variety of products, and our tastes, appetites and desires. They tend to humanize the race, to mitigate the horrors of war, to curb our brutish instincts and to open the flood-gates of human sympathy. A yellow fever epidemic, or a famine in Ireland, or in Silesia, is a blow upon the flinty rock of our selfishness, and lets loose a flood of living waters. But for the instant intercourse of nation with nation we should not know of the dire calamity until our lagging charities found only silent graves; nor would we have the facilities for conveying to the suffering millions the life-preserving bounty. Moreover, while we give that which sustains life and relieves suffering, a bond of union and sympathy is being formed, not only with

the recipients of our bounty, but with an intelligent and appreciative world; and this again is another guarantee, however feeble, against war; another bond to keep the peace; another ligament that binds man to man and nation to nation.

Dr. Humphrey, who evidently had been speculating on the cause of the perishing of the peach orchards spoken of by Dr. Bateman, said he thought the answer was in the statement made that the soil had been enriched to the extent stated by fertilizing. He thought the change made in the soil had probably destroyed the conditions necessary to the growth of peaches.

Prof. Standish stated that it is well known that plants, after a time, deposit in the soil a poison that destroys its power of nourishing the plant, which might account for the destruction of the orchards.

Dr. Bateman recalled a notable exception to the failures mentioned—the raising for a time upon some virgin soil in Vineland, N. J., of peaches similar to those of former years. This orchard subsequently failed also. He was inclined to support the theory of Dr. Humphrey. It is surprising how a small change in the conditions will change results. Dr. Bateman here gave an interesting narration of an experiment made by an advocate of homeopathy, being the opening of a small box of musk in a hall, the doors and windows of which were hermetically sealed, and which also contained an immense audience. After a given time the audience, being unaware of the experiment, were asked how many were visibly affected by the presence of the substance, and all rose without exception. It was found upon weighing the box that its weight had not diminished enough to be perceptible in the most delicate scales. In this connection he also gave his experience with roses. He suggested the thought that there being such a nice adjustment of human life with relation to the gases, may it not be so with plants in relation to the soil?

The Society adjourned to meet February 17th next, at the residence of Mr. J. K. Mitchell, the present subject to be continued, and Prof. and Mrs. Standish to be invited to compare the climates of the old and new worlds.

Kankakee County Horticultural Society.

PROCEEDINGS FOR 1879.

REPORTED BY HENRY S. BLOOM, *Secretary*.

OFFICERS FOR 1880.

<i>President</i> —Milo Barnard.	<i>Vice-President</i> —F. L. Merrick.
<i>Secretary</i> —Henry S. Bloom.	<i>Treasurer</i> —Mrs. Mary Barnard.

JANUARY MEETING.

The meeting was called to order by President Barnard, who announced the subject for discussion, viz.:

“Pruning of Apple-trees and how to induce fruitfulness in the same.”

President Barnard had succeeded in fruiting the Yellow Bellflower by girdling the limbs; that is, taking out a narrow strip of bark around the limb when the tree is in full bloom. The experiment had been very satisfactory.

Wm. Cooper had tried the same experiment on the Yellow Bellflower and Golden Russet when the trees were in full bloom, but with him the result was not satisfactory; he had no faith in it.

F. L. Merrick was in favor of winter pruning, when the weather was not too cold, but would cut off water sprouts in the spring. He would trim at least six feet high.

Wesley Cooper was no friend to pruning at any time of year; would as soon cut his trees down as to cut off large limbs; was in favor of low-down limbs, so as to completely shelter the trunk. The Yellow Bellflower did very well with him; his orchard was never pruned, and generally bore plenty of apples.

John Blackstone had not succeeded with Yellow Bellflowers; the Northern Spy bore well for him after the trees became of age.

Wm. Cooper would trim but very little and would have the limbs low down; had trimmed one orchard high enough so he could work under the trees with a team; the trees commenced traveling to the northeast and were dying out; would give more room to trees and raise nothing else on the ground after the trees came into bearing.

A. L. Miner had set three orchards, the first one many years ago, on good soil, in the Wabash country; had trimmed high; trees soon died out; had set two orchards in this State, the first one did not trim so closely as in Indiana; the trees did better and bore well after seeding down. The second and last orchard in this State he did not trim at all, but seeded it down as soon as the trees commenced bearing; had healthy trees and plenty of apples. The limbs were down low so the hogs could help themselves to fruit. The Bellflower does well with him in sandy soil—trees thirty-three feet apart. He manured his orchard as he did his corn field and had no trouble in raising apples.

A. Melon was opposed to trimming trees high. He knew a neighbor who had an orchard of untrimmed trees that bore well; afterward the orchard passed to other hands, who trimmed and pruned, and the trees ceased bearing, and are now dying out. He thinks that protection belts of timber are a damage, especially Black walnut, and cited several orchards without protection that are doing well.

Wm. Cooper knew of several similar instances.

Mr. Merrick's orchard was quite unprotected and bore very well; would set Yellow Bellflowers forty feet apart. Trees that were set next to a Black walnut grove had all died.

The members present, in general, opposed pruning. The prevailing opinion among members was that we should prune less, manure more and plant at greater distances apart, not less than thirty-three and from that to fifty feet. We could not, of course, have so many trees, but we would have healthier ones, with more and better fruit; that timber shelter-belts are of no advantage to an orchard, but that dry soil is; that fruit trees, in this country, would not succeed on wet soil.

Upon a suggestion from President Barnard a motion was made by Mr. Melon that we petition the Legislature for aid to county horticultural societies on a basis similar to that of county agricultural societies, which was carried.

The subject of "Orchards and the Storing and Keeping of Fruits" will be discussed at the next meeting; also the subject "Flower Culture."

The President appointed H. S. Bloom to prepare and read an essay on Flowers and Flower Culture, at the next meeting.

REPORT OF FRUIT COMMITTEE.

The apples exhibited by Milo Barnard we find to be very fine, viz.: Yellow Bellflower, Golden Swaar, White Pippin, Rawles' Janet, Milam, Willow Twig, Nelson's Sweet, Lyman's Pumpkin Sweet and Ben Davis.

Wesley Cooper exhibited some beautiful specimens, viz.: Ben Davis, Flushing Spitzenberg, Golden Swaar, Winter Pennock, Roman Stem, Rhode Island Greening and Tolman Sweet; also two varieties we are unable to name.

Daniel Kriebel exhibited several varieties, among which are Ben Davis, Wagoner, Rawles' Janet and Jonathan.

Wm. Cooper also exhibited some fine apples.

F. L. MERRICK, *Ch'n Fruit Com.*

MARCH MEETING.

The Society met in the Supervisors' room in the Court House, on the 11th inst. In the absence of President Barnard, the meeting was called to order by Vice-President F. L. Merrick.

The subject of Gathering, Storing and Keeping of Apples was taken up and discussed at considerable length. Mr. Burton picked when fully ripe; some varieties, such as Rawles' Janet, were left on the trees as long as possible, or till there was danger of freezing; he kept them in barrels in a cool place till cold weather set in, then put them in the cellar. In this way he had no difficulty in keeping apples.

Mr. Drayer, of Yellowhead, picked apples when fully ripe; stored in sheds till cold weather, then removed to cellar, sorting carefully, and stored in barrels and boxes. His apples kept remarkably well; they will spoil by lying in heaps in the sun, hence should have as little sunshine as possible after picking.

Mr. Merrick has had considerable experience in gathering and storing apples, for some years; he picked them when fully ripe; put into barrels in the orchard; then hauled and stored them, in out-houses or corn-cribs, as soon as convenient; left there till cold weather, then removed to cellars, carefully sorting. Apples thus treated always kept well. He had stored on shelves, six to ten inches deep, but they are apt to shrivel and do not keep so well. Apples should be kept in the dark.

Mr. Burton had picked apples from the trees when frozen; they did not keep well; nearly all spoiled; others, left till the frost came out, and then picked, kept tolerably well.

Mr. Merrick had barreled apples when frozen hard in heaps in the orchard, then removed them immediately to the cellar, where the frost came out slowly and they kept very well.

Mr. Miner had been in the habit, lately, of picking his apples and storing immediately in bins in the cellar; did not keep well: something was the matter; he would like to know what it was.

Mr. Mellen picked his apples, and then put them in boot or shoe boxes, and stored immediately in the cellar; nearly all rotted except the Little Red Romanite, and that was so poor it couldn't rot. Apples picked before ripe wilted and shriveled and did not keep well with him.

In a communication from President Barnard, in regard to early picking, he says he had heard it stated that the little Pomme Grise, a winter apple, if picked early would keep well. He tried it; picked two barrels in September and put them in the cellar immediately; looked them over in December and found them half rotten. The experiment was not satisfactory at all.

Mr. Drayer had kept apples in fine condition, in bins, in the ground. He sunk a box a foot or more in the ground, covered it with boards like an inverted V; covered this with hay or straw and a light covering of earth; and if weather gets very cold, put on an extra covering of manure, which he takes off as the weather gets warm. Apples treated this way kept very well.

At this point considerable discussion took place in regard to varieties, mode of planting and general treatment of an orchard.

Mr. Miner wanted to know something about the russets. He thought he had the Roxbury Russet; it bore very well.

Mr. Merrick said the Roxbury Russet does not grow well in this country, according to his experience and observation; the tree is tender. The Perry Russet, also the English Russet, do very well here; the American Golden Russet and the Pomme Grise are the best russets.

Mr. Bloom's experience with the russets was the same as Merrick's. He considered the Pomme Grise one of the very best; tree hardy, a good bearer, and fruit keeps well; quality best; rather too small to be popular.

Mr. Mellen has a Northern Spy that bore its fruit for the first time at the age of twenty-three years; he objected to both tree and fruit. The trees seldom bear, and when they do the fruit is only third-rate and does not keep well. With him the Northern Spy is a failure.

Several members said the Northern Spy for the last two or three years has spotted or scabbed very badly, which spoils it for market.

