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TRANSACTIONS

OF THE

WISCONSIN

STATE HORTICULTURAL SOCIETY,

INCLUDING

ADDRESSES AND PAPERS PRESENTED, AND PROCEEDINGS AT THE SUMMER AND WINTER MEETINGS OF THE YEAR 1882-3.

VOL. XIII.

WILLIAM TRELEASE, Secretary.

MADISON, WIS.:
DEMOCRAT PRINTING CO., STATE PRINTERS.
1884.

LETTER OF TRANSMITTAL.

To His Excellency, JEREMIAH M. RUSK,

Governor of the State of Wisconsin:

SIR: In compliance with the laws of the state, I have the honor to transmit to you, for publication, the thirteenth volume of the transactions of the State Horticultural Society, including a full statement of the receipts and expenditures of the Society, and a portion of the papers read at its meetings, in 1882–3.

Respectfully submitted,

WILLIAM TRELEASE,

Secretary.

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*Farm Life, Mrs. E. V. Layton .....
*The Farmer's Necessities, Mrs. V. H. Campbell .....
*Pansies, Wm. Toole .....

*Omitted from the Transactions for lack of space.
†Printed in the transactions of the Agricultural Society.
‡Printed in the Western Farmer, 1883.

LIST OF OFFICERS, 1883.

PRESIDENT.

J. M. SMITH, - - - - - - - GREEN BAY.

VICE PRESIDENT.

J. C. PLUMB, - - - - - - - MILTON.

RECORDING SECRETARY.

WM. TRELEASE, - - - - - - - MADISON.

CORRESPONDING SECRETARY.

B. S. HOXIE, - - - - - - - COOKSVILLE.

TREASURER.

M. ANDERSON, - - - - - - - PINE BLUFF.

MEMBERS OF EXECUTIVE COMMITTEE.

Ex Officio.

THE ABOVE MEMBERS.

By Election.

Dist.		*Dist.*	
1st.	G. J. KELLOGG, Janesville.	5th.	GEO. C. HILL, Rosendale.
2d.	B. F. ADAMS, Madison.	6th.	D. HUNTLEY, Appleton.
3d.	A. L. HATCH, Ithaca.	7th.	A. A. ARNOLD, Galesville.
4th.	J. S. STICKNEY, Wauwatosa.	8th.	W. REYNOLDS, Green Bay.
		9th.	——— ———

COMMITTEE OF OBSERVATION.

Dist.		*Dist.*	
1st.	B. B. OLDS, Clinton.	5th.	W REYNOLDS, Green Bay.
2d.	Geo. C. HILL, Rosendale.	6th.	A. ANDERSON, Neenah.
3d.	B. F. ADAMS, Madison.	7th.	A. J. PHILIPS, West Salem.
4th.	J. S. STICKNEY, Wauwatosa.	8th.	J. S. DORE, Neillsville.
		9th.	Wm. SPRINGER, Fremont.

COMMITTEE ON NOMENCLATURE.

J. C. PLUMB, Milton. D. T. PILGRIM, West Granville.

G. J. KELLOGG, Janesville.

MEMBERS, 1883.

Adams, B. F	Madison	Wisconsin.
Alcott, Wm	Brodhead	Wisconsin.
Anderson, M	Pine Bluff	Wisconsin.
Anderson, Andrew	Neenah	Wisconsin.
Arnold, A. A	Galesville	Wisconsin.
Babbitt, Clinton	Beloit	Wisconsin.
Barter, S	Markesan	Wisconsin.
Baumbach, Wm. Von	Wauwatosa	Wisconsin.
Coe, K. J	Ft. Atkinson	Wisconsin.
Cole, W. H	Brodhead	Wisconsin.
Cotta, J. V	Lannark	Illi n
Daniels, E. W	Auroraville	Wisconsin.
Daugherty, Wm. F	Preble	Wisconsin.
Dibble, G. W	Evansville	Wisconsin.
Dickerson, H. J	Appleton	Wisconsin.
Dore, J. S	Neillsville	Wisconsin.
Floyd, H	Berlin	Wisconsin.
Freeborn, S. J	Ithaca	Wisconsin.
Gill, Wm	Dayton	Wisconsin.
Goss, B. F	Pewaukee	Wisconsin.
Graves, S W	Brooklyn	Wisconsin.
Greenman, C. H	Dodge Center, Minn	Wisconsin.
Hacker, T. L	Madison	Wisconsin.
Haight, Nicholas	Syene	Wisconsin.
Hanchett, Mark	Footville	Wisconsin.
Hatch, A. L	Ithaca	Wisconsin.
Hill, Geo. C	Rosendale	Wisconsin.
Hirschinger, Chas	Baraboo	Wisconsin.
Holt, M. A	Madison	Wisconsin.
Hoxie, B. S	Cooksville	Wisconsin.
Howie, John	Waunakee	Wisconsin.
Hunt, Samuel	Evansville	Wisconsin.
Huntley, D	Appleton	Wisconsin.
Innis, W. T	W. Rosendale	Wisconsin.
Jeffery, Geo	Milwaukee, 630 Chestnut St	Wisconsin.
Jewett, Z. K	Sparta	Wisconsin.
Kellogg, Geo. J	Janesville	Wisconsin.
King, Edmund	Whitewater	Wisconsin.
Kingsbury, A	Fitzwilliam	New Hampshire.
Lawrence, F. S	Janesville	Wisconsin.
Libby, F. D	Madison	Wisconsin.
Lowe, Victor	Palmyra	Wisconsin.

McDonald, D.	Verona	Wisconsin.
Mills, Simeon	Madison	Wisconsin.
Morrison, W. H.	Elkhorn	Wisconsin.
Olds, B. B.	Clinton	Wisconsin.
Palmer, N. N	Brodhead	Wisconsin.
Partridge, E. G.	Warren	Wisconsin.
Peffer, George P.	Pewaukee	Wisconsin.
Philips, A. J.	West Salem	Wisconsin.
Pilgrim D. T.	West Granville	Wisconsin.
Plumb, J. C.	Milton	Wisconsin.
Potter, C. W.	Mauston	Wisconsin.
Reid, Wm., Sr	North Prairie	Wisconsin.
Reid, Wm., Jr.	North Prairie	Wisconsin.
Reynolds, Werden	Green Bay	Wisconsin.
Scribner, J.	Rosendale	Wisconsin.
Smith, Alfred	Madison	Wisconsin.
Smith, J. M	Green Bay	Wisconsin.
Spencer, R. C	Milwaukee	Wisconsin.
Springer, Wm.	Fremont	Wisconsin.
Stickney, J. S.	Wauwatosa	Wisconsin.
Stone, I. N.	Fort Atkinson	Wisconsin.
Thompson, H. M.	St. Francis	Wisconsin.
Trelease, Wm	Madison	Wisconsin.
Tuttle, A. G.	Baraboo	Wisconsin.
Vaughan, J. C.	Chicago	Illinois.
Warren, A. A.	Green Bay	Wisconsin.
Wrightman, E. W.	Weyauwega	Wisconsin.
West, J. R	Evansville	Wisconsin.
Wilcox, E.	Trempealeau	Wisconsin.
Williams, Daniel	Summit	Wisconsin.
Wood, J. W.	Baraboo	Wisconsin.

HONORARY MEMBERS.

LIFE.

Dr. Joseph Hobbins, ex-President; F. G. S., Corresponding Member Royal Horticultural Society, England, Madison, Wisconsin.

O. S. Willey, ex-Recording Secretary.

Peter M Gideon, Excelsior, Minnesota.

F. W. Case, ex-Recording Secretary Madison, Wisconsin.

ANNUAL.

Mrs. Vie. H. Campbell	Evansville	Wisconsin.
H. J. DeVry, Superintendent	Lincoln Park, Chicago	Illinois.
Mrs. C. V. Layton	Richland Center	Wisconsin.
Mrs. E. E. Powers	Appleton	Wisconsin.
Mrs. E. Y. Richmond	Appleton	Wisconsin.
Mrs. A. L. P. Loomis	Rosendale	Wisconsin.
Mrs. D. C. Ayres	Green Bay	Wisconsin.
Mrs. H. M. Lewis	Madison	Wisconsin.

FRUIT LIST.

APPLES.

Eight varieties best adapted to Wisconsin, hardiness, productiveness and quality taken into consideration.—Duchess of Oldenburg, Wealthy, Fameuse, Pewaukee, Plumb's Cider, Walbridge, Tallman Sweet, Wolf River.

Additional list for special locations.—Tetofsky, Red Astrachan, St. Lawrence, Fall Orange, Price's Sweet, Alexander, Utter, Westfield Seek-no-Further, Willow Twig, Golden Russet, Fall Spitzenberg, Haas.

For trial on sandy soils.—Duchess of Oldenburg, Whitney's No. 20, Hyslop, Transcendent, Fall Spitzenberg.

NOTE.—The question of adaptation of varieties is one so largely dependent upon local conditions of soil, elevation and aspect, that a general list will not answer fully the wants of every planter, and at best can only be a general guide in the selection of varieties.

For more specific directions, the following rules and lists are furnished by the committee chosen for this purpose:

1. Locations comparatively elevated and well drained, with a cool northern aspect and fine gravelly clay soil, not very rich, may extend the general list named above to an indefinite extent, with fair prospect of success in southern and eastern districts of the state. But for warm, sheltered locations and rich soils, which induce a great growth, no section of our state can safely plant other than those varieties known to be extremely hardy.

2. The best guide in the selection of varieties is for each to plant largely of such varieties as are found successful in locations similar to that each must plant upon. For all unfavorable locations, and extreme northern districts, only the most hardy, well tried apples of the Russian or Siberian type should be chosen for general planting.

3. In the extreme northern districts, only the crown of the hills should be chosen for the orchards, with a firm soil and porous subsoil, and if these materials are wanting naturally, they should be supplied artificially.

STRAWBERRIES.

For general cultivation.—Wilson, Boyden's No. 30, Green's Prolific, Crescent, Sharpless, Charles Downing, Captain Jack.

For trial.—Kentucky, Cumberland, Triumph, Miner's Prolific, Bidwell, Longfellow.

GRAPES.

For general cultivation.—Worden, Concord, Delaware, Janesville, Brighton, Moore's Early.

For trial.—Isabella, Champion, Elvira, Prentiss, Poclington, Duchesse.

For elevated, airy locations, clay soils, and lake regions.—Massasoit, Wilder, Agawam, Lindley, and other hybrids.

RASPBERRIES.

For general cultivation.— Black: Gregg, Miami, Doolittle. Red: Cuthbert, Philadelphia, Turner, Brandywine.

For trial.— Ohio Black Cap, Shafer, Lowhegan.

BLACKBERRIES.

For general cultivation.— Snyder, Stone's Hardy.

For trial.— Bartel's Dewberry, Ancient Briton.

PEARS.

Most likely to succeed for general cultivation.— Flemish Beauty.

For trial.— Ananas d'Eté, Early Bergamot, Bartlett, Swan's Orange, Seckel, Winter Nellis, Clapp's Favorite, Beure d'Anjou, Doyenne d'Eté.

PLUMS.

For general cultivation.— De Soto.

For special locations.— Lombard, Imperial Gage, Magnum Bonum, Yellow Egg, Eldridge, Duane's Purple.

CHERRIES.

For general cultivation.— Early Richmond, Late Richmond, English Morello.

EVERGREENS.

For general cultivation.— Norway Spruce, White Pine, Arbor Vitae, Scotch Pine, Balsam Fir, White Spruce.

For ornamental planting.— Austrian Pine, Norway Pine, Hemlock, Siberian Arbor Vitae, Red Cedar, Dwarf Pine (*Pinus Montana*).

For timber.— White Pine, Norway Spruce.

DECIDUOUS TREES FOR TIMBER.

Green Ash.
European Larch.

Trees for lawn. (Valuable in order named.)

Weeping Cut-leaved Birch.
Linden.
Hackberry.
Green Ash.
European Mountain Ash.
Oak-leaved Mountain Ash.
European Larch.
American Mountain Ash.
Horse Chestnut.
Wisconsin Weeping Willow.
New American Weeping Willow.
Kilmarnock Weeping Willow.
Weeping Golden-barked Ash.
Weeping Mountain Ash.
Weeping Poplar.

Shrubs for lawn. (Valuable in order named.)

Snow Balls.
Lilacs (three varieties).
Syringa.
Deutzia.
Weigelia.
Upright Honeysuckles.
Flowering Almonds.
Spiraeas.
Strawberry Shrub.
Cut-leaved Sumach.
Fringe or Smoke Trees.
Purple-leaved Barberry.
Pyrus Japonica.

ROSES.

Climbers — Queen of Prairie, Gem of Prairie, Baltimore Belle.

Hybrids — (With protection) Persian and Yellow Harrison, Madame Plantier, General Jacqueminot, La France, General Washington.

CLIMBING VINES.

American Ivy (*Ampelopsis*).
Scarlet Honeysuckles.
Fragrant Honeysuckles.
Clematis Jackmanni.

ACT OF REORGANIZATION

OF THE

STATE HORTICULTURAL SOCIETY.

CHAPTER 151, LAWS OF 1879.

SECTION 1. The executive committee of the Wisconsin State Horticultural Society shall hereafter consist of the president, secretary and treasurer of said society, and of one member from each congressional district of the state; said members from the congressional districts to be chosen annually by the county and local horticultural societies in the respective districts.

SECTION 2. The present officers and executive committee of said society shall hold their respective offices until the Tuesday next succeeding the first Monday in February, 1880, and until their successors are appointed.

SECTION 3. It shall be the duty of the said society to aid in the formation and maintenance of county and local horticultural societies; to promote the horticultural interests of the state by the holding of meetings for discussion; by the collection and dissemination of valuable information in regard to the cultivation of fruits, flowers and trees adapted to our soil and climate, and in every proper way to advance the fruit and tree growing interests of the state.

SECTION 4. The annual meeting of the society shall be held on the Tuesday next succeeding the first Monday in February of each year, for the election of its officers, the transaction of general business, and the consideration of questions pertaining to horticulture.

SECTION 5. All vacancies in the offices of said society may be filled by the executive committee; and should there be a failure to elect a member of the executive committee in any district, the vacancy may be filled by a two-thirds vote of the members of the society present at any regularly appointed meeting.

SECTION 6. It shall be the duty of the secretary of said society to make an annual report to the governor of the state of the transactions of the society, including an itemized account of all moneys expended during the year, in addition to such matters as are now specified in the law relating to the same.

SECTION 7. The number of printed pages of said report shall not exceed three hundred and fifty, and the number of copies shall be limited to three thousand five hundred. In all other respects the publication and

distribution of said report shall be in accordance with the provisions of law now in force concerning the same.

SECTION 8. The sum of $600 is hereby appropriated out of any money in the state treasury not otherwise appropriated, to aid the said society in carrying out the provisions of this act; said sum to be paid by the state treasurer upon the order of the president of said society, in such sums and at such times as shall best contribute to the prosperity of the society and the interests it represents.

SECTION 9. This act shall take effect and be in force from and after its passage and publication.

Approved March 1, 1879.

CONSTITUTION AND BY-LAWS.

As Amended February, 1883.

CONSTITUTION.

ART. I. This Society shall be known as the Wisconsin State Horticultural Society.

ART. II. Its object shall be the advancement of the art and science of horticulture throughout the state.

ART. III. Its members shall consist of *annual* members, paying an annual fee of one dollar; of *life* members, paying a fee of ten dollars at one time; of *honorary life* members, who shall be distinguished for merit in horticultural or kindred sciences, or who shall confer any particular benefit upon the society; and *honorary annual* members, who may, by vote, be invited to participate in the proceedings of the society.

ART. IV. Its officers shall consist of a President, Vice President, Recording Secretary, Corresponding Secretary, Treasurer, Superintendent, and an Executive Board consisting of the foregoing officers and additional members, one from each congressional district of the state, five of whom shall constitute a quorum at any of its meetings. In addition to the foregoing officers, the presidents of all local horticultural societies reporting to this society shall be deemed honorary members and *ex officio* vice presidents of this society. All officers shall be elected by ballot, and shall hold their office for one year thereafter, and until their successors are elected; provided, the additional executive members may be elected by the county or local horticultural societies of their respective districts.

ART. V. The society shall hold its annual meeting for the election of officers, on the Monday next preceding the first Tuesday in February. It shall also hold a meeting in December of each year, at such place and time as may be decided upon by the society or its executive committee, for the exhibition of fruit and for discussions, and such other meetings for discussions and exhibition as the executive committee may direct, at such time and place as the executive board shall designate.

ART. VI. This constitution, with the accompanying by-laws, may be amended at any regular meeting, by a two-thirds vote of the members present.

BY-LAWS.

I. The president shall preside at meetings, and, with the advice of the recording secretary, call all meetings of the society and have general supervision of the affairs of the society; and shall deliver an annual address upon some subject connected with horticulture.

II. The vice president shall act in the absence or disability of the president, and perform the duties of the chief officer.

III. The secretary shall attend to all the correspondence, shall record the proceedings of the society, preserve all papers belonging to the same, and superintend the publication of its reports. He shall also present a detailed report of the affairs of the society, at its annual meeting. He shall also endeavor to secure reports from the various committees, and from local societies, of the condition and progress of horticulture in the various districts of the state and report the same to this society. It shall be the duty of the secretary to make an annual report to the governor of the state, of the transactions of the society, according to the provisions of the statutes for state reports.

IV. The treasurer shall keep an account of all moneys belonging to the society, and disburse the same on the written order of the president, countersigned by the secretary, and shall make an annual report of the receipts and disbursements, and furnish the secretary with a copy of the same, on or before the first day of the annual meeting. The treasurer elect shall, before entering upon the discharge of the duties of his office, give good and sufficient bonds for the faithful performance of his duties, subject to the approval of the executive committee.

V. The executive board may, subject to the approval of the society, manage all its affairs and fill vacancies in the board of officers; three of their number, as designated by the president, shall constitute a finance committee.

VI. It shall be the duty of the finance committee to settle with the treasurer, and to examine and report upon all the bills or claims against the society, which may have been presented and referred to them.

VII. The standing committees of this society shall be as follows: 1st, Committee on Finance, consisting of three members; 2d, Committee on Nomenclature, consisting of three members; 3d, Committee of Observation, as now provided. Said committees to be appointed annually by the executive committee of the society.

LAWS RELATING TO THE PUBLICATION AND DISTRIBUTION OF THE TRANSACTIONS OF THE WISCONSIN STATE HORTICULTURAL SOCIETY.

Revised Statutes, 1878.

SECTION 339. There shall be printed annually by the state printer, on the order of the commissioners of public printing, * * * three thousand copies of the transactions of the Wisconsin State Horticultural Society, together with abstracts of reports of county and other horticultural societies, and such other matter pertaining to fruit growing and other horticultural interests of the state as shall be deemed important. The volume may include such engravings as shall be necessary to illustrate the printed matter; the cost of said engravings not to exceed the sum of one hundred and fifty dollars in any one year, and to be paid out of the state treasury.

SECTION 363. The transactions of the State Horticultural Society shall be distributed as follows: Five copies to each member of the legislature; fifty copies to each town or county horticultural society that shall report its organization, with officers elect, number of members, and an abstract of its proceedings, for publication in said volume, to the secretary of the State Horticultural Society; fifteen copies to each county agricultural society reporting to the secretary of state; fifty copies to the State Agricultural Society; fifty copies to the State University; twenty-five copies to the State Historical Society; and all remaining copies to the State Horticultural Society. * * * The number of the printed pages of the transactions * * * of said horticultural society shall not exceed two hundred, and all such transactions shall be printed on good book paper and bound in muslin covers, uniform in style with the previous volumes published.

Chapter 151, *Laws of* 1879.

SECTION 6. It shall be the duty of the secretary of said society to make an annual report to the governor of the state of the transactions of the society, including an itemized account of the moneys expended during the year, in addition to such matters as are now specified in the law relating to the same.

SECTION 7. The number of printed pages of said report shall not exceed three hundred and fifty, and the number of copies shall be limited to three thousand five hundred. In all other respects, the publication and distribution of said report shall be in accordance with the provisions of the law now in force concerning the same.

Chapter 320, *Laws of* 1883.

Section 7. There shall be printed annually by the state printer, and on the order of the commissioners of public printing, the following documents:

1. Twelve thousand copies of the transactions of the Wisconsin State Agricultural Society, together with abstracts of the reports of the county

agricultural societies, and such other matters pertaining to the industry of the state as shall be deemed important; provided the number of pages shall not exceed five hundred.

2. Twelve thousand copies of the transactions of the Wisconsin State Horticultural Society, together with such abstracts of reports of county and other horticultural societies, and such other matters pertaining to fruit growing and other horticultural interests of the state as shall be deemed important; provided, the number of pages shall not exceed two hundred.

3. Twelve thousand copies of the transactions of the State Dairymen's Association, and such other matters pertaining to the dairy interests of the state as shall be deemed most important; provided the number of pages shall not exceed one hundred and fifty.

4. Twelve thousand copies of the report of the department of agriculture of the State University; provided the number of pages shall not exceed one hundred.

Section 8. Eleven thousand five hundred volumes of said report shall be bound in cloth, uniform in style with volumes previously published, each volume to contain one copy of each of the reports designated in the preceding section, and shall be distributed as follows: Thirty copies to each member of the legislature; one hundred copies to the State Historical Society; twenty-five copies to each county agricultural society and district industrial association which embraces two or more counties and furnishes the State Agricultural Society a report of its proceedings; one hundred copies to the State Horticultural Society; twenty-five copies to each county horticultural society that shall report its organization, with officers elect, and give an abstract of its proceedings for publication in said volume to the secretary of the State Horticultural Society; one hundred copies to the State Dairymen's Association; fifty copies to the State University; five copies to the Wisconsin Humane Society; two copies to each public library in the state; and the remaining copies to the State Agricultural Society for distribution by its secretary.

Section 9. Five hundred copies of the transactions of the State Agricultural Society, and five hundred copies of the transactions of the State Horticultural Society, shall be bound singly, in cloth; five hundred copies of the transactions of the State Dairymen's Association, and five hundred copies of the report of the department of agriculture of the State University, shall be bound in paper, for the use of these several societies and departments for distribution or exchange.

LAW RELATING TO TREE BELTS.

Revised Statutes, 1878.

SECTION 1469. Every owner or possessor of five acres of land, or more, who shall successfully grow by planting with forest trees, consisting of the following kinds, or such species thereof as will grow to the height of fifty feet or more, viz.: arbor vitæ, ash, balsam fir, basswood, beech, birch, butternut, cedar, black cherry, chestnut, coffee tree, cucumber tree, elm, hack-

berry, hemlock, hickory, larch, locust, maple, oak, pine, spruce, tulip tree and walnut, tree belts in the manner and form prescribed in the next section, shall be entitled to have the land on which such tree belts grow until they shall reach the height of twelve feet, and after they shall have attained that height, to receive an annual bounty of two dollars per acre for each acre so grown.

SECTION 1470. Such tree belts shall be planted on the west or south sides of each tract of land, be of uniform width through their entire length, contain not less than eight trees, at nearly equi-distance, on each square rod of land, and be at least thirty feet wide for each five acre tract, sixty feet wide for each ten acre tract, and one hundred feet wide for each square forty acre tract, and upon all square tracts of land, upon two sides thereof. All tree belts owned by the same land owner must be planted not to exceed a fourth of a mile apart, and on the west and south sides of every square forty acres, and shall not exceed one-fifth of the entire tract of land on which the same are planted; provided, that when the east and north sides, or either, of any tract of land, is bounded by a public highway, a tree belt one rod wide may be planted next to said highway, although it, with the others on the west and south sides, shall exceed one-fifth of the whole tract; and tree belts may be planted on any other lines within each forty square acres, by permission of the assessor.

SECTION 1471. The assessor shall, upon the application of the owner thereof, in each year, at the time of assessing the personal property in his district, make a personal examination of all tree belts for which bounty or exemption from taxation is claimed, and ascertain whether they have been planted as required in the preceding section, and are thriftily growing, and if he shall be satisfied thereof, he shall not assess the same for taxation unless the trees therein shall have attained the height of twelve feet, and in that case he shall deliver to the owner a certificate that he is entitled to an annual bounty of two dollars for each acre of such tree belts, stating therein the whole amount of such bounty and giving a description of the entire land of which the tree belts form a part, and the amount of such bounty shall be credited by the treasurer in payment of any taxes assessed on such land, as so much cash; but if not so satisfied, the assessor shall assess the land for taxes or refuse to grant any certificate for the bounty, as the case may require; and if, after any certificate for such bounty shall have been issued, the owner of any such tree belts shall suffer the same to die out by want of cultivation or otherwise, or shall cut the same down, or in any other way allow the same to be so thinned out, that in the opinion of the assessor he ought no longer to receive such bounty, he shall give the treasurer written notice thereof, and thereafter no further bounty shall be allowed until such owner shall again receive a certificate therefor.

INSECTS AFFECTING THE STRAWBERRY.*

By PROF. S. A. FORBES, Illinois State Entomologist.

At least two dozen species of insects are on record as enemies of the strawberry in the eastern United States and Canada, and how many more may infest it whose injuries have never got into print, of course no one can tell. Every part of the plant is attacked by them, some limiting themselves to a single structure, and others devouring two or three indifferently. The fibrous roots are eaten by the root-worm, the white grub and the larva of the goldsmith beetle; the stem or *crown* (as it is commonly called) is gnawed and pierced by the root-worm, and excavated by the crown-borer and the crown-miner. At least a dozen enemies attack the leaf, either biting and gnawing its tissues or sucking its juices, and one of these, the strawberry plant-louse, also sucks the sap of the crown and even of the peduncle of the flower. The blossom itself is destroyed by two or three; and finally, the ripened fruit is likewise occasionally injured.

Some find their more usual food in other plants, taking the strawberry only when it comes in their way; still others, limiting themselves to the strawberry field, are doubtless the native enemies of the wild plant, whose multiplication has been immensely facilitated by the enormous increase of the food; and still a few others are believed to be of European origin, imported to this country by accident.

I have herein summarized what is known to me with regard to the most important of these insects, thinking it might be worth while to bring the essential facts together in one place for reference. I have included those found in-

* From the Proceedings of the Fourth Annual Meeting of the Mississippi Valley Horticultural Society, for 1883, with additional notes furnished by the author. The figures illustrating this paper were kindly loaned by the State of Illinois.

jurious eastward as well as in the limited region covered by the membership of this society, in order that you of the Mississippi valley may be on the lookout for the invasion of eastern enemies; but I have not noticed especially the strawberry pests of the Old World or of the Pacific Slope. I have drawn freely upon the writings of Thomas, Riley, Packard and Saunders in the preparation of this paper, my own contributions to the subject relating chiefly to the crown-borer, the root-worm and the crown-miner.

It is proposed to treat separately the insects injurious to the root, to the stem or crown, and to the foliage, flower and fruit, taking them up under each head in the order of the classification. Under this arrangement the first to be treated will be those attacking the exposed parts of the plant, namely, the foliage, blossom and berry.

INSECTS INJURING THE LEAVES, FLOWER AND FRUIT.

The Strawberry Worm. *Emphytus maculatus*, Norton.

Order Hymenoptera, Family Tenthredinidæ.