Mr. Burton gave his experience in girdling the trunks of trees and the limbs to induce fruitfulness. He took out a narrow strip of bark, around the trunk or limb, about the tenth of an inch in width, when the tree was in full bloom; the result was very satisfactory. He had obtained the same results by putting withes around the tree and drawing tight. His trees grew and blossomed well, but did not bear till he commenced the process as related above. His soil is sandy loam; subsoil, quicksand.

Messrs. Merrick and Mellen said they would use small wire instead of girdling; anything to arrest the downward flow of sap. Wire could be more easily applied than anything else.

Mr. Mellen said he would like to see the inside of a tree or limb that has been girdled; he is afraid the tree is injured by it. One reason why he looked with suspicion on the girdling process was that trees just before death generally bear well.

In regard to *filling in* old orchards, Mr. Burton thought it was best to throw out the old earth and roots and fill in with new soil; he had no trouble in raising new trees in that way.

Messrs. Drayer and Merrick thought that plenty of manure would answer the same purpose.

Mr. Merrick had set young trees by the side of the old stumps and had them grow well. He mulched heavily with coarse manure.

Mr. Drayer had fed his stock in his orchard winter before last and last summer; he had a splendid lot of apples, large and fair; was in favor of manuring an orchard the same as any other crop; did not object to keeping hogs in the orchard.

Mr. Miner kept hogs in his orchard; did not have so many wormy apples as they had in orchards where no hogs were kept.

Mr. Merrick said he would rather keep hogs in his orchard than wormy apples in his cellar.

Mr. Barber gave his experience in handling apples; he gathers when fully ripe; keeps them as cool as possible and in the dark; stores in barrels and on shelves in the cellar; his apples keep well.

The general conclusion among members was, to gather apples when fully ripe; keep as cool as possible without freezing, in barrels or boxes, not too large and in the dark. Apples thus treated would generally keep well.

Subject for next meeting: Small Fruits, best varieties, and best mode of culture.

APRIL MEETING.

The Society met at the City Hall in the city of Kankakee on Tuesday, April 8th.

The meeting was called to order by President Barnard.

Essays being called for, Mr. Mortimer responded by reading one entitled "Apples every year," which was very interesting. The Society voted its thanks to the reader and requested a copy for publication, which was granted.

APPLES EVERY YEAR.

ESSAY BY HENRY MORTIMER, MANTENO.

The heading of my article indicates a want felt by every producer and consumer of the most valuable fruit grown in our section of the country. The value of the Apple as a healthful article of human food, being almost a necessity as well as a luxury, is a proposition that may be safely assumed without argument. The object of my present essay is the discussion of the question, "Can we grow apples every year?" If I succeed in giving one new idea having a direct bearing on this subject, thereby inciting further investigation, my purpose will be accomplished.

The most careless horticultural observer has not failed to notice, here as well as elsewhere, the great difference in the amount of the apple crop in different years. One season we have an overabundant supply, which is often followed the succeeding year by an almost total failure. These excessive and partial crops often fail to pay the grower in the first instance, and the high prices the off-year restrict many families to an insufficient supply.

It will be readily admitted that any plan that is practicable, the adoption of which will increase the crop the non-bearing year, is desirable. Removing the blossoms or very young fruit of a tree, which of course prevents fruiting that year, will, if the season

proves favorable, result in a crop the succeeding year. I remember an apple-tree that many years ago had all the blossoms taken from about half of it. Afterward it fruited every season, but on each side alternately, for several years; at length a severe spring frost destroyed the fruit; after which time the entire tree bore a full crop each regular bearing year, the same as other trees in its locality.

The theory is that an apple-tree expends all its surplus power in its growth and in the growth and perfection of its fruit. Therefore, no fruit buds being formed during the fruitful season, it follows that there can be no bloom the season following; hence no fruit the succeeding summer and autumn. During this off-year, however, the tree perfects its buds for fruiting the next year. As a rule these trees which yield the largest crops one year are most likely to fail the next. As an instance of this I cite the fact of having trees, of the Rawles' Janet, overstocked with apples, and the year following, on some of the same trees, not a single specimen could be found. Again, I find the Willow Twig, Peck's Pleasant, and some other varieties, which are not very prolific bearers, usually yielding a small crop the off-year.

Regarding the plan of removing the blossoms or young fruit, except in a small way, as impracticable, or at least very tedious, I formed a theory that the object desired could be attained by enriching the soil on which the trees stand.

I am well aware that manuring orchards, to increase their fruitfulness and improve the size and quality of fruit, is neither new nor original. But I claim as original the selection of the time when this work should be done, never having read or heard any hints on this point.

As previously stated, the fruit buds being formed the non-bearing year, it occurred to me that an application of manure in the fall or early winter, as soon as practicable after the season's growth, would, by absorption, so enrich the soil that the commencement of next year's growth would find a surplus of ready material for the trees to draw on, as needed, which would be sufficient to continue their growth, perfect their crop of fruit, and produce fruit buds for next year's crop, all in the same season.

Acting on this theory, I now propose to give you the result of some experiments. Late in the fall of 1875, that being the off-year for apples, I spread a liberal quantity of barn-yard manure under a few trees, the varieties selected for experiment being Duchess of Oldenburg, Tolman Sweet, King of Tompkin's County and Yellow Bellflower. I also spread a few bushels of cob and wood ashes under the same trees, using them most freely for the benefit of the King and Bellflower, as these varieties produced small crops the previous bearing year.

The season of 1876 gave a bountiful crop of fruit, most varieties, excepting the Bellflower and a few others, doing well. During that year I could see no difference in favor of the manured trees, except the leaves, which were a darker green, appeared more vigorous.

The next year (1877), being the non-bearing year, I was gratified to find in the spring a full crop of blossoms on the Duchess, Bellflower and Tolman Sweet, and a fair amount of bloom on the King. I was pleased to find so much bloom on the Tolman Sweet, as in the neighboring orchards, on this variety, there were none.

The worthy President of our Society, Mr. Milo Barnard, happened to pass my place at that time, and at my request accompanied me through the orchard to see for himself. He was so much pleased with the promise of fruit that he engaged some Tolman Sweet apples on the spot.

As the season advanced, I found a full crop of Duchess, a moderately fair crop of Tolman Sweet, a small crop of Kings, and, with the exception of here and there a specimen to let me know that the Yellow Bellflower apple-tree can produce fruit, this variety was a failure.

Although not entirely successful, I came to the conclusion that my theory had some foundation in fact, at least enough to render it worthy of a more extensive trial.

Late in the fall of 1877, it being the off-year, as stated, and during the early part of the succeeding winter, I applied a considerable quantity of barn-yard manure broadcast over my orchard, and also fed a number of hogs in it.

This winter I have noticed on several different varieties a much larger number of fruit buds than usual for fruiting the coming off season. Whether they have been

killed by our unusually severe winter I cannot now determine. As varieties greatly differ, in the decree of cold they can safely endure, some may stand the storm.

The Perry Russet has probably the greatest number of fruit buds, but the excess is no doubt largely owing to the killing of a part of the fruit by the cold weather of last spring. This variety produced a smaller crop last year than usual for the bearing season, hence left much of its vital force free, to be expended in the growth of fruit buds for this year's crop. If these buds live through this winter, and escape damage from spring frosts, I predict that those who have the Perry Russet in this locality will be rewarded this fall with a fair crop of fruit.

If I were asked to name two good varieties for fruiting every year, with my present limited experience, I would select Duchess for summer and Northern Spy for winter. The extreme hardness of the first, and the second blooming late, both are likely to yield crops of fruit when other varieties fail. Further experiments by interested parties will doubtless prove many more varieties worth adding to the list.

For those having bearing orchards, in order to test the truthfulness of my statements, it scarcely remains necessary to remark that the coming fall or early part of next winter will be the proper time for manuring; not the present winter, as enriching the soil now will increase the number of fruit buds the coming spring for crop of next year, which will, in our locality, be the regular year for fruit.

Where an orchard is already very rich in all the essentials necessary for the growth of wood and fruit, the chances of success will probably not be so great as in one that is poorer; in such cases, plowing early in the bearing season, with frequent summer harrowings to destroy weeds, would probably assist in accomplishing the desired object. If some mechanical contrivance, as a rake with short comb-like iron teeth, could be used for removing a portion of the young fruit, this of itself might enable the tree to grow fruit buds the next year, and the fruit left would grow larger and be better for taking off nearly half of it soon after forming.

I do not wish it understood that I believe success will in all cases be attained by following out the views just given. Seasons are likely to be in the future, as they have been in the past, favorable and unfavorable. I have only stepped into a field where much remains to be cleared, where theories can be formed and afterward submitted to the "crucial test of truth." Time will determine which is right; and here, in conclusion let me remark, becomes apparent the advantages of our Society, for a truth discovered by one of our members through the medium of our organization becomes the property of all.

President Barnard made a report on library.

H. S. Bloom presented the following resolution :

Resolved, That the raising of small-fruits here, for market, is not profitable.

O. W. Barnard said he had raised gooseberries quite extensively the past summer, but thought the people farther south had the advantage of us by being able to get into market ahead of us, and by the time our small-fruits were ripe the markets were generally glutted, and hence we could not realize near the cost of production. The variety he cultivated was the American Seedling, which has no blight; requires an open location and plenty of sunshine. In picking, used shallow boxes about four inches deep, and from twenty to thirty inches square; set them under the bushes, and with gloves on stripped the branches of their fruit, of course gathering some leaves also, but they were easily separated from the fruit.

Mrs. Mary Barnard thought currants could be raised with some degree of profit, as they were used quite extensively for making jelly and for canning, also for making currant wine, but the lady did not approve of using them for the latter purpose.

Wm. Cooper said his experience with small-fruits was limited, having confined his products in that direction mostly to a sufficiency for his family and his neighbors; had marketed raspberries, but had never sold at a profit; thought dealers discriminated against home-grown fruit; cited some instances that seemed to confirm his statement; was in favor of raising a variety of small-fruits for home consumption, as they were wholesome and productive of good health. He considered the Red Dutch the best currant; had planted currants in his orchard thirteen years ago which had borne constantly and abundantly ever since; had manured once or twice, and his hogs had rooted up the ground between the rows several times; had planted three rows of currants between two rows of apple-trees. In answer to a question, he said he did not think currants bore quite as well where the shade was densest.