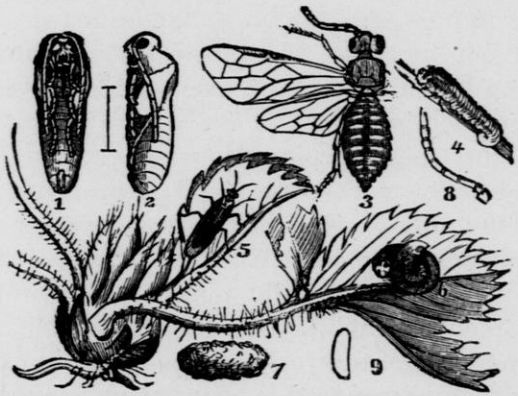

Fig. 1. STRAWBERRY WORM (*Emphytus maculatus, Norton*): 1. Ventral view of pupa: 2. Side view of same; 3. Enlarged sketch of perfect fly, the wings on one side detached: 4. Larva crawling, natural size; 5. Perfect fly, natural size; 6. Larva at rest; 7. Cocoon; 8. Enlarged antenna, showing joints; 9. Enlarged egg. After Riley.

This insect is one of the most destructive enemies of the strawberry in localities where it secures a footing, but is not as widespread and continuous in its ravages as the leaf-roller and some of the various beetle larvæ affecting the root and crown. It is, however, to be placed among strawberry insects of the first class. It has occurred in great

numbers throughout central and northern Illinois, Missouri and Iowa, and as far east as Ontario, Canada. Prof. Riley's terse description, given in his ninth report, as state entomologist of Missouri, can scarcely be improved upon, and I quote the substance of it in his own words:

"Early in the spring numerous flies may be seen hanging to and flying about the vines, in fields which have been previously infested. They are dull and inactive in the cool of the evening, and at these hours are seldom noticed. They are of a pitchy black color, with two rows of large, transverse, dull, whitish spots upon the abdomen. The female, with the saw-like instrument peculiar to the insects of this family, deposits her eggs by a most curious and interesting process, in the stems of the plant, clinging the while to the hairy substance by which these stems are covered. The eggs are white, opaque, and .03 of an inch long, and may be readily perceived upon splitting the stalk, though the outside orifice at which they were introduced is scarcely visible. They soon increase somewhat in bulk, causing a swelling of the stalk, and hatch in two weeks — more or less, according to the temperature — and during the early part of May the worms attract attention by the innumerable small holes they make in the leaves. Their colors are dirty yellow and gray-green, and when not feeding they rest on the under side of the leaf, curled up in a spiral manner, the tail occupying the center, and fall to the ground at the slightest disturbance. After changing their skin four times, they become fully grown, when they measure about three-fourths of an inch. At this season they descend into the ground, and form a very weak cocoon of earth, the inside being made smooth by a sort of gum. In this they soon change to pupæ, from which are produced a second brood of flies by the end of June and beginning of July. Under the influence of July weather the whole process of egg-depositing, etc., is rapidly repeated, and the second brood of worms descend into the earth during the forepart of August, and form their cocoons, in which they remain in the caterpillar state through the fall, winter and spring months, till the middle of April following, when they become pupæ and flies again, as related."

As the second brood of the larvæ appear upon the leaves in July, after the fruit is picked, and feed entirely upon the foliage of the plant, they may doubtless be destroyed without difficulty by the use of the ordinary poisons. Paris green, London purple, or powdered hellebore may be safely recommended for this purpose. It is also not unlikely that fire as applied for the leaf roller, would be found efficient for the destruction of this pest likewise, if used at the time when the eggs and larvæ are exposed upon the foliage. It should be noticed that plowing up the fields in autumn will not actually destroy this insect, unless the ground be planted for a year to another crop, and that even then it is possible that the adult saw-flies, escaping from the field, will secure a lodgment in other strawberry vines.

Mason Bee. *Osmia canadensis*, Cresson.

Order Hymenoptera, Family, Apidæ.

I notice this insect here on the strength of a paragraph by Mr. Wm. A. Saunders, contained in the report of the Entomological Society of Ontario, for 1872.

"This," he says, "is the name of a small hymenopterous insect, a sort of wild bee, which has proved destructive to the foliage of some strawberry plants during the past season, in the township of Oxford. It was observed by Mr. Johnson Pettit of Grinsby, who kindly furnished me with specimens of the insect. In both sexes, the head, thorax and abdomen are green and more or less densely covered with whitish down or short hairs, those on the thorax being longest. The wings are nearly transparent, with blackish veins. The female is larger than the male." The length is .35 inch, and the spread of the extended wings about half an inch.

"Mr. Pettit says: 'The insects were taken in East Oxford, July 2d, on a few strawberry plants in a garden. The plants, perhaps, nearly one hundred in number, had been nearly all denuded of their leaves, and a search in the evening having failed to reveal the authors of the mischief, I examined them again in the heat of the day, and found the little culprits actively engaged in nibbling away the remaining shreds of the leaves. They appeared to chew the fragments

into a pulp and carry it away, but the little time I spent in observing them was insufficient to determine anything further respecting their habits.' Doubtless in this instance the leaves so consumed were used in the construction of suitable nests, in which to deposit the eggs and rear the young of those insects."

If this species should ever become seriously destructive (as is very unlikely), its injuries could probably be checked by the use of insect poison, since the time when it made the attack above described was after the fruiting of the plant.

The Strawberry Span Worm. *Nematocampa filamentaria*, Guenée.

Order Lepidoptera, Family Phalænidæ.

In June, or earlier, to the southward, a wood-colored measuring worm, seven-tenths of an inch in length, with two unequal pairs of long, slender, fleshy filaments, situated on the third and fifth abdominal rings, the posterior pair shorter than the others, curled at the end, and finely tuberculated, may be found feeding on the strawberry and currant. The head is pale rust-red, with some spots of same hue on the body. Half way between the metathoracic legs and the first pair of filaments are two sub-acute tubercles, which are rust-red. When the four filaments are uncurled, they are as long as from the head to the tubercles. The anterior pair of filaments are pale rust-red beneath at base, brown above, but tipped with white. An oval dark spot occurs behind the last pair of tubercles, and extending into the anal plate. This curious worm produces a little, pale, ochre-colored moth, measuring about an inch in expanse, with brown lines crossing the wings, and an outer border of dull brown, that is continuous across both wings, except the apical portion of the anterior pair. They are never sufficiently numerous to cause much injury.

This, like the preceding, if it ever becomes destructive, can doubtless be met with insect poison sprayed or sprinkled upon the leaves.

The Green Strawberry Span Worm. *Angerona crocataria*, Guenée.

Order Lepidoptera, Family Phalænidæ.

This is another of the measuring-worms which has been reported injurious to the strawberry; but as it has not been anywhere a serious enemy, as far as I can learn, I mention it here only for the purpose of putting fruit-growers on their guard against it. The larva, which appears on the foliage in May or June, is about an inch and a half long, gradually increasing in size from the head to the first pair of prolegs. The general color is a yellowish green. There is an indistinct dorsal line, and a rather broad whitish line on each side just below the spiracles, bordered above with faint purple, which increases in depth of color toward the posterior rings. This becomes a purple strip on the anal prolegs, and forms a mark like an inverted Λ. Beneath, same color as above, but with faint, interrupted longitudinal lines. Spiracles white, bordered with purple. Above, on each segment, from second to seventh inclusive, are five minute black dots (four in a square and one in front towards the head) and all the rings have a yellowish band on the swelled part, where the succeeding segment is inserted; legs pale green.

The pupa is .5 to .6 inch in length, and of a dark olive-green color, with the exception of the abdomen, which is pale greenish yellow, and has a row of black dots on each side, and another dorsal row. The wing-cases are very prominent, and from their strong contrast with the abdomen in color, make the chrysalis a pretty object. They are fastened by the tail, and rest in a slight net-work of silken threads, with which the caterpillar draws together the edges of the leaf so as to form a kind of cradle.

The moth appears in June or July, and may be found at twilight until September. It expands about an inch and a half; the wings and body are bright yellow, the first spotted with pale reddish brown, and crossed by a broad, broken band of the same color a little beyond the middle. On the forewings, midway between this band and the body, is another band more broken than the outer one, and the spots of

which it is composed are smaller. It is one of the brightest colored of the geometrid moths.

The insect is a very prolific one, a single female depositing over two hundred eggs. These are laid soon after the appearance of the moth, in patches or clusters. They are of an oval shape, about .03 inch long and .02 wide. When first laid they are yellow, but in a day or two change to bright red, and afterwards to grayish-brown. They hatch in one or two weeks. The young caterpillar is about a tenth of an inch long, with a large brown head and yellowish green body, with a dark brown stripe along each side. Below this the body is pale, with a whitish bloom on its surface, and a few short, brownish hairs, which are most numerous on the last segment.

If this insect should ever become sufficiently numerous in the strawberry fields to require especial attention, it can probably be destroyed by the same measures which have been found efficient for the leaf-roller.

The Smeared Dagger. *Acronycta oblinita*, Sm. & Abb.

Order Lepidoptera, Family Noctuidæ.

Another minor enemy of the plant, capable, however, of possible mischief, is a caterpillar covered with red bristles proceeding from crimson warts, with a bright yellow band along the sides, which may frequently be found in June and again in August or September. It is about one and a quarter inches long, and the body above is of a dull velvety black. On each side of a line drawn down the center of the back is a row of bright yellow spots, two or more on each segment, and below this and close to the under surface is a bright yellow band, deeply indented on each segment, the indentations being on a line with the rows of tubercles. The spiracles or breathing holes are pure white, and are placed in the indented portions of the yellow band; there are also a few whitish dots scattered irregularly over the surface of the body. The under side is dull reddish along the middle, and brownish black along the sides; the feet are of a shining black, and slightly hairy, while the thick, fleshy hinder legs,

called the prolegs, are reddish, tipped with brown, with a cluster of short hairs on the outside of each. This caterpillar is conspicuous from its beauty, and at first one can hardly believe that such a handsome caterpillar could produce so plain and quiet-looking a moth. It is a general feeder, attacking the strawberry in common with several other plants.

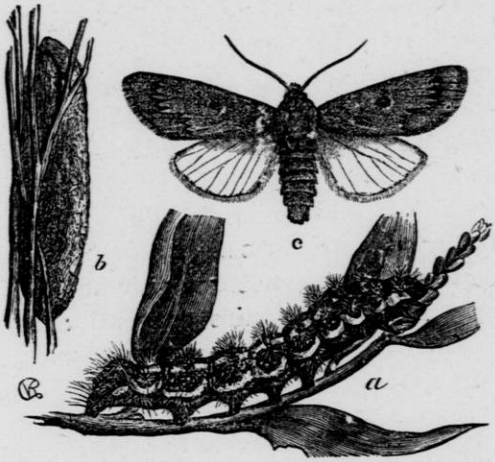

Fig. 2. Smeared Dagger (*Acronycta oblinita Sm. & Abb.*): *a.* Larva; *b.* Pupa; *c.* Moth.

The chrysalis is very dark brown, and with the exception of a smooth, shining band on the posterior border of each abdominal joint, is rough or shagreened. It has the power of violently turning round and round in its cocoon when disturbed, thereby causing a rustling noise.

The moth has the front wings of an ash-gray color, caused by innumerable dark atoms scattered over a white ground, and there is a distinct row of black dots along the posterior border, a more or less distinct black zigzag line across the outer fourth, and some dusky spots just above the middle of the wing. The hind wings are pure white.

There are two broods each year, the first brood of worms appearing for the most part during June, and giving out the moths in July, and the second brood occurring in the fall, passing the winter in the chrysalis state, and producing moths the following May.

This, like the other late leaf-eating larvæ, may be attacked by insect poisons if it should chance to become worthy of so much attention.

The Army Worm. *Leucania unipuncta*, Haw.

Order Lepidoptera, Family Noctuidæ.

Passing mention may be made in this connection of this destructive pest, which last year swept through strawberry fields of southern Illinois, stripping the plants of foliage, and leaving the unripe fruit upon the ground, gnawed from the stems.

The fields might be protected from its attack by the barriers used by grain farmers to arrest its march. The most successful of these is a deep furrow plowed around the field, the inner wall of which may be made slanting outwards from the furrow by the use of a spade. The worms collecting here may be killed by dragging a log along the furrow; or holes may be dug in it at intervals, in which they will rapidly collect, where they may be mashed by thousands. It should be remembered that measures of this sort which will not pay for ordinary farm crops, may nevertheless be employed with great profit for products as valuable as the strawberry.

Cutworms. *Agrotis, sp.*

Order Lepidoptera, Family Noctuidæ.

An illustration of the damage to strawberries which these insects are liable to do under favoring conditions is afforded by the account given by Mr. Saunders, in the article already cited, of the injuries due to a species occurring in Canada, but the name of which he does not mention. He says:—

"This is an insect which has been most unusually injurious during the past season on the fruit plantations of Mr. Mountjoy and Mr. Bunning, on the borders of Lake Huron, near Sarnia. At first its habits were not understood, and it pursued the 'even tenor of its way' uninterrupted night after night, the perplexed fruit-growers not knowing why it was that every day the foliage on their fruit trees and strawberry patches grew slimmer. But soon it was found that the enemy was a night worker, and this knowledge of its habits was at once

turned to account, and night watches instituted, with the view of counteracting this insiduous foe, and with good results, as many as eighteen hundred having been killed by Mr. Mountjoy in one night.

"Their manner of life may be thus described: The moths from which the worms are produced appear on the wing during the month of August, and soon after pair and deposit their eggs on the ground or on some other plant or other substance near the ground; they probably hatch in the fall, and feed for a time on the leaves of grass and other plants then abundant; and after attaining but a small measure of their growth, they burrow into the earth, and there remain in a torpid state during the winter; but the warmth of spring revives them, and soon they are abroad and active. During the first few weeks, while they are still small, the quantity of food they consume is not sufficient to attract much attention; but as they approach nearer maturity, that is, about the time when the trees first put out their tender foliage, the quantity of food they consume is enormous. In the day time they rest tolerably secure from harm, by burrowing a short distance under ground, and towards night they sally forth from their hiding places to begin their work of destruction. They are extremely active in their movements, and travel over quite a space of ground in a very short time, eating almost everything green in their way; they climb the trunks of trees, and consume not only the young foliage, but the buds also, leaving the limbs almost bare, and before the light of another day dawns they retreat to their hiding places and rest in quiet. When full grown they burrow deeper into the earth, and form for themselves an oval cell or chamber, in which they change to chrysalis, and from which the moths are produced early in the autumn to continue the race. In this instance these caterpillars took a decided liking for the strawberry vines, and in spite of the most vigilant search for them, day after day and night after night, they defoliated a large patch of the vines to such an extent that they were utterly ruined. Nearly all through the month of June they literally swarmed, and scarcely a night passed without considerable damage being done by them."

Concerning remedies for its attack, he adds:—

"The battle must be fought with this insect while in the larva or caterpillar state, and then the surest way of disposing of them is to catch and kill them. By searching around the vines just under the surface of the ground during the day, many may be turned up and destroyed, by inspecting again at night when they are active and busy, their ranks may be still further thinned, and by continuing this treatment, day after day, they may no doubt be kept under. Probably dusting the vines with hellebore would poison them as it does other leaf-feeding insects; this measure is at least worthy of a trial."

It is possible that these cutworms might be enticed and poisoned in the field with cabbage leaves or other foliage laid on the ground and poisoned with Paris green or other arsenical substances.

The Stalk Borer. *Gortyna nitela*, Guenée.

Order Lepidoptera, Family Noctuidæ.

Concerning the work in the strawberry field of this well-known and widepread insect, I can add nothing to the mere mention made by Prof. Riley in his third report, as state entomologist of Missouri, that it sometimes bores into ripe

Fig. 3. STALK BORER (*Gortyna nitela Guenée*): Moth and larva.

strawberries. It is very unlikely that it could do any noticeable damage in this way unless its breeding had been encouraged by permitting the unrestrained growth of thick-stemmed weeds in or near the strawberry field.

The Strawberry Leaf-roller. *Anchylopera fragariæ*, Riley.

Order Lepidoptera, Family Tortricidæ.

Under this name we have to deal with one of the most destructive enemies of the plant, which at one time threat-

ened to put an end to the cutivation of the strawberry over large areas, and which would probably have done so, for a considerable time, at least, if measures of controlling it had not happily been hit upon.

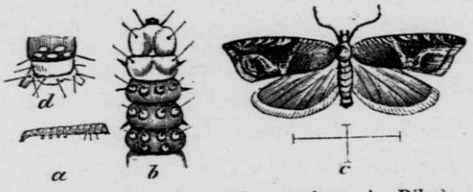

Fig. 4. STRAWBERRY LEAF-ROLLER (*Anchylopera fragariæ Riley*): *a*. Larva; *b*. Anterior segments, magnified: *c*. Moth; *d*. Last segments. After Riley.

The following description is by Prof. Riley, and is extracted from the *American Entomologist* for January, 1869:

"The larva or caterpillar measures, when full grown, a little more than one-third of an inch. It is largest on the front segments, tapering slightly towards the hinder ones. In color it varies from a very light yellowish brown to a dark olive-green or brown, with a body soft and somewhat semi-transparent. Its head is of a shining yellowish brown color with a dark eye spot on each side. The second segment has a shield above, similar in color and appearance to the head, and on each segment or ring of the body are a few pale spots, from each one of which arises a single hair. The hinder segment has two black spots, while the under surface, feet and forelegs are about the same color as the body above. In certain parts of northern Illinois and Indiana this insect has been ruining the strawberry beds in a most wholesale manner. It crumples and folds the leaves, feeding on their pulpy substance, and causes them to appear dry and seared. It most usually lines the inside of the fold with silk. There are two broods during the year, and the worms of the first brood, which appear during the month of June, change to the pupa state within the rolled-up leaf, and become moths during the fore part of July.

"The moth has the head, thorax and fore wings reddish brown, the latter streaked and spotted with black and white; the hind wings and abdomen are dusky. The wings, when spread, measure nearly half an inch across. After pairing, the females deposit their eggs on the plants, from which

eggs, in due time, there hatches a second brood of worms, which come to their growth towards the end of September, and changing to pupæ, pass the winter in that state."

Observations made at Normal show that considerable numbers of the larvæ winter over. The moths begin to fly very early in spring, the first warm days of the opening season calling them forth.

The favorite remedy for this pest is that of mowing the field after the berries are picked, and burning it over when dry. The plants are not hurt, and the leaf-roller is checked at once, and in two or three years reduced to insignificance, if not entirely exterminated. Sprinkling or dusting the vines, in August, with suitable poisons, during the life of the second brood, would probably be equally effectual.

Other Strawberry Leaf-rollers.

Mr. Saunders mentions a second leaf-roller of the strawberry, under name of *Exartema permundana*, Clemens, which was found attacking strawberry vines in Canada, in immense numbers, in one case destroying nearly half the crop. I quote from the valuable paper already so frequently cited:

"All these leaf-rollers have the habit of rolling up the leaves and fasten them with silken threads, and living within the enclosure; but this little creature prefers taking the flowers, expanded and unexpanded, and, bringing them together with silken threads into a sort of ball, it feasts on their substance. This peculiarity makes its attacks much more annoying and destructive than any mere consumption of leaves would be. It is small in size, of a green color, and with very active habits, wriggling itself quickly out of its hiding place when disturbed. It is the progeny of a small moth, with its fore wings yellowish, varied with brown streaks and patches, and darker hind wings, who lays her eggs quite early in the spring, placing them upon the developing leaves, where the newly hatched larvæ may be sure to enjoy an abundance of tender and juicy food, and these attain to nearly their full growth and are capable of most mischief just at the time when the plant is coming into full flower.

"We have found this species attacking the wild strawberry in different localities, and have little doubt but that it is widely disseminated; but why it should so persistently attack the plants in one locality, and multiply so amazingly there, while comparatively unknown in other places, we are unable to more than guess. Possibly they may have been kept under in other localities by parasites which feed on them. The larvæ of most moths are liable to attack from one or more such enemies, and we know that this species is not exempt, for several of the lavæ which we succeeded in bringing into the chrysalis state, instead of producing moths, yielded specimens of these small parasitic flies.

"This species was described by Dr. Clemens, in the Proceedings of the Academy of Natural Sciences, Philadelphia, for August, 1860, where the author states that 'the larvæ bind together the terminal leaves of Spiræa.' Hence it would appear that this insect does not confine itself to the strawberry as a food plant, and may possibly be quite a general feeder. The chrysalides of this species were of the usual dark brown color, from which the moths made their escape from the eighth to the twelfth of July."

Still another species of the same habit, *Lozotœnia fragariæ*, from the wild strawberry, has been described by Prof. Packard, in his "Guide to the study of Insects." The larva was found in Maine, early in June, in folds of the leaves; the moth appearing about the middle of the same month. The moth is very pretty, and measures, when its wings are expanded, eighth-tenths of an inch. Its fore wings are red, darker on the outer half, with a large triangular white spot near the middle of the front edge; the outer edge of the spot is hollowed out. The outer edge of the wing is pale, especially in the middle, and about the same color as the head and thorax; the hind wings and abdomen are of a whitish buff, underneath they are whitish.

Various other species have also been briefly referred to as enemies of this plant, but it does not seem worth while to multiply descriptions of them, as the same principles must guide us in the destruction of all of them. Fire or insect poisons, either arsenical or vegetable, like hellebore water,

must be used, according to the season when the worms or pupæ occur upon the leaves.

The Grape-vine Colaspis. *Colaspis flavida*, Say.

Order Coleoptera, Family Chrysomelidæ.

Prof. Riley states in his third report as State Entomologist of Missouri, that this beetle greedily devours the leaves of the strawberry, commencing to appear in June and continuing until autumn, although leaving the strawberry vines for other food, to a great extent, late in July and in August. The following is Say's description of the beetle.

"Pale yellowish; elytra striate, with a double series of punctures. Body densely punctured; punctures rather large and profound, head with two slightly elevated tubercles between the antennæ; thorax tinged with rufous; elytra with elevated lines, of which the inner one curves round at the base and descends a short distance to unite with the sutural line; interstitial spaces, excepting the subsutural one and the two exterior ones, with double series of rather large profound

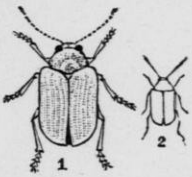

Fig. 5. GRAPE-VINE COLASPIS (*Colaspis flavida Say*): Enlarged, and natural size.

punctures; exterior edge blackish brown; venter dusky. Length nearly one-fifth of an inch. Var. *a*. Interstitial spaces of the elytra black; beneath, excepting the feet, black."

Prof. Riley's inference in the article cited, that this beetle is the adult of the common root-worm of the strawberry, cannot yet be regarded as established as will be explained more fully under *Paria aterrima*, when treating of species injurious to the root.

The beetle (Colaspis) could, of course, be easily poisoned in the strawberry field; but as it feeds on the leaves of the grape as well, and possibly on some other plants, such treatment might not be a complete remedy.

Until the larva of this beetle is more certainly known, and its life history has been thoroughly cleared up, we cannot recommend more effective measures.

The Root-worm Beetles. *Colaspis flavida*, Say; *Paria aterrima*, Oliv.; *Scelodonta pubescens*, Mels.

Order Coleoptera, Family Chrysomelidæ.

The above species of beetles all feed upon the leaves of the strawberry in their adult stages, and upon the roots as larvæ. Although they sometimes do appreciable harm to the foliage, they are so much more destructive as root-worms that I have treated them fully under the head of insects injurious to the roots, and to that article the reader is referred.

Locusts. *Caloptenus spretus*, Thos., *Acridium americanum*, Drury, etc.

Order Orthoptera, Family Acrididæ.

Prof. Riley mentions strawberry leaves as among the favorite food plants of the Rocky Mountain locust (Seventh Report, p. 159), and we have found the young of the second species above mentioned devouring the strawberry leaves in southern Illinois. Mr. F. S. Earle, of Cobden, Ill., writes in July: "A few days ago I noticed some 'flocks' of young grasshoppers [probably of this species] that were literally eating up some strawberry plants. They were quite small, apparently just hatched, and there were not enough of them to do any serious harm, but they made a clean sweep as far as they went."

The Strawberry Plant-louse. *Siphonophora fragariæ*, Koch.

Order Hemiptera, Family Aphididæ.

This species occurs in numbers large enough to attract attention, and occasionally to do decided injury in Kansas and Illinois,* and probably elsewhere also. Like all the plant-lice it is far more dangerous than its usual insignificance would lead one to suppose. The reproductive rate of these insects is so enormous that when conditions happen

* The form figured below, from Southern Illinois, has the aspect of an Aphis, and it is possible that the Illinois species is not *Siphonophora fragariæ*, as was supposed by Dr. Thomas. Until the aërial forms can be seen, however, I prefer to leave the matter as above.

especially to favor their increase, they may suddenly swarm in countless myriads, and utterly destroy the plants which they infest.

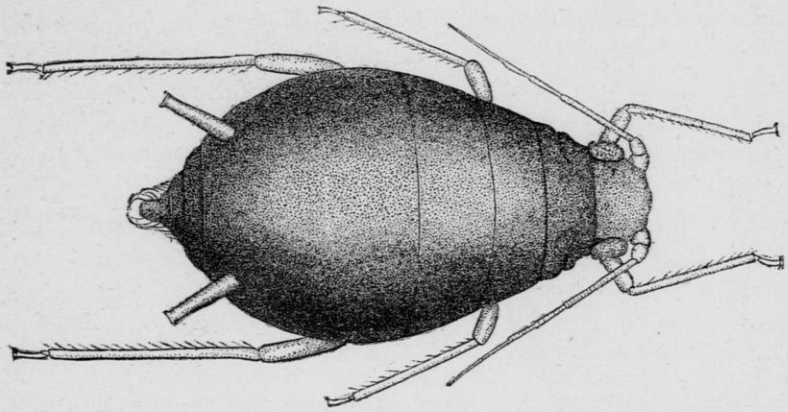

Fig. 6. STRAWBERRY PLANT-LOUSE (*Siphonophora fragariæ Koch*): Root form (?) from crown. H. Garman.

In spring and early summer this species occurs on the under sides of the leaves and on the stalks of the growing fruit, causing the leaves to wither and diminishing the size of the berry. In autumn, the lice move to the crown, where they may be found between the bases of the roots. In November, the wingless females here lay their eggs, which survive the winter to hatch in the spring.

The winged form probably appears at irregular intervals throughout the summer, as is usually the case with the plant-lice, and this is consequently the time when the species spreads from field to field. The following descriptions are from Buckton's "British Aphides," Vol. I., page 125:—

"*Apterous viviparous female* — Size of body .09 x .04 inch, length of antennæ 1 inch, of cornicles .025 inch. Whole body shining green, except the cornicles, which are tipped with black, and straight. Eyes red. Antennæ long and dark olive. Legs pale, with dark femora and tibia joints. Tail yellow.

"*Pupa* —Reddish green, with a smoky line down the dorsum. Thorax and wing cases gray. The last with blackish tips.

"*Winged viviparous female* — Expanse of wings .35 inch, size of body .09 x .04, length of antennæ .1 inch, of cornicles .025 inch. Head, thoracic lobes, antennæ, nectaries, tibiæ, and femoral points black. All the rest of the body green. Abdomen with four round black spots on each side of the carina, and several obscure marks down the dorsum. Eyes red. Cubitus and wing insertions bright yellow, other veins black. Stigma grayish. Tail yellow. Wholly green on the under side. Some specimens are of a redder shade than the rest."