Mr. Bloom said he had raised currants under pear and cherry-trees and found the fruit equally as fine as that grown in full sunshine, while their season was prolonged at least ten days; used plenty of manure; considered the Red and White Dutch the best; had tried some of the newer varieties, but found them no better than the old ones.

Mr. Barnard thought the Red Dutch and White Grape the best.

Mr. Mortimer had found nothing better than the old-fashioned Red Dutch.

Mr. Cooper had not succeeded very well with strawberries, owing perhaps to poor varieties, but should try again; had succeeded well with black-cap raspberries; planted in hills and cultivated both ways by horse power.

Mr. Cooper asked what was the best varieties of strawberries for family use.

Mr. Barnard answered as follows: For the million and for market, "Wilson's Albany;" for family use, the "Green Prolific," which is very hardy; holds its fruit well above the soil, and the fruit is easily separated from the calyx, which is quite a recommendation to housewives. It is a pistillate variety and needs an occasional row of some staminate variety to fertilize it, such as Wilson's Albany or Kentucky. There are other varieties that are considered very good, such as the Charles Downing, the Crescent, the Kentucky and some others. The Crescent is very highly esteemed by those who have raised it. The Sharpless is one of the new candidates for public favor, about which marvelous tales are told of its great size and other good qualities.

Mr. Bloom thought people could afford to wait a while for results, as a few years ago a great deal was said in favor of the "Agriculturist," and many people went for it, but now nothing is heard of it.

Mr. Mellen said he had had a good deal of trouble in raising strawberries; had never succeeded a second time on the same ground; considered the Lawton blackberry a nuisance.

Mr. Barnard would never plant strawberries a second time on the same ground. In answer to a question, he stated that he would always plant in the spring in this climate; would plant in rows three or four feet apart and cultivate with a horse. As to blackberries, he said the

Lawton and Kittatinny were killed to the ground; were not hardy enough for this climate, which was the opinion of the members generally. He thought the "Snyder" was perfectly hardy, at least it proved so with him. This spring it seemed alive to the very tips of the canes.

Mr. Cooper said that Mr. Nelson, of Wilmington, said it was alive with him and he considers it very hardy.

Mr. Barnard, in answer to a question about raspberries, replied that he thought the Doolittle very hardy and a good berry. The Mammoth Cluster or Miami was from five to seven days later than the Doolittle and a better berry. The Gregg is represented as being first quality in every respect.

Mr. Cooper made some remarks about experimenting with new varieties of fruits, etc. He thought that nine-tenths of the experiments were failures, but that we should not be deterred from experimenting because we sometimes fail. Of course some have not the requisite time or means to experiment, but those that have should do the best they can, and when successful, or otherwise, make report, that others may be benefited by their experience; and right here is where our Society can and will be of great benefit to its members and the country at large. Could I have had the experience of such a society as ours when I first commenced planting fruit-trees it would have saved me at least one thousand dollars. I should not now have a lot of worthless trees.

Mr. Barnard thought we could be of great benefit to each other and to the community by following Mr. Cooper's advice, and that was one of the objects of this Society to obtain and disseminate information.

Mr. Mortimer thought a risk was incurred in trying too many new things, and therefore experiments should be very carefully made.

Mr. Bloom said that several persons had applied to him for a list of a dozen good varieties of apples, and would like the Society to make out such a list.

O. W. Barnard moved that the President name a dozen varieties, and if approved by the Society that they be recommended. Carried.

For summer, Duchess of Oldenburg, a Russian apple, very beautiful, medium size, juicy, sour, good for cooking; tree medium size and very hardy. Red Astrachan, another Russian variety, an abundant bearer of fair, handsome fruit, rather sour for dessert, but excellent for cooking. Golden Sweet, tree hardy and vigorous, fruit excellent and very sweet. [Mr. Mortimer said plant two or three trees of the "Early Joe" for children, and all the members said amen. Tree medium size, moderately vigorous, an early and abundant bearer of the very best quality of fruit.] For autumn, Lowell; tree vigorous and healthy, fruit very good. Maiden's Blush, one of the very best; tree hardy, vigorous and productive, bears early, fruit always fair, good size and one of the best for drying. The Hurlbutt and Rambo might also be included in the autumn list. The fruit of both is excellent. The limbs of the Hurlbutt sometimes split or break off, and the Rambo is not long-lived. Bailey Sweet; tree vigorous and productive, fruit large and red, very good. For winter, Jonathan, one of the best in every respect. Ben Daws; tree hardy, early

bearer, fruit always fair, but not of the best quality, excellent keeper. Rawles' Janet; tree hardy, an abundant bearer, every alternate year, fruit of good quality and keeps well; an excellent cider apple. Roman Stem; tree hardy, fruit good and a good keeper. Tolman Sweet; very good while trees are young, fruit medium size, very sweet. Nelson's Sweet; originated in Will county, tree very hardy, an abundant bearer, fruit above medium, dark green, very sweet, will keep till June, but best about the first of May.

There was some discussion in regard to plums. The Lombard and Magnum Bonum were thought to be the best here. Remedy for curculio—salt, ashes and lime sprinkled plentifully under the trees soon after the blossoms fall.

Mr. Allers said he had succeeded in raising plums when treated as above stated.

Mr. Mortimer exhibited some fine specimens of Rawles' Janet apples.

President Barnard exhibited some very fine Roman Stems and Rawles' Janet, and splendid specimens of Nelson's Sweet, and also a Concord grape vine of last season's growth, nineteen-and-one-quarter feet long.

JUNE MEETING.

The Society held its regular monthly meeting at the residence and on the grounds of Dr. A. L. Small. Notwithstanding the rain in the early part of the day and the threatening aspect of the weather, quite a goodly number of our horticultural people got together about noon and had quite a pleasant time till evening. The show of strawberries and roses was very fine. There were twelve entries of strawberries and eleven of roses. After dinner the meeting was called to order by President Barnard and the business of the Society proceeded with.

A motion was made and carried that the President appoint a committee on strawberries and roses.

The President appointed as a committee on strawberries, Henry Mortimer, Cephas Williams and B. G. Lee; and as a committee on roses, A. L. Small, Jane Barnard and Mrs. Mortimer.

The awards on strawberries were as follows: Best and greatest variety, Wm. G. Nelson, of Will county, \$5.00; second best, Milo Barnard, \$2.00.

Best single quart of any variety, Green Prolific, Milo Barnard, \$3.00; second best, "Chas. Downing," Wm. T. Nelson, \$1.00.

Best quart Green Prolific, Barnard, \$1.00.

Best quart "Wilson," D. L. Durham, \$1.00.

Best quart "Chas. Downing," Nelson, \$1.00.

Mr. L. E. Cunningham exhibited some monster berries, but not having the plant in fruit, nor named, could not compete for premium. The berries exhibited by Mr. Cunningham were raised by Mr. James Mix, of this city. Mr. Mix said he procured the plants at Columbus, Kentucky, and he calls them the "Columbus." After examining Mr. Mix's

plate of strawberries, I must confess they are ahead of anything in the strawberry line I ever saw. He says the plants are very vigorous and wonderfully productive of very large fruit; many of the berries weighed an ounce and over. Mr. Mix has no plants to sell.

Mr. F. E. Eggleston exhibited some "Kentuckys," which were very fine.

Among other exhibitors were Messrs. Lee, Powell and St. John.

The awards on roses were as follows:

Mrs. N. B. Pratt, for best and greatest variety raised by exhibitor, fifteen varieties, \$3.00; second best, Mrs. Mary Barnard, fifteen varieties, \$2.00.

Best display of June roses, Mrs. Mary Barnard, \$2.00.

Best rose bouquet, Mrs. N. B. Pratt, \$1.00; second best, Mrs. B. G. Lee, 50 cents.

Mrs. R. H. Enos and Mrs. Powell exhibited some very fine roses.

The exhibition of strawberries and roses, taken together, was very satisfactory, and the Society feels very much encouraged to go on in the good work.

The next meeting of the Society will be held on Saturday, the 12th of July, on the M. E. camp-meeting grounds, two-and-a-half miles southeast of this city.

AUGUST MEETING.

The Society met at Salina Grange Hall, on the 9th inst. Meeting called to order by the President.

As there were many present that were not acquainted with the Society and its benefits the President read the constitution and by-laws. Mr. Cooper made some remarks upon the benefits to be derived from such a society, and said if he had been a member of such a society for one year when he was starting his orchard he would have saved, at least, one thousand dollars.

Mr. Lane spoke of the benefit, of raising fruit and flowers, to the people; he thought that those interested in their cultivation would be benefited mentally, morally and physically.

Mr. Hawker was very anxious to have his neighbor, Mr. Shreffler, join the Society, as his orchard was across the road from his home, and if Mr. Shreffler got posted on horticultural matters and improved his fruit he thought he should be benefited. He had no fruit on his own place; had planted three orchards, but they died for want of care. Like a great many other farmers, he could not take care of so much corn and trees too.

Mr. Mellen said he had trees in his orchard, bought of a tree peddler, that were not even good for fire-wood; he thought the farmers should learn to graft, then they could easily get all the fruit they wanted.

Mr. Williams had heard the Sops of Wine apple spoken of many times, and intended to get some of the trees as soon as possible; but by

coming to the meeting to-day he had found that he had all he wanted on his place, but did not know the name before; he also learned at the June meeting how to raise strawberries.

There was a fine display of apples and the President gave a description of some of them; recommending for this climate, Red June, Primate, Sops of Wine, Duchess of Oldenburg, Red Astrachan, Sweet June, Gravenstein, etc.

The President re-appointed the standing committees of the last six months.

The committee to look after the horticultural display at the County Fair are as follows: Milo Barnard, Supt.; Mrs. Decker, H. S. Bloom and H. Mortimer.