Fig. 7. Egg of same. H. Garman.

At the time when this insect probably does its principal injuries, namely: previous to the ripening of the fruit, the usual standard remedies for the injuries of plant-lice are impracticable, since the poisonous powders and fluids which are used for the destruction of these insects would render the berries inedible. The proper season to attack this pest by local applications is doubtless in autumn, when the lice are congregated upon the crown. At this time, if desirable, they might easily be exterminated by the thorough application of a kerosene emulsion to the plants. This would have the advantage of destroying both the living insects and the eggs. It is at this time, also, that the fields should be plowed up, if it proves to be necessary to resort to this treatment to arrest the multiplication of the insects. As the eggs remain during the winter upon the crowns of the plants, not hatching until spring, care should of course be taken in forming new plantations, that the young plants are obtained from fields not infested by lice, or else that these and their eggs are destroyed upon the plants before they are set. Although I have not yet had any opportunity to experiment upon this matter, I have little doubt that dipping the plants in the kerosene emulsion or in a simple mechanical mixture of kerosene and water, about three parts to one hundred, would be efficient for this purpose, and secure the new field from infection against the old.

Leaf-Hoppers

Order Hemiptera, Family Tettigonidæ.

I find in the *Farmer and Fruit-Grower* for June 16, 1880, an item quoted from the "*Examiner and Chronicle*," which probably relates to some one of the above family, known by the name of leaf-hoppers:

"In a field which produced some fine fruit last June, as the plants were set the previous August, there appeared about the time the fruit was gathered a small insect, resembling the grape-thrips, only one-third its size, or less than one-sixteenth of an inch long. They are perfectly white, and keep on the under side of the leaves that are nearest the ground. The leaves soon turn black and dry up, and the ground under the plant gets foul, as if soot had been thrown there. As fast as the dead leaves were removed, they would collect on the lowest leaves of the plant as before and soon cause their decay. So numerous were they that they would fill your eyes and nostrils full when you were cleaning off the plants. I gave them a heavy dose of air-slacked lime, but it did not seem to destroy any of them, and the plants were nearly ruined. Before the season was over I could see some of them on the other plats on my ground, and on some of my neighbors' a mile away, and if they have not been destroyed by the frost, they may do as much damage this season."

The False Chinch-Bug. *Nysius destructor*, Riley.

Order Hemiptera, Family Lygæidæ.

This little bug is so similar in size, form and general appearance to the notorious chinch-bug, that it is very fre- except a median brown spot at base of crown, and a narrow, paler spot on the clypeus; ocelli piceous; rostrum piceous, paler at base and reaching to hind coxæ; antennæ either pale yellowish brown or darker brown, the torulus and first joint darkest. Thorax with the pronotum narrowing anteriorly, the sides slightly sinuate, irregularly and more coarsely punctate than the head, more or less pubescent, dingy yellow or brown, with a transverse black band

quently mistaken for the latter by those not accustomed to observe insects closely. It often occurs in great numbers in strawberry fields, especially in autumn, when purslane and other spreading weeds have been allowed to grow freely. It is not usually guilty of any very serious injury to the plants, and yet is worthy of mention. The following item in the *Western Rural* for 1870, by a fruit grower of Centralia, Illinois, probably refers to this insect:

"A new insect, to us here, has appeared on our strawberries for the first time the past season, damaging the crop very much. It resembles somewhat the chinch-bug, so destructive to our wheat and corn, and, judging from the peculiar odor they emit on being mashed, should think them very nearly related. Some claim that they are of a different species altogether. Whether this be so or not those interested in the cultivation of the strawberry are anxiously looking forward to another season to see if they are to continue their depredations."

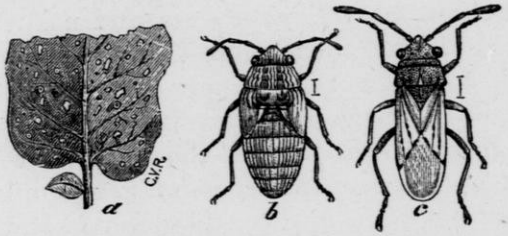

Fig. 8. FALSE CHINCH BUG (*Nysius destructor, Riley*): *a*. Leaf of potato, showing injury; *b*. Pupa; *c*. Adult. After Riley.

From the genuine chinch-bug it may be very readily distinguished by the fact that it is of a rather uniform pale and tarnished brown color, whereas the chinch-bug has a decidedly black head and thorax, with two conspicuous black spots on the front wings, separated by an hour-glass-shaped white blotch. The genuine chinch-bug does not attack the strawberry. Prof. Riley's description and figure of *Nysius destructor* are given herewith, somewhat condensed:

"General color grayish brown. Head more or less distinctly pubescent; the surface usually brown, with a distinct black, longitudinal line each side, broadening on the crown, but generally leaving the orbit of the eyes pale; these lines sometimes more diffuse and occupying the whole surface,

near the anterior edge; also five more or less distinct longitudinal dark lines, the central one most persistent and leading on the posterior margin to a pale, shiny, impunctate spot; scutellum usually dark, coarsely punctate. Legs pale yellow, inclining more or less to brown; coxæ dark at base, pale at tip; trochanters pale; front and middle femora spotted more or less confluently on the outside with brown; tibiæ ringed with brown at base. Hemelytra either colorless, transparent and prismatic, or distinctly tinged with dingy yellow; shallowly punctate and very finely pubescent. Venter piceous, minutely and regularly covered with gray pubescence; female dingy yellow, except at base; female paler than male, and generally larger. Average length .13 inch. Described from numerous specimens."

The Flea Negro Bug. *Thyreocoris pulicaria,* Germar.

Order Hemiptera, Family Pentatomidæ.

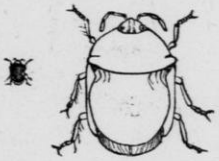

Fig. 9. FLEA NEGRO BUG (*Thyreocoris pulicaria Germar*). After Riley.

This species is sometimes quite injurious to the strawberry, puncturing the stem with its beak and sucking the sap, thus causing the blossom or fruit to wilt. Wherever it occurs, the nauseous flavor which it imparts to every berry it touches will soon make its presence manifest.

It is about .12 of an inch long, by three-fourths that width; the outline of the head and thorax together triangular; that of the abdomen semi-oval and broadly rounded behind; the scutellum is very large, nearly covering the abdomen. The color is glossy black above and beneath; the edges of the wing covers white; the antennæ, tibiæ, and tarsi, brown; the whole surface finely punctured.

The Tarnished Plant Bug. *Lygus lineolaris,* Beauv.

Order Hemiptera, Family Capsidæ.

The tarnished plant bug is one of the true bugs, and consequently destitute of jaws, and provided with a suctorial

beak. The adult or winged form is about a fifth of an inch long by half as wide, oval, yellow or greenish yellow, and more or less striped or mottled with dusky. It is extremely variable, but the most constant marks are five longitudinal white lines on the thorax (often reduced to spots, which then occupy the anterior margin), a white, Y-shaped mark on the scutellum, which is sometimes broken into three white points arranged in a triangle, and a white blotch, tipped with black, at the end of the leathery part of the wing covers.

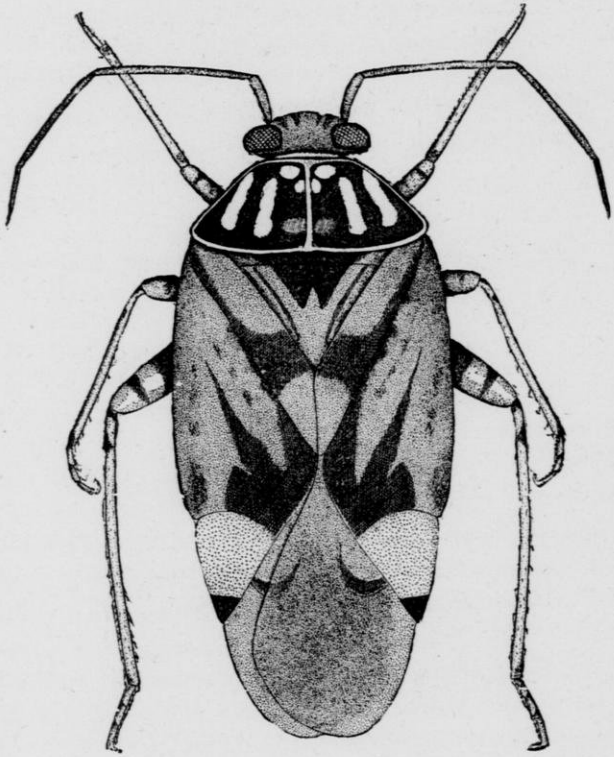

Fig. 10. THE TARNISHED PLANT BUG (*Lygus lineolaris Beauv.*). Adult.

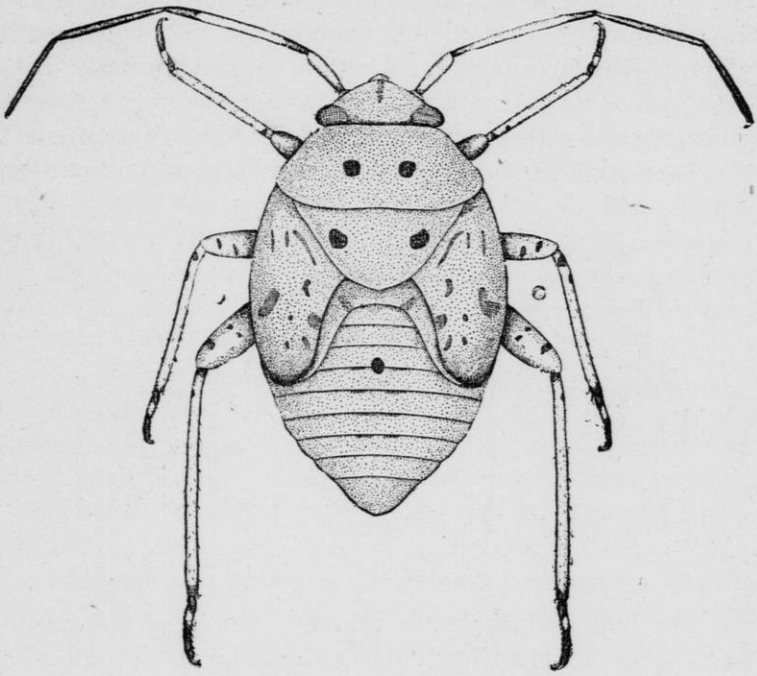

Fig. 11, the same, pupa.

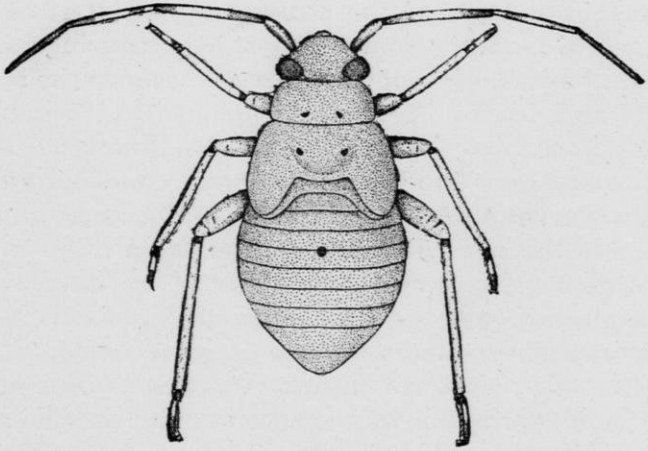

Fig. 12, the same, 3d stage.

The young are much less variegated than the adult, and more distinctly green. There are four stages between the egg and the mature insect, corresponding to as many different moults. In all except the first stage, the young may be distinguished by the presence of four black dots upon the thorax, arranged in a square, with a fifth near the middle of the abdomen.

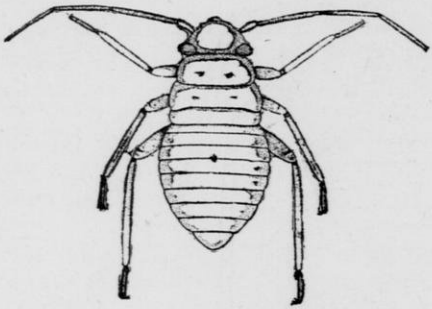

Fig. 13, the same, 2d stage.

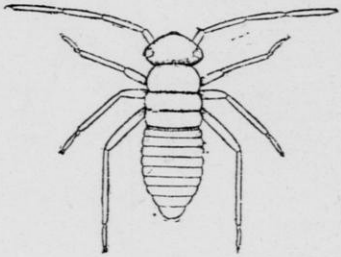

Fig. 14, the same, 1st stage.

The old bugs winter over under rubbish on the ground, emerge early in the spring, cluster upon the unfolding buds of fruit trees, the fresh foliage of strawberries, and other early vegetation, and there lay their eggs, old and young together draining these succulent, growing parts of sap. The effect is to arrest the development of the leaves, and even to kill them, and, in the case of the strawberry, to interfere with the growth of the fruit; sometimes, at least, causing what is known as the *buttoning* of the berry. Later in the season, the buds and leaves of flowering plants and vegetables, especially the cabbage and the potato, are attacked.

There are at least two broods in a year, one maturing in May and June, and the other in July and August, and it is possible that there is still another, intermediate.

Although a very few of these insects are devoured by birds, no natural enemies are known to have any positive effect upon their numbers. There is some evidence, however, that wet seasons are injurious to them. The general and uniform distribution of the species at all seasons of the year, makes it impossible to exterminate it, or seriously to diminish its numbers, by artificial means, unless the general

clearing up and burning of rubbish late in autumn may have that effect. The attention of the orchardist and gardener whose fruits and vegetables are threatened by this insect, should rather be directed to measures for defending directly the crops endangered. The bugs may be caught early in cool mornings, by beating with an insect net the tips of the twigs and leaves of the plants in which they usually lie concealed at that time, and may then be readily killed by shaking them out into a bucket containing a little kerosene or a film of kerosene on water. They may also be destroyed, as I have proven, by careful experiment, by sprinkling or dusting the foliage with pyrethrum, or spraying it with the kerosene emulsion. Any, and even all, of these measures of defense may be used with very great profit, whenever the insect is numerous enough to threaten any serious damage.

We are still in doubt as to the precise time and place of oviposition; the exact *degree* of injury attributable to this species; the conditions under which this injury is peculiarly likely to become serious, especially in the strawberry field; and the whole number of broods appearing in the course of the year. Additional experiments, with preventive and remedial agents, are likewise to be desired.

Chrysalis Snails. *Pupilla fallax*, Say.

Although these little mollusks are, of course, not properly included in an entomological article, it may be worth while to notice the injury occasionally done by them to the strawberry.

The only mention of this species in this connection, which I have seen, is in Vol. II. of the *American Naturalist*, page 666: A gentleman at New Harmony, Indiana, who found his strawberry plants dying rapidly, on searching for the cause, discovered these mollusks at work upon the stems and crowns of the plants, rasping off the outer coating, and sucking their juices in such a manner as to cause them to decay. He found as many as forty upon one plant, and thinks that they have killed several thousands upon the different beds. Though more abundant on the strawberry, he has found them on a variety of plants. Since attention has been called

to the depredations of these minute mollusks, they have been found at work upon the strawberry plants in all the gardens examined.

INSECTS INJURIOUS TO THE CROWN.

The Strawberry Crown Miner. *Anarsia lineatella*, Zeller.

Order Lepidoptera, Family Tineidæ.

Under the above name I have to report the occurrence in Illinois of an insect which, if it has hitherto occurred in this region, has wholly escaped attention until last fall, but which has shown by its performances elsewhere both the ability and the disposition to do serious mischief in the strawberry field. It was detected last September, at Normal, by the roadside, in plants which had escaped from cultivation. About seventy-five per cent. of the crowns of these plants were infested by a small, reddish caterpillar, which had eaten out the interior of the crown, inflicting an injury similar to that done by the crown-borer in southern Illinois, and certainly equally serious. These caterpillars were about two-fifths of an inch (7 to 8 mm.) in length, reddish pink on the back, fading into dull yellow on the second and third segments. The head is yellow, with the sutures deeply indented. The

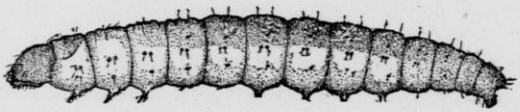

Fig. 15. STRAWBERRY CROWN MINER (*Anarsia lineatella Zeller*): Larva, magnified nine diameters. From strawberry crown. H. Garman.

anterior part of the segment behind the head is smooth and horny, and of a pale, brownish yellow color. On each segment are a few shining reddish dots, or slightly elevated tubercles, from each of which arises a very fine, short yellowish hair. These dots are arranged in imperfect rows, a single one across the third, fourth and last segments, and a more or less perfect double row on the others. The sides and under surface are of a dull whitish color, becoming faintly reddish on the hinder segments. A row of setigerous tubercles, like those on the back, crosses each ventral segment. The feet and false legs are yellowish white, the former tipped with dark brown.

These caterpillars were quite active, creeping rapidly about when their burrows were opened, and often letting themselves drop to the ground by a thread. Mr. Wm. Saunders, of Ontario, Canada, is to be credited with the first published mention of their injuries to the strawberry, and I can not do better than to quote from his account of it in the annual report of the Entomological Society of the Province of Ontario for the year 1872:

"This is a very troublesome insect where it occurs plentifully and takes a liking to the strawberry; but happily this is not often the case. We have never seen it affecting this fruit anywhere except on the grounds of Mr. Luke Bishop, of St. Thomas, Ont., who first called our attention to it about the middle of May, 1869, when he brought us a few specimens. During 1868 and 1869 they played sad havoc with his plants, destroying a large proportion of them.

"On the eighth of June we visited the grounds of Mr. Bishop, and found his strawberry beds badly infested — indeed almost destroyed — by this pest, along with a leaf-roller, to be presently described. The borer eats irregular channels through the crown, sometimes excavating large chambers, at other times merely girdling it in various directions, here and there eating its way to the surface. Whether these various chambers and channels are due to the presence of more worms than one in a single root we were unable to determine with certainty. Most of the larvæ found at this date had eaten their way to the upper part of the crown of the plant, just under the surface, and were found about the center with a hole eaten through the surface. From the fact that a large number of roots were examined, and although almost every one was more or less injured, but very few larvæ were to be found, we inferred that the probabilities were that the larvæ, when mature, usually leave the root, and undergo the change to chrysalis, either under the surface of the ground, or amongst rubbish at the surface. One chrysalis only was found, and that was in the cavity of a root. As soon as Mr. Bishop had discovered the destructive character of this pest, he, with commendable caution, refused to sell any more plants until the

insect was subdued, for fear of spreading the evil. He is of opinion that the insect came to him from some part of the United States, with some plants of the Hooker strawberry, as it was in a patch of these, so obtained, that he first noticed the insect working.

"Specimens of the larvæ gotten late in the season, wintered over, and were examined on the 12th of January following, when they did not appear so plump in body as those examined in July. They appear to spend most of the winter in a torpid state within the silken cases before mentioned. Several were found thus sheltered at this time, and one, whose original abode had been disturbed in the fall, had prepared for itself a similar casing within the fold of a strawberry leaf. In the last instance, the larva seemed quite active, moving itself briskly about whenever touched. The chrysalis of this insect is very small, and of the usual dark reddish brown color. That one which was found on the 8th of June, produced the moth on the 12th of July."

The moth bred from the chrysalis above mentioned was submitted by Mr. Saunders to Prof. Riley, and by him determined to be *Anarsia lineatella*, Zeller. Prof. Riley also says that he has bred the same moth from larvæ boring in peach twigs. The worm has likewise been found by Prof.

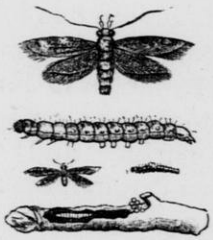

Fig 16. PEACH TWIG BORER. Larva and perfect insect, natural size, and magnified. Also a bored twig. After Glover

Comstock in the fruit of the peach in July and August. These peach and strawberry insects are, however, not certainly the same, as not only their habits but their life histories seem inconsistent as far as known. But, without assuming to pass upon this question now, I have accomplished my present purpose by giving timely warning of the appearance in the Mississippi valley of what may, unless it is closely watched, prove a serious enemy of the favorite fruit of America.

Until the life history of this species is complete, I can only say that the strawberry fields should be inspected in fall and spring for evidence of the presence of this caterpillar; and if it is found, it can be exterminated, as far as we know, only by destroying the plants. It will, of course, be most likely to occur in old and neglected fields, or, as at Normal, in runaway plants in fence corners and by roadsides. I hardly need say that these neglected plants, living from year to year without "rotation," are the best possible breeding places for strawberry pests, and may easily become centers of infection for a whole neighborhood.

Otiorhynchus sulcatus, Schoen.

Order Coleoptera, Family Otiorhynchidæ.

This is a rough, brownish black snout beetle, about four-tenths of an inch long, of whose injuries to the strawberry I only know the fact reported by Prof. Riley in his third report, that it infests the crowns of these plants; doubtless in the larval stage. This species may be distinguished from the other members of its genus by the fact that the femora are provided with a very small tooth, while the rostrum is sulcate, with a bifid carina at the tip; and the elytra are also longitudinally grooved. The thorax is sub-cylindrical, with the sides moderately rounded, widest in front of the middle, and the surface rather closely set with rounded tubercles. Each interval of the elytra bears a row of shining, rounded tubercles, rather closely placed, and small patches of short yellowish hair, irregularly distributed.

Although it has hitherto done but little harm north of the latitude of central Illinois, this species certainly occurs as far northward as Minnesota, and there is no sufficient security that it may not become injurious wherever introduced.

It has been known as one of the worst enemies of the strawberry for more than fifteen years, but its life history has only been very lately completed. The first published notice of its injuries of which I am aware, occurs in Prof. Riley's third report as State Entomologist of Missouri, published in 1871. "This insect," he says, "has done considera-

ble damage to the strawberry crop in the southern portion of Illinois, especially along the line of the Illinois Central Railroad, and I have seen evidence of its work in St. Louis county, Missouri. At the meeting of the Southern Illinois Fruit Growers' Association, held at South Pass, in November, 1867, several complaints were made by parties from Anna and Makanda, of a white worm which worked in the roots of their strawberries, and in 1868, the greater portion of the plants of a ten-acre field at Anna, belonging to Mr. Parker Earle, was destroyed by it."

This insect, in the form in which it does its injury, is the grub or larva of one of the snout beetles, belonging, in fact, to the same family as the peach curculio. It was first described by Prof. Riley, in the report already cited, and his description of the beetle is herewith given. The larva and pupa are described from fresh material obtained last fall from strawberry fields in southern Illinois.

The Strawberry Crown-Borer. *Tyloderma fragariæ*, Riley.

Order Coleoptera, Family Curculionidæ.

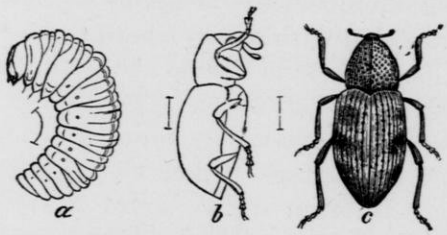

Fig. 17. STRAWBERRY CROWN-BORER (*Tyloderma fragariæ Riley*): *a*. Larva; *b*. Outline, side view; *c*. Back view of beetle. After Riley.

"Tyloderma fragariæ. — *Imago.* — Color deep chestnut-brown, sub-polished, the elytra somewhat lighter. Head and rostrum dark, finely and densely punctate and with short, course, fulvous hairs, longest at tip of rostrum; antennæ rather lighter towards base, ten-jointed, the scape much thickened at apex, joint 2 longest and robust, 3 moderately long, 4–7 short, 8–10 connate and forming a stout club. Thorax dark, cylindrical, slightly swollen across the middle and uniformly covered with large thimble-like punctures, and with a few short, coarse fulvous hairs, usually arranged in three more or less distinct longitudinal lines; pectoral

groove ending between front legs. Abdomen with small, remote punctures and hairs, which are denser towards apex. Legs of equal stoutness, and with shallow, dilated punctures and uniform very short hairs. Elytra more yellowish brown, dilated at lower sides anteriorly, and with about nine deeply punctured striæ, the striæ themselves sometimes obsolete; more or less covered with coarse and short pale yellow hairs which form by their great density three more or less conspicuous transverse bands, the first of which is at the base; between the second and third band in the middle of the elytron, is a smooth, dark brown or black spot, with a less distinct spot of the same color below the third, and a still less distinct one above the second band. Length .16 inch. Described from four specimens bred from strawberry-boring larvæ. The black spots on the elytra are quite distinct and conspicuous on two specimens, less so on one, and entirely obsolete on the other."

Larva — White, except the head, which is pale yellow. The mandibles are dark brown, black at the edges, and bifid at the tip. The labrum is narrowed from behind; broadly rounded, entire and bristly in front, and marked by a transverse suture, before the middle. The antennæ, situated outside the upper angles of the mandibles, are one-jointed and excessively minute, being about .02 mm. in length. Just outside each antenna is a black ocellus-like spot in full grown larvæ, wanting in smaller individuals. The head is smooth, except for about three transverse rows of slender hairs. The body is strongly arched, like that of a lamellicorn, each segment bearing a single row of very short sparse hairs. The first segment of the dorsum is smooth; the remaining segments are divided into three transverse lobes or folds, the first and last of which are interrupted near the end by oblique grooves. Below the spiracles is a row of large, low, triangular tubercles, and beneath these a second row, separated from the former by a longitudinal channel. The ventral segments of the abdomen have the usual form of a single transverse ridge, a triangular portion of each end of which is marked off by an oblique groove. The structure of the segments is, in fact, almost precisely that of the straw-

berry root-worm, to be hereafter described. The pectoral ridges of the thorax, however, bear upon each side, instead of feet, three large, fleshy tubercles, each with two or three stiff hairs at the tip. This larva, when stretched out, is one-fifth of an inch in length by one-half that width.

Pupa—The pupa is white throughout, with the exception of the eyes, which show through the pupal envelope at the base of the snout. The head and snout are bent against the breast; the second is about twice as long as wide, broadening toward the tip, where it is widely emarginate. The

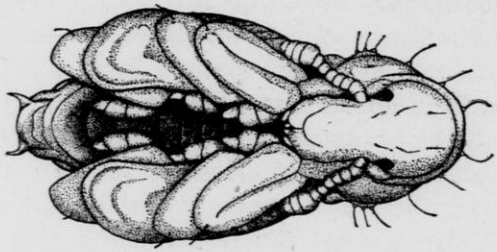

Fig. 18. PUPA OF CROWN-BORER. H. Garman.

clubbed antennæ extend scarcely beyond the tip of the snout. The middle of the head bears two longitudinal rows of stiff bristles, four or five in each row, and three rows of similar bristles extend transversely upon the thorax, while others surround the margin. The posterior edge of each abdominal segment is likewise bristled, and a pair of incurved hooks terminates the abdomen.

The life history of the crown-borer is now practically complete, thanks to the early observations of Prof. Riley, and to some contributions to the subject which I have been able to make since last August.