There was also a committee appointed to solicit horticultural products for the fair, in the several towns, viz.: John Blackstone, Bourbonnais; Cephas Williams, Limestone; Thos. Stroud, Salina; A. L. Miner, Momence; A. L. Small, Kankakee; S. A. Randall, Yellowhead; B. McKinstry, Sumner; Mary Barnard, Manteno; F. L. Merrick, Aroma; A. Mellen, Otto.

Mrs. Pratt would suggest to the ladies of the several towns to bring flowers and plants, either cut or in pots, as would be most convenient, so as not to have to rely upon the ladies of Kankakee altogether to fill up the floral department. Of course it would be some trouble, but she was sure they could make a very creditable display.

A vote of thanks was tendered to the people of Salina and adjoining towns for their cordial welcome of the Society, and the very excellent dinner they provided for the members thereof and all others that were present. Twenty-two new members joined the Society.

The next meeting of the Society will be held in Momence, at Murphy Hall, Saturday, September 13th.

SEPTEMBER MEETING.

The Society met at Momence, on Saturday, the 13th inst., in Murphy Hall. The meeting was quite well attended—some sixty persons were present, besides the children.

The show of fruit was very fine. Mr. Bonvallet, of Belle Park, was there with some ten or twelve varieties of grapes that were very fine. Among the fruit men present we noticed Mr. McKinstry, of Sumner; Wm. Cooper, Knox; John McElroy and Mr. Blackstone, of Bourbonnais; Mr. Mellen, of Otto; Mr. Vail, of Momence, and others.

The Society is under obligations to the ladies of Momence and vicinity, and especially to Mrs. A. L. Miner, for the sumptuous dinner prepared and spread for the members and visitors.

After regaling the inner man, and discussing the fruits, the meeting was called to order by President Barnard, who made some remarks about the last meeting of the Society, and in regard to competition by other

societies at our county fair, and read a letter from the Alton Horticultural Society in regard to exhibiting fruit, etc., and his answer to same. The President said he had not been able to consult the Executive Committee and had taken the responsibility upon himself to make such suggestions to competing societies as to him seemed proper to facilitate their exhibition at our county fair.

Mr. Cooper made a motion indorsing the action of the President in the premises, which was approved by the Society.

Mr. Miner said he was appointed a committee to select fruits for the Society from the east part of the county, and would like to have donations of fruit.

The President called upon members for information in relation to fruit prospects in their several localities.

Dr. Small said apples were almost a failure with him, and but few in his vicinity.

Mr. McKinstry said he had no fruit of any consequence; what there was was good; among pears, the Duchess is the best.

Mr. Stoddard said he had a fair show of apples; orchard well protected by natural forest.

Question by Mr. McKinstry.—Has the proximity of the river anything to do with it?

Mr. Stoddard did not know; thought trees near the river bore better than those back, at a distance, from the river.

The President remarked that Mr. Brady, of Kankakee, had told him, as long as the river was open the temperature was several degrees higher near the river than it was back some distance from it; when the river was frozen over there was no perceptible difference.

Mr. Mellen said in his vicinity summer and fall apples were tolerably plenty. Winter fruit scarce. The Ortly does very well with him; Sops of Wine trees were full, as also the Bailey Sweet.

Mr. McKinstry said the Bailey Sweet bore well with him this year; Domine did tolerably well, so also did the Rambos.

Question by Mr. Drayer.—Did the trees bloom well last spring?

Mr. McKinstry.—Did not; orchard is protected by artificial timber belts; had succeeded this year in raising some Bellflowers by girdling the limbs; used a common pruning saw; just sawed through the bark.

Mr. Cooper says with him the girdling process was a failure; could see no difference.

Mr. Chatfield being called upon said, I am not a member of your Society. I live on a farm and have an orchard; used to raise some apples. Some one told me I ought to trim my trees; let an old professor of pruning trim my orchard, and have had no fruit since of any consequence; have come to the conclusion never to trim an orchard in this country, and especially when old, and never cut off a large limb. Had some summer and fall apples. Red Astrachan bore pretty well. No winter fruit.

The President made some remarks on pruning—he said his father bought a farm with a large orchard on it; the limbs were low down; he cut them off so as to drive under them and the trees soon commenced to die.

Several members coincided with Mr. Chatfield in regard to pruning.

Mr. Vail had some experience in pruning; would never cut a large limb; would prune moderately when trees were young; told of a neighbor's orchard pruned like Mr. Chatfield's, and had failed like his. Not much fruit this year.

Mr. Mellen would like to have some one bring a section of a big limb that had been girdled; was of the opinion that the girdling process was death to the tree; they might possibly bear one or two crops, but that was the end of them.

Wm. Smith would like to ask Mr. Vail if his orchard was not injured by frost? Northeast winds will sometimes blight fruit, but was of the opinion that frost never killed fruit without killing the leaves.

O. W. Barnard, in regard to pruning, would like to know whether water-sprouts were cut out. Several members replied that when trees are not pruned there are no water-sprouts of any consequence.

Mr. Miner has two orchards; trims some trees pretty well, and they are dying; others never pruned are thrifty and bear well. Noticed that orchards near the river are generally full, and bear well; perhaps from better drainage. Had one tree fourteen inches through, never had an apple on it; will try root-pruning in the spring.

Mr. Mellen.—“I would girdle that tree!”

Mr. Bonvallet made some very interesting remarks on grape culture, and the management of the vineyard in general; he raises the very finest of grapes and cherries on his soil, which is almost pure sand. The Secretary understood him to say his cherries brought him four dollars per bushel clear; his finer grapes about eight cents per pound. Strawberries not profitable; thinks the rot in grapes is caused by phylloxera, whenever it is too wet, too hot or too cold; understood him to say we could raise as fine fruit here as anywhere, by preparing the ground properly, and with proper culture; would not trim trees when large; he does his pruning when trees are young; prefers wire trellis for grapes.

Mr. Cooper had a tolerable crop of summer and fall apples, but no winter fruit; his brother's orchard is bearing very well, the Russets are full; noticed the orchards along the road, between here and Bourbonnais, but saw very little fruit. Speaking of fruit culture in general, he said we could not beat Nature, but we could aid her, and that is where such societies as ours can do much good, by exciting competition, by comparing notes, by discussing our successes and failures, the kinds of soil, the best varieties to plant, best kinds of treatment, etc. The social feature of the Society he thought was worth a good deal; this meeting together and having a good dinner—and that we always have in Momence—tended to draw us nearer together, and made us more charitable towards each other. Speaking of floriculture, he said *that* more immediately concerned the ladies, but he thought men did not pay enough attention to home surroundings, etc.

The Secretary regrets very much that he is not able to give Mr. Cooper's remarks in full, as they were very interesting and instructive. Mr. Cooper, in answer to a question by Mr. Mellen, about his brother's

orchard, said it was partially protected on the north by the farm buildings and a black walnut grove, on the other side by a hedge fence; was seeded down to clover, when the trees commenced bearing; lets hogs and sheep run in it occasionally; has never pruned since the trees were set, and always has more or less of fruit; generally more.

The President had succeeded in fruiting the Bellflower by girdling. Apples in Manteno scarce; in his own orchard had plenty of winter fruit, Russets; no summer or fall apples; Roman Stem bearing well.

The next meeting of the Society will be held in the city of Kankakee, on the second Saturday of October, at the Supervisors' room in the Court House.

The Society is under special obligation to the following named persons for donations of fruit for exhibition at our county fair:

To Henry Mortimer, of Manteno, for some fifty named varieties; also, Milo Barnard, President of the Society, for an equal number, which were generally true to name; Mr. Stroud, of Salina, exhibited some splendid specimens, that were very highly colored; Mr. Randall had some fine apples, not named; Messrs. Hiram Goodwin, of Bourbonnais, and Benj. Goodwin, of Rockville, sent in some forty varieties of superior apples; Messrs. Mellen, Miner and the Coopers donated a large number of varieties; Mrs. Hobbie sent in some very fine apples and pears, ten varieties of the latter. Quite a number of others contributed some very fine fruit. Mr. Bonvallet, of Belle Park, contributed some very fine grapes, thirteen varieties.

We think our exhibition of fruit was a credit to the Society and to the county that produced it.

There were some one hundred and fifty varieties of apples on exhibition, thirteen of pears and about twenty of grapes.

The show of flowers by the Society was not what it should have been, but we hope it will be better another year. The Society wishes to acknowledge its obligations to Mrs. Pratt, Mrs. Stone and Mrs. Decker for valuable aid during the fair.

NOVEMBER MEETING.

The Society met at the Court House, on the 8th inst.

Meeting called to order by President Barnard.

Remarks were made by Mr. Cooper and others, in regard to apples growing without the flower petals opening on account of frost. Several curious instances were cited.

Some discussion was had in relation to the winter protection of small-fruit stock.

Dr. Small said one of his neighbors was very successful in raising some of the tender varieties of raspberries, especially the Clark, by simply laying the canes on the ground and covering slightly with earth; he always has plenty of berries.

President Barnard had had some experience with raspberries. He tried *this* plan, and thought if effectually done it would be a good winter protection, viz.: drive down stakes on each side of the rows of canes or plants, nail on strips of boards and then set up corn stalks on each side in sufficient quantity to keep out the sunlight.

Mr. Mortimer.—Where canes could be bent to the ground, a slight covering of earth was the very best protection, better than any kind of mulch.

Question by President Barnard.—What is the best covering for strawberries? In his own experience, prairie hay or slough grass, thinly spread over the plants, was best. Straw was objectionable on account of weed seeds.

Mr. Mortimer spoke of corn stalks as good covering for strawberry plants; laying the stalks lengthwise of the rows first, and then crosswise, just enough to cover the plants, but not enough to smother them.

General discussion was had in regard to planting strawberries.

Most members recommended early autumn planting, if not too dry, or if the plants could be well watered.

Mr. Cooper inquired about manuring with well-rotted, fine manure.

Mr. Small and others.—The effect would certainly be good.

Mr. Miner sowed a peck of plaster on the end of a Wilson's strawberry bed—thought the plants did much better.