The eggs are laid on the crown in spring (this year certainly not earlier than April), being pushed down among the bases of the leaves. The larvæ penetrate the crowns soon after hatching, and excavate the interior all summer, until they get their growth.

It is worthy of note, however, that a single larva does not wholly destroy a plant, as it matures by the time a quarter or a fourth of the substance of the crown is devoured. (See Fig. 19.) Frequently two or three or more beetles will attack

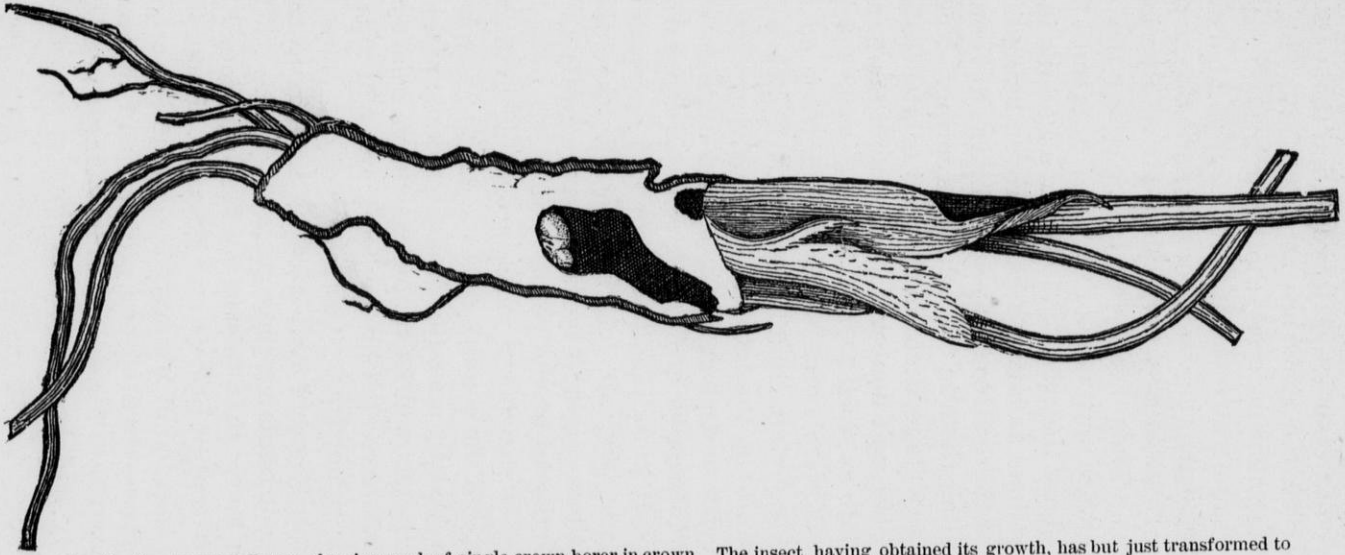

Fig. 19. STRAWBERRY PLANT, showing work of single crown-borer in crown. The insect, having obtained its growth, has but just transformed to the adult stage. H. Garman.

a single stool, and they then leave behind them only a hollow shell, to which the roots are attached. (See Fig. 20.) Still in its subterranean cavity, the worm transforms to a pupa, and in the same safe retreat effects also the final change into the mature beetle, this last transformation occurring all the way along from August to October, during a period of about two months. These beetles all escape from the crowns in autumn, but are not known to lay any eggs until the following year. That they pass the winter as adults in the fields infested by them as larvæ, I have proven by finding a number of them there alive this year as late as November 29, and also by finding them in the fields this spring. None of these insects, in any stage, occur in the crowns later than the latter part of October, and none were to be found there in southern Illinois as late as April 25, although the adult beetles of last year's brood were occasionally encountered on the crown among the leaf stalks and leaves. A pair of these were seen there *in copulo*, on the 12th of that month.

This is a shy and sluggish insect, rarely seen outside its burrow, *and incapable of flight*, the membranous wings being reduced to useless rudiments, as shown by several dissections which I made last fall. As it does not leave the field in which it had its origin, it feeds of course, while a mature insect, on the tissues of the plant.

The effect of this borer varies according to the variety of strawberry, and the condition of the field. Wilsons are said to be destroyed by a single attack, but some more thriftily-growing varieties will form new crowns year after year to replace those excavated by the borer, and will thus resist its injuries for some time. Our observations show that this process is considerably facilitated by hilling up the plants, or throwing dirt against the rows.

I do not know that this insect has been found injurious anywhere except in Illinois and Missouri, although we have specimens collected in Minnesota. It doubtless originated in the wild strawberries of our prairies, and its work could probably have been foreseen, and its ravages prevented, if a proper study had been made, in time, of insect injuries to the wild plant.

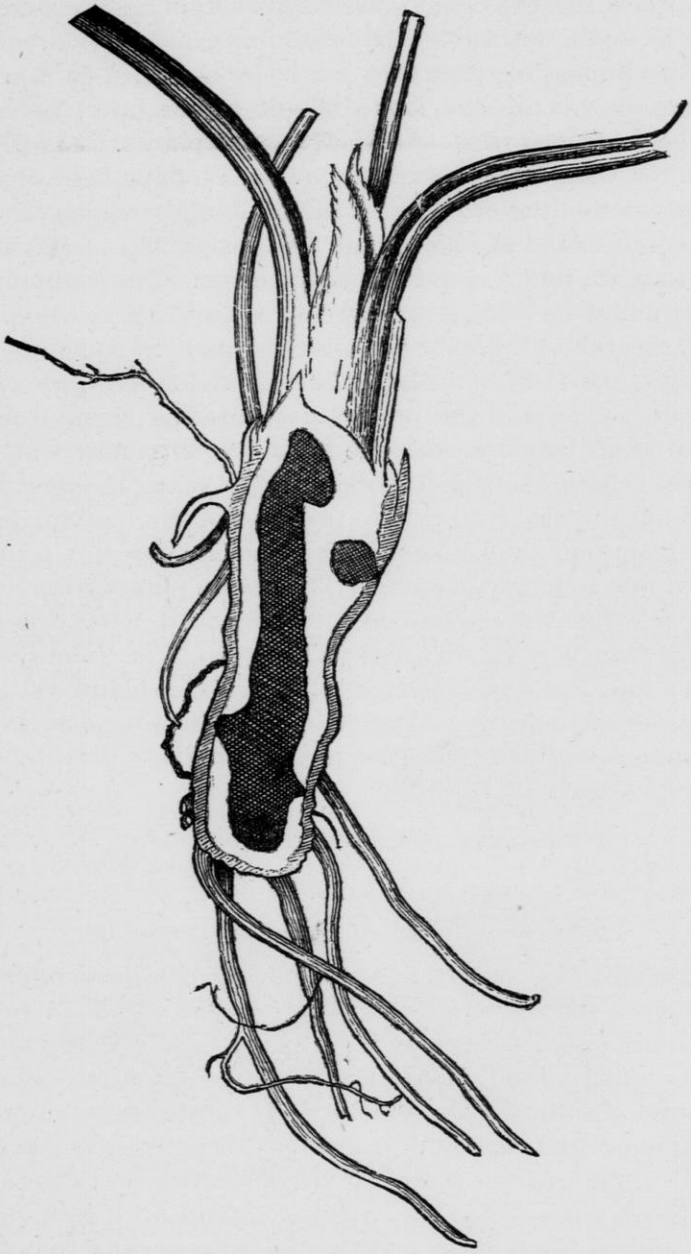

Fig. 20. Plant with crown fully excavated.

As these beetles spend their entire time in the field, and feed, of course, as adults, upon the foliage of the strawberry, it is not impossible that they might be poisoned in the fall. Except by this method, it is difficult to see how the insect can be destroyed without sacrificing the plants. To kill both together, the ground should be plowed late in June or early in July, when the crowns are full of half-grown larvæ.

It is not in the life history of this insect, but in its structure, that we find a clue to its subjugation. The rudimentary condition of its wings, and its consequent lack of the power of flight, taken together with its sluggish movements, suggest the value of the isolation of new fields as a preventive measure, or at least the policy of separating them from infested areas by a considerable interval. Just how wide this interval should be it is impossible to tell without experiment; but from the observed rate of progress of the pest during the year from one patch to another adjacent, it seems probable that a few rods would suffice. To obtain plants from an old field in which the crown-borer has prevailed, without serious risk of transporting the insect with them, it is evidently necessary that the stools selected should be transplanted as early as possible in spring. After the beetle commences to stir, the danger will daily increase that the crowns will be infested with its eggs.

INSECTS INJURIOUS TO THE ROOT.

Ants.

Order Hymenoptera, Family Formicidæ.

Although these enterprising and nearly omnipresent insects of various species often occur in strawberry fields in noticeable numbers, I have never learned personally of any serious injury which could justly be attributed to them. For the purpose of calling attention to them, however, I quote the following note from the *Farmer and Fruit Grower* for June 16, 1880, and credited therein to the *Examiner and Chronicle:*

"The next pest that we have to contend with here is the ants, and so destructive are they in this locality that some growers think of turning their attention to other pursuits. They honeycomb the ground right under the plants, eat off

the fine roots and as fast as new ones are put forth they share the same fate, and the plants soon lose their vitality. If the grass and weeds are allowed to grow among the plants, they will not suffer so much, as the ants will work among the weeds as well as the strawberry plants; but to grow fine fruit the ground must be kept clear of weeds and runners."

It is proper to say, however, that the difficulty of determining exactly what as small a creature as an ant is doing under ground, makes it not impossible that the writer of this article was deceived as to the real business of these insects. Only a dissection of specimens and a study of the contents of their alimentary canals could determine this matter with certainty.

The White Grub. *Lachnosterna*, sp.

Order Coleoptera, Family Scarabæidæ.

Doubtless I can say little or nothing concerning this species which is new to the readers of this article, so familiar is the insect to every one who has anything to do with agriculture or horticulture in any of their departments. All know that the name is commonly applied to the larvæ of several

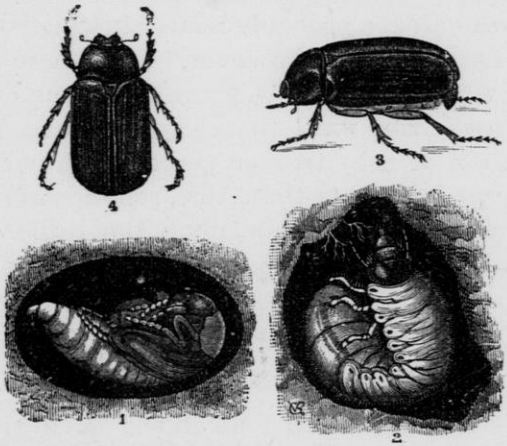

Fig. 21. MAY BEETLE, WHITE GRUB (*Lachnosterna fusca, Fröhl.*): 1. Pupa in its earthen cell; 2. Larva; 3, 4. Beetle, side and back view.

species of the chestnut-brown May beetles, or June beetles or dor-bugs, as they are variously called; that the grub lives in the ground, feeding on the roots of vegetation for about three years; that it emerges as a beetle in May or June, and

that in this stage it feeds on the leaves of various fruit and ornamental trees, often defoliating them when it becomes very abundant. All fruit-growers know, too, that the strawberry is not exempt from its attacks, but that the roots of this plant are often destroyed by it to a degree to impair seriously the value of the plantation.

This is perhaps the most unsatisfactory insect with which the strawberry-grower has to deal, offering the fewest opportunities for effective attack. It is true that in the beetle stage large numbers may be destroyed by the use of lights and reflectors, placed above tubs of water into which the beetles may fall, this trap being rendered more efficient if the water is covered with a thin film of kerosene; but unless this method is generally and continuously used by an entire community, and throughout a term of years, it can have no great effect upon the crops of the individual fruit farmer. In the egg stage this species is beyond our reach, and as a larva it can be attacked only by repeated stirring of the ground, or by digging out the individual grubs as their presence is manifested by the withering of the plants. No applications to the soil have established more than a temporary reputation, and all are probably nearly ineffective. A single preventive measure may, however, be taken to advantage. In a region where the grub is prevalent, ground should not be set to strawberries until these insects have been pretty well cleared out of it by two or three years' cultivation in some hoed crop. Further than this, reliance must probably be had, as far as we now know, upon the rather crude and expensive method of the destruction of the grubs by hand.

The Goldsmith Beetle. *Cotalpa lanigera*, Linn.

Order Coleoptera, Family Scarabæidæ.

This beetle is also a white grub in the larval stage, distinguished from the preceding only by trivial characters, but widely different as an adult. The beetle is about of the same size as the common "June bug," bright yellow above, with a golden metallic luster on the head and thorax, while the under side of the body is copper-colored and densely covered with long white hairs. The life history of this spe-

cies is almost identical with that of the true white grub, and the beetle feeds, like the June beetle, upon the leaves of a variety of fruit and forest trees. It also appears at about the same time of the year, namely, in May and June. For practical purposes, consequently, these two insects may be treated as one.

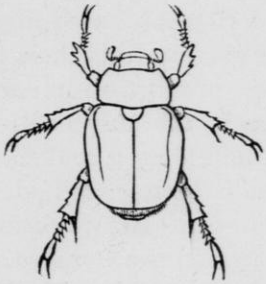

Fig. 22. GOLDSMITH BEETLE. (*Cotalpa lanigera Linn.*): Adult. After Packard.

The following comparative description of the larva of the goldsmith beetle is quoted from Prof. Packard:

Fig. 23. GOLDSMITH BEETLE (*Cotalpa lanigera Linn.*): Larva. After Packard.