Mr. Miner wanted to know how to renew an old strawberry bed. How would it do to hoe out a portion? Barnard thought it would hardly pay; would plant a new bed every year.

Mr. Stodard told of a man that plowed up his strawberry bed every year, as soon as the fruit was gathered and enough came up for a bed the next year; always had berries.

Mr. Small said we must recollect to do our cultivating the season before we get our fruit.

Grape culture and pruning was next taken up.

President Barnard pruned two or three vines in the presence of the meeting, on the spur system, leaving two or three buds on each limb of this year's growth.

Mr. Vail.—Would you take all the limbs off from three-year-old vines?

President Barnard.—No; leave two or three buds on this year's wood.

Mr. Knox spoke of the renewal system of pruning. Said it was practiced altogether in the wine-growing districts of Missouri.

What is the best soil for the grape?

Answer by President Barnard.—The Concord will grow on almost any soil; the Hybrids do best on a sandy soil or sandy loam.

Mr. Small.—What time would you prune?

President Barnard.—Just after the fall of the leaf, or any time in November; can prune in the spring, but would not recommend it.

[To the novice in grape culture the illustrations given by the President in regard to pruning and management of the grape vine would have been of great practical importance, but we cannot convey it in words without occupying too much space.—SEC.]

Mr. Vail.—Show us now how you prepare grape cuttings for planting.

President Barnard.—In this manner, taking a vine of this year's growth and cutting in pieces four to eight inches in length, two buds to each cutting.

Some very fine apples were exhibited by the President, viz.: Ben Davis, Willow, Roman Stem, Yellow Bellflower, Rawles' Janet and Winter Wine, which were large and fine looking. Several other varieties were exhibited.

The following resolution was offered by Mr. Small, which will be the subject of discussion at the next meeting:

Resolved, That small-fruits are of more value to the prairie farmer than the larger or tree fruits.

The next meeting of the Society will be held at the Supervisors' room, on the second Saturday of December, which will be the annual meeting, and at which time officers will be elected for the ensuing year.

DECEMBER MEETING.

The annual meeting of the Society was held on the 14th inst., in the Supervisors' room in the Court House.

The meeting was called to order by President Barnard.

The President said the regular order of business would be discussion upon the resolution passed at the last meeting.

The resolution was called for and read by the Secretary.

Resolved, That small-fruits are of more value to the prairie farmer than the larger or tree fruits.

Upon invitation, the President proceeded to deliver his annual address, as follows:

PRESIDENT BARNARD'S ADDRESS.

Three years have passed since the organization of our Society, and the continued success and yearly growth of our institution gives the lie to the sayings of the weak-kneed and unfaithful, who predicted our speedy dissolution.

Each year has witnessed a steady growth in horticultural knowledge by the members of our Society. And this knowledge has not been confined to members alone, but by the published reports of our discussions, and by the example of many enterprising horticulturists, has reached many outsiders who have not yet become members.

By holding our meetings in different parts of the county, during the summer season, we have secured many new members and aroused an interest in our calling that we could not have done had our meetings been held at one place only. And we feel like recommending the plan for the future, and hope the board of trustees will duly consider the matter, and reduce it to some kind of system and order, and as early in the season as practicable arrange and announce the time of meeting in the different localities. This will give time to make arrangements, and if made early enough may induce members to strive for success, both in the vegetable and flower garden, that they may have specimens for exhibition at their home meeting that they would not care to exhibit at a distance.

The Society's exhibition of strawberries and roses at the June meeting, although not large, may be considered a grand success, for this one meeting gave an impetus to

strawberry culture worth many times what it cost, premiums and all. And the good done will not cease with this generation, but will benefit those who come after; will be handed down from parent to child, spreading and widening as the years roll on. And, as we have a full treasury, I think we would do well to expend a like amount in premiums next June.

Although our success has been all the most sanguine could have expected, still there has been one failure—I refer to the failure of the bill for the encouragement of horticulture to pass the Legislature last winter. But trusting in the justice of our cause, let us not be discouraged nor give up, but talk the matter over with men of influence; agitate the subject; keep it before the people; and at the proper time send in petitions, and try to send the right men up to the Legislature to receive our petitions, and the time is not far distant when State aid will be granted us sufficient to enable us to publish our proceedings at the end of each year, thereby benefiting many we could not otherwise reach. And in the mean time let us labor, experiment and study, that our discussions and essays may be worthy of publication and a source of knowledge to new beginners.

We need a botanist to give us occasional talks on botany and to name the plants and flowers that are placed on exhibition from time to time. We also need an entomologist to look after our insect and bug enemies. We need more essay writers, for this stimulates experiment, that we may have something practical to write about. We want a little more energy in attending the meetings of the Society, and more care and thought in bringing horticultural products for exhibition, and more willingness to take part in our discussions, that our meetings may not be dull, but lively and interesting. And above all, we want more fruit, especially for the children. We older ones are prone to forget the intense longings of Young America for the luscious, juicy, life-giving fruits in their season. I am tempted to give, by way of argument, a little personal experience on this point, at the risk of being considered egotistical, and will take for my text

The First Apple.—I don't mean the apple that grew in the Garden of Eden, the eating of which "brought death into the world, and all our woes," according to Milton, but the first whole apple the speaker ever had the pleasure and satisfaction of eating; or, I might say, the first I have any recollection of.

My father settled in Northern Indiana when I was three years old, the country at that time being an untamed wilderness, with plenty of Indians, but no fruit except the wild fruit of the forest. But as soon as father had cleared a place for an orchard (he settled on the heavy timber land) he went into Michigan, 75 miles, and brought the first load of fruit-trees that was brought to that neighborhood; and I can assure you the growth of those trees was watched with great anxiety, and it seemed as though they would never come into bearing. I suppose they bore as early as trees usually do, but time moves slowly in our childhood. During all this time apples were scarce in that part of the country. Once in a while an apple or two would reach us, but the family being large, they had to be cut in small pieces to reach around. But at last the time came; the trees were in bloom, and a few—three, I think—remained on one tree, and were carefully looked after almost daily during the long summer; and one of these apples it was that I got full possession of in the fall.

Whether the apples were gathered by my parents, and a whole one given to me in consideration of my taking more interest in the orchard than the other children, or whether I took the matter into my own hands, bound at all hazards to have a whole apple, when one-third was all that justly belonged to me, I am unable at this late day to determine; but the precautions I took to guard against discovery, while eating it, looks, I am free to confess, as though the mode of my getting possession of that apple was at least questionable, for I climbed into the haymow in the old log stable, and secured a comfortable seat, in a hidden place, before commencing the pleasing and ever-to-be-remembered task of eating my first whole apple. It was the American Golden Russet, an excellent variety, but it was hard, being just picked; and although I have eaten many apples since that time I have never eaten one quite so good as that one. And although forty years have past since that (to me) momentous occasion, I well remember with what an intense longing I wished for more, and wondered if the time would ever come when I could have all the apples I could eat.

I have no fault to find with my father in this matter, and cannot charge him with neglect—for times at that early day were not as they are now—but shall ever feel grateful to him that he supplied his family with fruit at the earliest practicable moment. But there were men then, as there are now, who are almost criminally negligent in these matters; not so much willful negligence, perhaps, as carelessness; and to jog their memory now and then is legitimate work for the Kankakee County Horticultural Society.

At this point considerable miscellaneous discussion was had on various topics.

Mr. Cunningham was desirous of planting several varieties of grapes, and would like to know if any one present had had any experience with the Perkins.

Dr. Small said, if he would call at his place he would show him the vine, and at the proper season the fruit; considered it hardy and desirable.

President Barnard said that showed the need of a Society like ours; that Mr. Small had the Perkins grape some time in bearing and Mr. Cunningham his near neighbor knew nothing about it.

Mr. Hempstead, of South Haven, Michigan, being present, was called upon to say something about the fruit region of Michigan. Mr. Hempstead replied that he did not come to make an address, but to learn, but that he would gladly answer any questions that might be asked.

Secretary.—What is the nature of the soil in your best fruit-producing district?

Mr. Hempstead.—Various; next to Lake Michigan and for two or three miles back, light sandy, then a heavier sand; after that a sandy loam, then clay.

Secretary.—What is the native timber?

Mr. Hempstead.—Most all kinds of hard wood, with some pine and hemlock.

Secretary.—What do you consider the best strawberry?

Mr. Hempstead.—On our light sandy soil, Wilson's Albany is by all odds the best; Monarch of the West next; for ordinary soils, Bidwell's Seedling is the best. He said he had seen in some of our reports, some time ago, that we did not deem it expedient to raise more than one crop on the same ground without rest. With him they raised strawberries year after year on the same ground, but he would not favor that practice. He would not take more than two crops from the same land without giving it rest of one year or more; would set strawberries in rows, about four feet apart and fifteen inches in the row.

In answer to a question about raspberries, Mr. Hempstead replied that, for black-caps, the Mammoth Cluster, with them, is by far the best, a very prolific bearer, of good quality, and hardy. Of reds, the Philadelphia was a great favorite. The Herstine is a noble berry, but poor bearer, not profitable; would like to know what we considered the best raspberries here.

Several members answered that they thought the Turner, Clark and Gregg as good as any.

Adjourned to meet in Supervisors' room on Saturday, January 10th, 1880.

PREMIUM LIST.

The following premiums will be paid on fruit exhibited at the annual meeting of the Illinois State Horticultural Society at Warsaw, December 14-16, 1880.

"Plates" of fruits shall contain ten specimens each (neither more nor less).

Exhibitors and judges shall conform to the rules published by this Society in vol. 12 of its Transactions, pages 297-300, except as follows: In rule 6, when applied to "best and largest display," condition and quality shall take precedence over number, also in "Special Rule 2," size shall be considered meritorious, when specimens conform to Special Rule 3d. All the fruit exhibited by any person must have been grown by himself.

APPLES.

	1ST PREM.	2D PREM.
Best and largest display.....	\$15 00	\$8 00
Best ten plates grown in Southern Illinois.....	6 00	4 00
Best ten plates grown in Central Illinois.....	6 00	4 00
Best ten plates grown in Northern Illinois.....	6 00	4 00

Plates entered, as above, for best ten, must be distinct from those entered as single plates of varieties.

Best collection of Seedlings.....	8 00	4 00
Best plate New Variety (not in general cultivation).....	8 00	4 00

Seedlings and new varieties, to secure premiums, must have superior merit; and each exhibitor of such must furnish the examining committee with a written statement of the characteristics of each variety, both of tree and fruit.

FOR NORTHERN ILLINOIS.

	1ST PREM.	2D PREM.
Best plate Jonathan.....	\$2 00	\$1 00
do. do. Willow Twig.....	2 00	1 00
do. do. Eng. Gold. Russet.....	2 00	1 00
do. do. White Pippin.....	2 00	1 00
do. do. Domine.....	2 00	1 00
do. do. Ben Davis.....	2 00	1 00
do. do. Grimes' Golden.....	2 00	1 00
do. do. Snow.....	2 00	1 00
do. do. Roman Stem.....	2 00	1 00
do. do. Yellow Bellflower.....	2 00	1 00
do. do. Northern Spy.....	2 00	1 00
do. do. Rawles' Janet.....	2 00	1 00
do. do. Winesap.....	2 00	1 00
do. do. Ramsdill's Sweet.....	2 00	1 00

FOR CENTRAL ILLINOIS.

The same premiums, and for the same varieties as above, will be paid for fruit grown in Central Illinois, excepting that Wythe and Red Canada shall be substituted for Snow and Roman Stem.

FOR SOUTHERN ILLINOIS.

	1ST PREM.	2D PREM.
Best plate Jonathan.....	\$2 00	\$1 00
do. do. Ben Davis.....	2 00	1 00
do. do. Winesap.....	2 00	1 00
do. do. White Pippin.....	2 00	1 00

	1ST PREM.	2D PREM.
Best plate Yellow Bellflower.....	\$2 00	\$1 00
do. do. Newtown Pippin.....	2 00	1 00
do. do. Smith's Cider.....	2 00	1 00
do. do. Rome Beauty.....	2 00	1 00
do. do. Rhenish May.....	2 00	1 00
do. do. Rawles' Janet.....	2 00	1 00
do. do. Winter Sweet Paradise.....	2 00	1 00
do. do. Sparks' Keeper.....	2 00	1 00
do. do. White Winter Pearmain.....	2 00	1 00

PEARS.

	1ST PREM.	2D PREM.
Best plate of Lawrence.....	\$3 00	\$2 00
do. do. Beurre d'Anjou.....	3 00	2 00
do. do. Easter Beurre.....	3 00	2 00
do. do. Winter Nelis.....	3 00	2 00

GRAPES.

	1ST PREM.	2D PREM.
Best six bunches of Concord Grapes.....	\$3 00	\$2 00
do. do. Catawba.....	3 00	2 00
do. do. Lindley.....	3 00	2 00
do. do. Goethe.....	3 00	2 00
do. do. Agawam.....	3 00	2 00
do. do. Wilder.....	3 00	2 00
do. do. Merrimac.....	3 00	2 00

Exhibitors of Grapes must furnish to the committee written statements of manner in which they have been kept since gathering.

By order of the Executive Board.

PARKER EARLE, *President.*

O. B. GALUSHA, *Secretary.*

ILLINOIS STATE HORTICULTURAL SOCIETY.

ANNUAL MEETING FOR 1880.

The Twenty-fifth Annual Meeting of the Illinois State Horticultural Society will be held in the city of Warsaw, December 14th, 15th, 16th, 1880.

The usual reductions of fares upon railroads and at hotels are expected to be made. The Warsaw Horticultural Society will furnish a comfortable and commodious hall for the meetings and provide for the entertainment and comfort of all members. It is expected that the liberal and varied premiums offered will call out the largest display of fruits ever exhibited in winter in the West.

Horticulturists in Eastern Iowa are invited to participate in the proceedings. Persons who cannot attend may become members of the Society and receive a copy of its Transactions by inclosing one dollar and fifteen cents to the Secretary.

PARKER EARLE, *President.*

O. B. GALUSHA, *Secretary, Morris, Ill.*

ALTON HORTICULTURAL SOCIETY.

OFFICERS FOR 1880.

- President*—Dr. B. F. Long.
Vice-President—Jas. M. Davis.
Vice-President—F. Hayden.
Secretary—Jno. M. Pearson.
Treasurer—D. Stewart.
Librarian—E. Hollister.
Committee on Orchards—Jas. M. Davis.
Committee on Vineyards—F. Hayden.
Committee on Vegetables—E. Hollister.
Committee on Small-Fruits—Wm. Jackson.
Committee on Ornamental Planting—Jno. M. Pearson.
Committee on Orchard Fruits—E. A. Reihl.

HORTICULTURAL SOCIETY OF CENTRAL ILL.

OFFICERS FOR 1880.

- President*—A. C. Hammond, Warsaw.
Vice-President—J. W. Robison, Tremont.
Secretary—Albert Dunlap, Champaign.

HORTICULTURAL SOCIETY OF SOUTHERN ILL.

OFFICERS FOR 1880.

- President*—Hon. J. M. Pearson, Godfrey.
Vice-President—E. Hollister, Jr., Alton.
Secretary—F. Hayden, Alton.

CONSTITUTION AND BY-LAWS

AS AMENDED AT THE ANNUAL MEETING, 1874.

CONSTITUTION.

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

II. Its object 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 and Secretary, who shall be elected at the annual meeting, and serve until their successors are chosen; also an Executive Board, as hereafter provided.

V. The affairs of the Society shall be managed by an Executive Board, to consist of the President and Secretary of the Society, and the President and Vice-President from each of the three District Horticultural Societies of the State.

VI. The Society shall hold annual meetings, and publish its transactions annually; *provided*, there are sufficient funds in the treasury to defray the expenses of publication.

VII. 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 direction, have a general superintendence 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 special committees, unless otherwise ordered.

II. The Vice-President shall preside at the meetings in the absence of the President.

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 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.

V. The Executive Board shall perform all the duties required of them by section four of the "Act re-organizing the State Horticultural Society," approved March 24, 1874. They may appoint such standing and other committees as they may deem advisable.

VI. These By-Laws may be altered at any regular meeting, by a two-thirds vote of the members present.

STATE 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. Ayers, 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 to re-organize the Illinois State Horticultural Society.

SECTION 1. *Be it enacted by the people of the State of Illinois, represented in the General Assembly,* That the organization heretofore chartered and aided by appropriations, under the name of the Illinois State Horticultural Society, is hereby made and declared a public corporation of the State.

SEC. 2. The Illinois State Horticultural Society shall embrace, as hereinafter provided, three Horticultural Societies, to be organized in the three Horticultural Districts of the State, which shall be known as the Horticultural Society of Northern Illinois, now operating in the counties of Bureau, Boone, Cook, Carroll, DuPage, DeKalb, Henry, Grundy, Jo Daviess, Kane, Kendall, Kankakee, Lake, Lee, LaSalle, McHenry, Ogle, Putnam, Rock Island, Stephenson, Whiteside, Winnebago and Will (23); the Horticultural Society of Central Illinois, operating in the counties of Adams, Brown, Cass, Champaign, Christian, Coles, DeWitt, Douglas, Edgar, Fulton, Ford, Iroquois, Hancock, Henderson, Knox, Logan, Livingston, McLean, McDonough, Marshall, Mason, Mercer, Menard, Morgan, Macon, Moultrie, Peoria, Pike, Piatt, Sangamon, Shelby, Schuyler, Scott, Stark, Vermillion, Tazewell, Warren and Woodford (38); and the Horticultural Society of Southern Illinois, operating in the counties of Alexander, Bond, Clark, Clay, Crawford, Calhoun, Cumberland, Clinton, Edwards, Effingham, Fayette, Franklin, Green, Gallatin, Hamilton, Hardin, Jasper, Jefferson, Jersey, Jackson, Johnson, Lawrence, Madison, Macoupin, Marion, Monroe, Montgomery, Massac, Perry, Pope, Pulaski, Richland, Randolph, St. Clair, Saline, Union, Wayne, White, Washington, Williamson and Wabash (41).

SEC. 3. The affairs of the Illinois State Horticultural Society shall be managed by an Executive Board, to consist of the President and Secretaries of said Society and the

President and one Vice-President from each of the three District Horticultural Societies; *provided*, that the eligible officers now elect of the Illinois State and District Horticultural Societies shall be the first members of the Executive Board created by this act, and shall hold their office until their successors are elected, as herein provided for.

SEC. 4. The Executive Board of the Illinois State Horticultural Society shall have the sole care and disposal of all funds that may be apportioned [appropriated] by the State of Illinois to sustain the Illinois State Horticultural Society, and shall expend the same in such manner as in their judgment will best promote the interests of Horticulture and Arboriculture in this State. They shall meet at Springfield, on the second Tuesday after the first Monday in January, 1875, and biennially thereafter. They shall render to the Governor of the State a detailed statement of all funds received from the State and all other sources; which statement shall, also, include all expenditures made by them, and the specific objects in detail for which said sums were expended. They shall make no appropriations without having funds in hand to meet the same, and if any debt is created, the members of the Board shall be held severally and jointly liable for the payment of the same; and in no event shall the State of Illinois be held liable or responsible for any debt, obligation or contract made by the Illinois State Horticultural Society or its Executive Board.

SEC. 5. The Illinois State and the three District Horticultural Societies shall hold annual meetings, at which their officers for the ensuing year shall be elected. Within one month after the annual meeting of the District Societies, they shall forward to the Secretary of the Executive Board a report of their transactions, including a list of officers elected at such meeting. The Executive Board shall publish, annually, at the expense of said Society, a report of its transactions and such other papers as they may deem of value to Horticulture and Arboriculture. Four members of the Executive Board shall constitute a quorum for the transaction of business.

SEC. 6. Members of the several District Societies shall be entitled to all the privileges of the members of the State Society, except that of voting for officers.

SEC. 7. By-laws and rules that do not conflict with the laws of this State may be passed and enforced by the several Societies herein mentioned.

Approved March 24, 1874.

INDEX.

- Transactions of State Horticultural Society, page 1 to page 257.
 Transactions of Horticultural Society of Northern Illinois, page 258 to page 320.
 Transactions of Warsaw Horticultural Society, page 330 to page 348.
 Transactions of Galesburg Horticultural Society, page 349 to page 370.
 Transactions of Kankakee County Horticultural Society, page 371 to page 389.
- Adams County—Report of..... 48
 Address Annual.....261, 344
 By President Burrill..... 72
 By President Barnard, Kank. Soc...387
 By President Lanphere, Galesb. Soc.303
 Of Welcome.....1, 250
 Adjournment of Meeting State Soc.....238
 Advertisement of Meeting.....327, 391
 Alton Hortl. Soc.—Officers of.....392
 Amber Cane.....207
 Annual Address.....72, 261, 344
 Annual Meeting—Advertisem't of.327, 391
 Apple—Blossoms destroyed by frost,
 186, 199
 Long-keeping wanted..... 8
 New one wanted.....26, 202
 Orchards—Cultivation of.....15, 268
 Decay of.....10, 14, 26
 Discussion upon.....28, 268
 Protection for..... 14
 Seeding of..... 205
 Soils for..... 14
 Trees—Blight of.....11, 186
 Damaged by winter..... 42
 How to make annual bearers.....375
 How to protect from Rabbits.....209
 Pruning of..... 371
 Apples—Crop of.....7, 10, 11, 12, 16,
 25, 42, 46, 50, 184, 186, 187,
 241, 343, 383, 384
 Decay of..... 52
 Dry rot of.....218
 Every year—Essay upon.....375
 For Northern Illinois.....273
 Freezing of.....276
 List of.....13, 26, 43, 48, 49, 187,
 189, 241, 269, 272, 273, 274,
 293, 331, 374, 382
- Apples—New varieties of—How to
 procure 9
 Premium List of.....208
 Prices of..... 42
 Rotting of.....186
 Siberian, New195
 Varieties of—Ben Davis.....26, 203
 Cayuga Red Streak.....269
 Duchess of Oldenburg..... 23
 Golden Russet..... 269
 Grimes' Golden.....269, 276
 Red Astrachan..... 23
 Rome Beauty..... 27
 Salomè.....19, 22, 195, 202, 203,
 269, 333, 334
 Triumph.....195
 Wealthy..... 27
 Winesap..... 26
 Worthen Winter Sweet.....103
 Wythe.....27, 194, 203, 269
 Asparagus.....239, 253, 254
 Auditing Committee..... 7
 Report by.....192
- Bailey C.—Report by..... 12
 Baller F. A.—Report by..... 86
 Bancroft L. R.—Report by.....185
 Barnard Pres. Milo—Address of.....387
 Bateman Dr. Newton on Climatic In-
 fluences.....367
 Berries—Soil for..... 47
 Bird Law—Bill for.....183
 Birds as insect destroyers.....59, 65
 Defense of..... 181
 Food of.....120, 136
 Value of.....173
 Paper upon.....295
 Species of—Alice Thrush.....137, 160

- Birds—Brown Thrush.....134, 150
 Cat-bird.....133, 146
 Hermit Thrush.....137, 156
 Robin.....126, 142
 Swainson's Thrush... ..138, 162
 Wood Thrush.....136, 154
 Blackberries.....241
 Crop of.....184, 187, 188, 241
 Cultivation of.....46, 184
 Discussion upon.....105
 List of.....43, 49, 102, 103, 300
 Rust of.....191
 Varieties of—Ancient Britain.....197
 Barnard.....197
 Snyder.....10, 11, 16, 29, 42, 51,
 95, 102, 106, 184, 187, 191, 197
 Taylor.....197
 Bonvallet P. A.—On Small-fruits.....384
 Report by.....287
 Brewer Dr. Thomas—Paper by.....173
 Brown Hon. A. M.—Eulogy upon..... 84
 Bryant Arthur Jr.—Report by.....309
 Burrill Pres. T. J.—Address by..... 72
 Response by..... 3
 Cabbage Insects—Paper upon.....242
 Capps C. S.—Report by.....187
 Champaign County—Report of.....187
 Cherries—Crop of.....11, 43, 46, 185, 241
 On Mazzard stocks..... 72
 Stocks for.....241
 Varieties of—Early Richmond.....188
 English Morello.....188
 Lieb.....188
 Northwest.....196
 Cider in Hancock county343
 Climate—Effects of, on Horticulture...
 366, 368
 Cold—Damage by.....9, 332, 334, 335
 Committees—Appointment of..... 50
 Of 1880.....vi, 328
 On General Horticulture v
 Constitution of State Horticultural So-
 ciety.....393
 Cultivation of Apple Orchards.....311, 313
 Cumings A. L.—Report by295
 Currants and Gooseberries — Reports
 upon.....38, 39
 Damaged by Insects..... 11
 How to Grow.....378
 List of..... 38, 40, 43, 49, 191, 300
 Long-bunca Holland.....301
 DeKalb County—Report of 12
 Dennis C. N.—Reports by ...32, 342, 346
 Resolution by.....193
 Discussion upon Apple Orchards...17, 268
 Discussion upon Evergreens.....318
 Gathering and Storing Apples.....371
 Insects49, 65, 291
 Pruning Apple-trees.....371
 Seeding Orchards.....205
 Small-fruits.....302
 Tree-planting214
 Vegetable Seeds.....290
 Dorman Hattie—Report by.....341
 Douglas County—Report of.....189
 Douglas Robert—Resolutions by178
 Dry Rot in Apples.....218
 Dunlap H. M.—Report by184
 Earle Parker—Eulogy by..... 84
 Report by.....33, 208
 Edwards Samuel—Reports by10,
 38, 311, 317
 Election of Officers for 1880..180, 293, 316
 Ellsworth L.—Paper from 14
 English Sparrow.....64, 182
 Entomology—Lecture upon.....111, 242
 Paper upon.....361
 Reports upon.....59, 111, 242, 286, 361
 Evergreens for Protection.....188
 For Shelter.....33, 35, 45
 Pruning of.....318
 Report upon.....317
 When to plant.....319, 320
 Executive Board—Members of v
 Farmers' Horticulture — Discussion
 upon 33
 Report upon.....32, 34
 Fell J. W.—On Tree-planting ...214, 216
 Final Resolutions.....237, 327
 Floriculture—Discussion upon ...359, 360
 Increasing..... 44
 Reports upon..... 86, 89, 341, 346
 Flowering Plants—List of.....87, 89
 Flowers fertilized by Bees277 to 281
 Presentation of.....24, 277
 Food of Birds—Paper upon.....120
 Forbes Prof. S. A.—Report by.....120
 Forests influencing Rainfall.....352
 French Prof. G. H.—Paper by218
 Fruit Districts..... iv
 Fruits on Exhibition.....208, 348
 Report upon..... 67
 Galesburg Hort. Soc.—Proceedings of...349
 Galusha O. B.—On Fertilization of
 Flowers.....280
 On Girdling..... 58
 On Orchard Culture..... 18
 Reports by.....4, 92, 194, 274, 282
 Garden Vegetables—List of.....354,
 356, 357, 358

- Gathering and Keeping Apples.....12, 371
 Geology—Lecture upon.....303
 General Horticulture—Com. on for
 1880..... v
 Reports upon.....7, 41, 184
 Girdling Trees to induce bearing...53
 to 59, 374, 385
 Gooseberries—List of.....38, 40
 Grape Culture301
 Grapes and Culture—Report upon.....
 200, 212, 287
 Crop of.....11, 43, 48, 49, 185, 188,
 191, 210, 212, 241, 301
 New.....196
 Varieties of—Brighton.....21, 22
 Catawba.....210
 Champion.....211
 Concord21, 210
 Delaware.....210
 Elvira.....186, 213
 Goethe.....213
 Hartford.....210
 Ives.....210
 Lady.....196, 210
 Lindley.....213
 Martha.....186, 196, 210, 213
 Merrimac.....213
 Perkins.....196, 210, 213
 Wilder.....210
 Grape-vines—Grafting of.....20
 Graves H. C.—Report by.....7
 Greenhouse Plants and Insects.....291
 Gregory Dr. J. M.—Lecture by.....227
 Grundy County—Report of.....15
- Hammond A. C.—Address by.....344
 Reports by.....25, 192, 332, 335, 341
 Happiness in Rural Life—Paper upon.....222
 Hatheway E. C.—Reports by...11, 39,
 209, 287
 Hay A. L.—Report by.....45
 Hayden Fred.—Report by.....212
 Hays C. I.—Report by.....89
 Hessian-fly destroyed by cold.....286
 Hewitt E. C.—Address by.....1
 Holdridge W. H. H.—On Draining...18
 Hollister E.—Report by.....97
 Home Adornment—Report upon.....315
 Honey-bee—Paper upon.....278
 Honorary Members—Election of.....37
 List ofviii
 Horticultural Districts.....iv
 Society of Central Ill.—Officers of...392
 Of Northern Ill.—Proceedings of,
 258 to 320
 Of South. Ill.—Officers of.....392
- Humphrey Dr. A. G.—On Climatic
 Influence.....367
 Reports by.....107, 204, 393
- Insects—Damage by11, 12
 Discussion upon40, 65
 Infesting Currants40
 Prevalence of.....44
 Reports upon.....59, 111, 242 to 261
 Species of Borers.....30
 Cabbage-butterfly.....12, 66, 112,
 186, 188, 243 to 257
 Canker-worm332
 Codling-moth312
 Colorado Potato-beetles.....13
 Cucumber-beetle13
 Curculio310
 Earth Worms—Work of.....69
 Lady-bug62
 Potato-beetles286
 Rose-slug361
 Squash-bug44
 Strawberry-worm362
 Introduction.....19, 24, 83
- Jackson William—Report by103
 Johnson J. S.—Report by.....41
 Resolutions by348
 Johnson J. T.—Paper by330
 Reporter of Warsaw Society330
 Report by202
 Jones W. W.—Report by.....189
- Kankakee County Horticultural So-
 ciety—Proceedings of...371 to 389
 Officers of.....371
 Kendall County—Report of13
 Kinney D. F.—Report by276
- Laphere Pres. G. C.—Address by....363
 Papers by350, 368
 Laws affecting Horticulture394
 Life in Little Things.....111
 Life Membership.....180
 List of Premiums.....300, 301
 Livingston County—Report of.....185
 Locating Annual Meetings.....179, 293
 Logan County—Report of189
 Lord G. P.—Address by259
- McHenry County—Report of.....241
 McWhorter T.—On Apple Orchards...17
 Report by67
 Membership List.....vii, 329
 Meteorology—Reports upon233, 350
 Minier G. W.—Bird Law by.....183
 Report by181

- Minkler S. G.—On Apples and Apple
Orchards..... 18
On President's Address.....266
Reports by.....6, 313
Morgan County—Report of..... 45
Mortimer Henry—Paper by.....375
Mulch enriching Land..... 70
Murfeldt C. W.—Paper by.....222
- New Fruits—Reports upon..194, 202, 217
- Obituary Committee—Report by..... 84
Officers—Election of.....180, 293
For 1880—State Society..... v
Of Alton Society.....392
Of Central Illinois Society.....392
Of Galesburg Society.....349
Of Kankakee County Society.....371
Of Northern Illinois Society.....293
O'Neil B.—Report by.....315
Orchards—Cultivation of.....12, 31, 46, 48
Report upon.....25, 311, 313
Decay of..... 8
Paper upon.....330
Reports upon.....332, 335, 341
Sites for.....47, 49
Origin and Evolution of Life.....107
Ornithology—Reports upon..120, 181, 295
Our Young Folks—Paper upon.....338
Parks of Paris—Lecture upon.....227
- Peaches—List of.....49, 189, 196
New.....203
Varieties of—Heath Cling..... 31
Old Mixon..... 30
Peach-trees killed by Winter.....185
Pears—Crop of.....11, 185, 188, 241
List of.....13, 189
Not profitable.....185
On Apple Stocks..... 70
Varieties of—Berkitt..... 196
Duchess D'Angouleme.....188
Flemish Beauty.....187
Hosenshank.....188
Howell.....187
Seckel.....188
Wilkinson's Winter.....191
Pear-trees—Blight of.....188
In grass.....9, 12
Periam Pres. Jona—Annual Address
by.....261
Paper by.....338
Response by.....260
Plums.....11
Crop of..... 43
List of.....49, 241, 308
Not profitable..... 48
Plums—Reports upon.....308, 309
Varieties of—De Soto.....310
Miner.....196, 310, 311
Newman's.....308
Wild Goose.....196
Plum-trees—"Switching" to promote
fruitage.....192
Potatoes—Crop of.....188
New—Beauty of Hebron.....290
Prairies—The Formation of.....303
Premium List.....390, 391
Premiums awarded on Fruits..... 67
On Strawberries—Kankakee Soc.....380
Presentation of Flowers.....24, 277
President's Address.....72 to 83
Pruning Apple-trees.....383, 384
Evergreens.....318
To induce fruitage.....371
Query-box.....20, 69, 205
Quinces—Success in growing.....186
- Ragan W. H.—Letter from..... 86
Rainfall—Paper upon.....350, 351, 352
Raspberries—Crop of.....187, 188, 241
Cultivation of.....46, 50, 102, 104
Discussion upon.....105
Four varieties of for N. Ill.....294, 295
Hardy sorts.....295
List of.....43, 48, 49, 104, 190, 241, 300
Reports upon.....101, 103
Varieties of—Brandywine.....102, 198
Cuthbert.....197
Davison's Thornless.....101
Doolittle.....101
Florence.....10, 102
Ganargua.....102, 198
Gregg.....10, 198
Highland Hardy.....101, 198
Mammoth Cluster.....101
Miller's Daily.....198
New Rochelle.....198
Philadelphia.....102
Pride-of-the-Hudson.....102, 198
Reliance.....197
Seneca.....101, 185
Sweet Home.....105
Thwack.....197
Turner.....101, 186
Winant.....197
Winter protection of.....385, 386
Reeve J. B.—Report by.....186
Report by Auditing Committee.....192
By Secretary..... 4
By Treasurers.....6, 258
Of Counties—Adams..... 18
Champaign.....187

Report of Counties—DeKalb.....	12	Small-fruits—Discussion upon.....	377
Douglas.....	180	In Long Rows.....	13
Grundy.....	15	Report upon.....	299, 342
Kendall.....	13	Smith Miss E. A.—Paper by.....	361
LaSalle.....	10, 11	Spalding J. B.—On Girdling.....	53
Logan.....	187	On New Fruits.....	217
McHenry.....	241	Spur-blight.....	186
Morgan.....	45	Standish J. V. N.—On Influence of Climate.....	306
Shelby.....	186	On Parks of Europe.....	304
Upon Currants and Gooseberries..	38, 39	On Vegetables.....	354
Entomology.....	59, 111, 242, 286, 361	Mrs. J. V. N.—On Floriculture..	358,
Evergreens.....	317		359, 360
Farmers' Horticulture.....	32, 33	On Horticulture in Europe.....	365
Floriculture.....	86, 89, 341	Strawberries—Crop of...10, 11, 13, 10,	
Fruit on Exhibition.....	67, 208	43, 47, 51, 185, 187, 188, 190, 241	
Gathering and Keeping Apples, 	274, 275, 276	Cultivation of.....	94, 190, 299
General Horticulture.....	7, 41, 184	Discussion upon.....	99
Grapes and Culture.....	209, 212, 287	Exhibition of.....	380
Home Adornment.....	315	Gathering of.....	47
Insects.....	59, 111, 242, 286, 361	List of.....10, 43, 48, 49, 96, 97, 98,	
Meteorology.....	233		241, 294, 300, 378
New Fruits.....	194, 202	Prices of.....	11
Orchards and Culture.....	25, 311,	Report upon.....	92, 97
	313, 332, 335, 341	Varieties of—Black Defiance.....	200
Ornithology.....	120, 181, 295	Captain Jack.....	12, 99, 199
Plums.....	308, 309	Centennial Favorite.....	199
President's Address.....	204, 282	Cinderella.....	199
Raspberries and Blackberries..	101, 103	Continental.....	200
Small-fruits.....	299	Crescent...10, 11, 95, 97, 100, 199,	
Strawberries.....	92, 97		204, 300
Vegetable Gardening.....	287	Cumberland Triumph.....	200
Resolutions—Final.....	237, 327	Crystal City.....	201
On Com. on Weights of Fruits...193		Duchess.....	199
Locating Meeting.....	178	Duncan.....	200
Work for 1880.....	348	Essex Beauty.....	201
Response by President Burrill.....	3	Forest Rose.....	10, 97
President Periam.....	260	Great American.....	200
Ridings J. W.—Report by.....	15, 237	Green Prolific.....	185
Robison on Girdling.....	58	Miner.....	10, 199
Rogers J. S.—Report by.....	241	Pioneer.....	201
Ryan W. A.—Reporter of Galesburg Society.....	349	President Lincoln.....	200
Scofield D. C.—On Apple Orchards...271		Prouty.....	10
On Pruning Evergreens.....	320	Russell.....	204
Report by.....	321	Sharpless.....	11, 199
Schröder Dr. H.—On Girdling.....	57	Springdale.....	200
On Woman's Work.....	34	Star of the West.....	201
Paper by.....	239	Wilson.....	10, 11, 98
Secretary's Report.....	4	Windsor Chief.....	199
Seeley J. S.—Report by.....	13	Wright.....	203
Shaw Hon. James—Lecture by.....	303	Winter Protection of.....	386
Shelby County—Report of.....	186	Sweet Potato Culture.....	191
Shelter-belts.....	44, 47, 49, 188	Tables of Food of Birds.....	142 to 172
Siberian Apples.....	241	Thomas Prof. Cyrus—On Timber Sup- ply.....	267
Slade S. M.—Report by.....	275	Papers and Reports by.....111, 242,	
Small-fruits—Crop of.....9, 10, 11, 13, 16			277, 286

Thompson Geo.—Paper by.....	278	Vegetables—Species of—Asparagus.....	353
Thompson J. G.—Report by.....	187	Vickroy H. K.—Report by.....	101
Thompson W. H.—Report by.....	48	Vineyard—Cultivation of.....	205
Thrushes—Food of.....	121 to 172		
Timber-planting—Paper upon.....	321, 323	Warder Dr. J. A.—Paper by.....	323
Timber-trees—Decrease of.....	16	Warsaw Hortl. Soc.—Report of.....	330
List of.....	45, 216, 322, 326	Weather—Effects of.....	7, 10, 11, 25, 41, 45, 51, 52, 184, 189, 332, 334, 335, 379
Species of—Black Walnut.....	215	Weights and Measures of Fruits.....	193
Honey Locust.....	216	White Willow infested with Lice.....	216
White Willow.....	216	Whitney A. R.—Resolutions by.....	178
Treasurer—Report by.....	6	Wier D. B.—On Girdling.....	57
Treasurer's Account—Report upon.....	286	Reports by.....	59, 308
Tree-peddlers—Scourge of.....	15	Resolutions by.....	180
Trees damaged by Winter.....	332, 334, 335	Window Gardening—Paper upon.....	315
Turner Rasp. for shipping.....	106, 107	Wind—Paper upon.....	350
Turner Prof. J. B.—On Timber-plant- ing.....	215	Wilcox Hon. S.—On Apple Orchards.....	270
Report by.....	233	Winter-killing of Fruit-trees.....	291
Vegetable Gardening.....	287	Woman's Influence in Horticulture....	35
Discussion upon.....	353 to 358	Woodard L.—Report by.....	258
Vegetables—Crop of.....	12		
List of.....	289, 290, 354, 356, 357	Young Folks, Our—Paper upon.....	338
Report upon.....	347		

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