"*Larva.*—The larvæ are whitish grubs, about one inch and three-quarters long and over half an inch thick, with a yellowish brown scale on the part corresponding to the thorax. It so nearly resembles the young of the May beetle that it requires a close examination to tell them apart. The proportions of the two are much the same; if anything, the Cotalpa is slightly shorter and thicker, and its body is covered with short stiff hair, especially at the end, while in the May beetle the hairs are much finer, sparse, and the skin is consequently shiny. They also differ in the head, it being fuller, more rounded in Cotalpa, the clypeus shorter and very convex, while in the May beetle it is flattened. The upper lip (labium) is in Cotalpa longer, more rounded in front and narrower at the base, and full convex on the surface, while in the young May beetle it is flat. The antennæ are larger and longer in the goldsmith beetle, the second joint a

little over half as long as the third, while in the May beetle grub it is nearly three-quarters as long; the third joint is much longer than in the latter grub, while the fourth and fifth are of the same relative length as in the May beetle, but much thicker. The jaws (mandibles) are much alike in both, but not quite so acute in the Cotalpa as in the other, nor are the inner teeth so prominent. The maxilla is much longer and with stouter spines, and the palpi are longer and slenderer in the grub of Cotalpa than in the other, though the joints have the same relative proportion in each; the basal joint is nearly twice as long as in the May beetle. The under lip (labium) is throughout much longer, and the palpi, though two-jointed in each, are much longer and slenderer in the grub of Cotalpa than in that of the May beetle. The feet are much larger and more hairy in the Cotalpa. Both larvæ are about an inch and a half long, and a third (.35) of an inch thick at the widest part."

This grub has been reported extremely destructive to strawberry roots in New Jersey by Dr. S. Lockwood, and doubtless occurs in strawberry fields in other parts of the country wherever the beetle is known, probably having been generally confounded with the larva of Lachnosterna. Certain fields, according to Dr. Lockwood, in Monmouth county, New Jersey, were badly thinned out by it, the plants being dead on the surface and easily pulled up, the roots having been eaten off below.

The remarks made respecting remedies for the previous species will apply equally, as far as we know, to this.

THE STRAWBERRY ROOT-WORMS.

Colaspis brunnea, Fab., *Paria aterrima*, Oliv., *Scelodonta pubescens*, Mels.

Order Coleoptera, Family Chrysomelidæ.

The so-called root-worm of the strawberry proves, on careful study, to represent not merely one, but three species of closely allied beetles, all belonging to the great family of plant feeders (Chrysomelidæ), to the same tribe of that family (Eumolpini), but to different genera and species.

COMMON CHARACTERS.

Larvæ. These root-worms may be known from the crown-borer, to which they bear a strong superficial resemblance by the absence of jointed legs in the latter; and from small white grubs, with which they are often associated in the ground, both feeding alike upon the roots of the strawberry, by their relatively shorter and thicker bodies, by the greatly inferior development of the abdomen, and by the fact that they are not nearly as much arched from before backwards

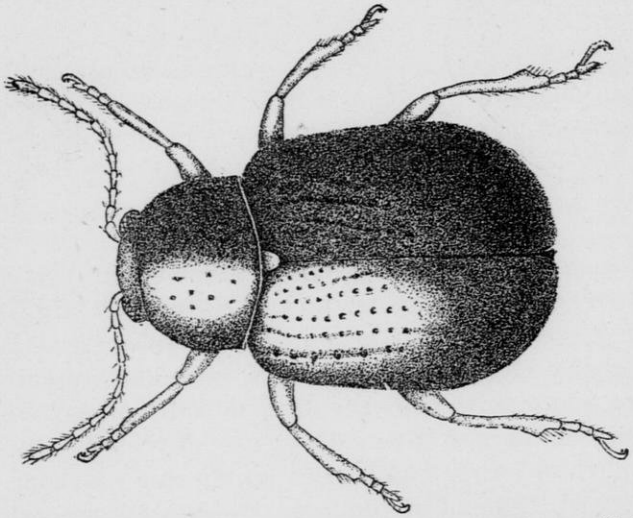

Fig. 24. STRAWBERRY ROOT-WORM (*Paria aterrima Oliv.*): Adult, magnified 16 diameters. H. Garman.

as the grubs. In the root-worms the length is only about twice the breadth, while in white grubs of that size, it is four or five times as great. In the former the abdomen is but little longer than the head and thorax taken together, while in small white grubs it is at least twice as long. The latter insects have also the posterior half of the abdomen somewhat swollen, round and smooth, while in the root-worms the terminal segments are smaller than the preceding ones, and are at least equally wrinkled and tuberculate.

The root-worms here treated are all of nearly the same size, .12 to .16 of an inch long by half as wide, and all are white except the head and first segment, which are pale,

yellowish brown. The segments are twelve in number behind the head, with a rudimentary thirteenth one in which the vent is situated. The first segment, the one bearing the first pair of legs, is of a firmer consistence than the others, leathery and smooth above, and as long as the two following together, and each of the remaining eleven is marked on the back by about three transverse dorsal folds, and by a single

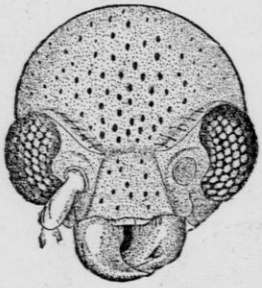

Fig. 25. Head of same, front view.

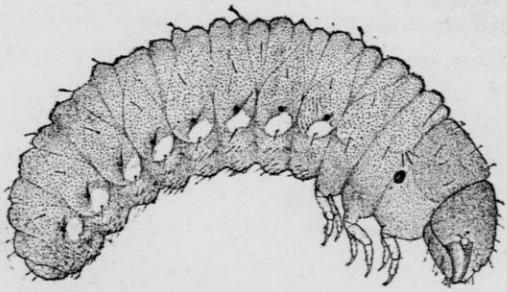

Fig. 26. Larva of same, magnified 16 diameters. H. Garman.

fold beneath. There is little peculiarity in the external structure of the segments, and it differs but slightly from that of a great number of soft-bodied subterranean larvæ. The legs are about as long as their corresponding segments, and are white, with the exception of their claws, which are dark brown at the tips. They are provided with a few slender white hairs, which become shorter and more spine-like towards the end of the leg. The head is smooth, somewhat flattened in front, with a few slender scattered hairs. The clypeus is trapezoidal, narrowing forward, and the labrum is rounded in front. The mandibles are dark brown, with black tips.

Pupæ. The pupæ are .14 inch long, by .1 inch wide. They are white, except the eyes and the mandibles, which, when the pupæ are mature, show through the outer envelope, red or black. The head is bent against the breast, and the legs folded against the body beneath, the posterior pair being applied against the sides of the abdomen, and the thighs of the anterior pair projecting at right angles. The front of the head is set with a few long spines with inflated bases, and three transverse rows of similar spines appear upon the thorax, one near the anterior border, one near the

posterior, and the third intermediate. Six similar hairs occur upon the scutellum, and a row of about six or eight borders each one of the abdominal segments above. The last three segments are variously armed with spines, differing in shape and direction according to the genus, and the knees of the last pair of legs are furnished with hooks and long slender hairs with inflated bases. The sheaths of the antennæ are set externally with conical tubercles.

Adults. The group to which these beetles belong is thus defined by Leconte & Horn:—

"Body oblong, convex, rarely rounded or oval, usually metallic, sometimes testaceous or spotted. Head moderate, deflexed, front wide, eyes more or less emarginate; antennæ filiform, or slightly thicker externally, usually long; widely separated at the base. Prothorax with distinct lateral margin, which is, however, rarely effaced. Pygidium covered by the elytra, which are rounded at tip. Front coxæ separated by the prosternum, globose, cavities closed behind. Legs moderate, the front ones sometimes elongated; tarsi broad, the third joint deeply bilobed, claws appendiculate or bifid in our genera."

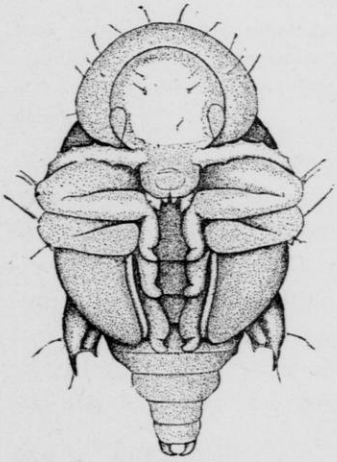

Fig. 27. Pupa of *Scelodonta pubescens*, Mels.

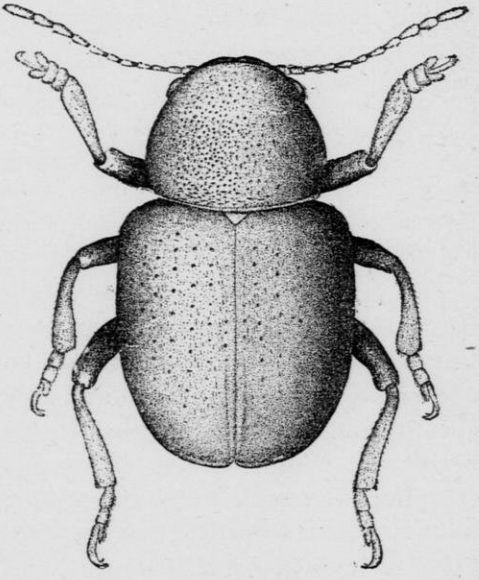

Fig. 28. Adult of same.

DIFFERENTIAL CHARACTERS.

As may be inferred from the fact that these root-worms all belong to the same tribe, the characters which distinguish them in their immature stages are few and trivial. The adult beetles may be described without difficulty; but the larvæ of Scelodonta and Paria are almost indistinguishable.

Hoping to avoid the necessity for long and minute descriptions, I have drawn up the following tables for the determination of larvæ and pupæ.

Larvæ.

a. Mandibles notched or bifid at tip.

b. Inner edge of mandible excavated before tip; anal segment rudimentary, penultimate segment shorter than the preceding, with four dorsal tubercles; the two rows of ventral tubercles no more prominent than the corresponding ventral ridges.....*Paria.*

bb. Inner edge of mandibles not excavated; the last two segments well developed, not tuberculate, the penultimate bifid beneath; the ventral tubercles prominent, with long hairs.....*Colaspis.*

aa. Mandibles entire at tip, inner edge excavated; anal segment rudimentary, ventral tubercles not prominent.....*Scelodonta.*

Pupæ.

a. Hooks at tip of abdomen simple, incurved.....*Colaspis.*

aa. Abdominal hooks recurved.

b. Hooks stout, with strong, erect tooth at upper side of base, and two long hairs on posterior margin.....*Scelodonta.*

bb. Hook simple, or with slender hair at upper side of base; no hairs on posterior margin.....*Paria.*

The beetles may be more easily distinguished, Colaspis being usually of a pale clay-yellow, varying to a yellowish brown, smooth but not shining, concolorous throughout or occasionally with the head and thorax green; while Paria is shining black above, varying to brown, with four blotches upon the wing covers; but always with pale legs; and Graphops is purple or green, with a bronzed, metallic luster, and covered with a gray pubescence, of which both the other species are destitute.

The life histories of these insects, as far as known, are curiously different in respect to the times and periods of de-

velopment. The larva of Colaspis appears early in the season, and does its mischief principally in the months of April and May, the beetles appearing in June and July. That the eggs are laid by this beetle in the preceding year, is rendered highly probable, in which case the species hibernates in the egg. Paria, on the other hand, certainly passes the winter as an adult, doubtless laying its eggs in the spring, and making its chief attack upon the plants in July, the beetles emerging in the latter part of July and early in August. Scelodonta, again, hibernates in the larval condition (the root-worms having gained their growth the previous autumn), pupates in the spring and emerges in June. The eggs are probably laid in July, and the larvæ make their attack on the plant in August and September, continuing it possibly through October, as well. Certainly by November, they have gained their growth, and formed cells in the ground for their hibernation. The beetles of all these species live in part upon the leaves of the strawberry, especially at first, but scatter afterwards elsewhere, feeding upon various kinds of vegetation; Colaspis especially upon the grape, Paria upon the juniper and crab apple, and Graphops upon the evening primrose, and probably upon heads of grass.

In their laval stage, all, as far as known, depend strictly upon the roots of strawberries for food, devouring especially the smaller fibrous roots, but also penetrating and perforating the crowns. An attack in force is extremely destructive, and rapidly kills the plants affected. Often as many as fifteen or twenty larvæ occur in or about the infested stool. This injury is maintained throughout the season, the species attacking the plant successively — Colaspis first, Paria next, and Scelodonta last.

Finally, in the absence of conclusive experiments on the artificial destruction of these pests, it will be worth while only to say that Paris green or London purple applied to the leaves from June to August, will take effect upon the mature beetles as they emerge from the earth, and will thus unquestionably limit the increase of the larvæ; while it is not impossible that applications of bi-sulphide of carbon or similar substances destructive to larval life, may be profita-

bly made to the earth of infested fields, with a view to killing the larvæ in the ground. It is especially likely that this last, or some similar measure, will prove worth while (if used in time) for the destruction of the larvæ when they first make their appearance, in isolated patches in the field.

If it be desired to destroy the root-worms by plowing up the plants, the time for this must evidently depend upon the species by which the field is occupied; since this measure will be ineffective unless taken when either the eggs or the young larvæ are exposed to it. To kill Colaspis, the plants must be destroyed immediately after the fruit is picked; Paria may be reached in July and Scelodonta in August.

To obtain plants free from insects for the establishment of new plantations, it is best that they should be taken up in early spring; but there is a strong probability that even at that time they will contain the eggs of Colaspis. For absolute security against a transfer of these root-worms, the plants first set out should be dug up and destroyed as soon as the runners have struck root in sufficient number to leave a fair setting of these new stools.

GENERAL DISCUSSION.

Having now treated separately all the species of insects injurious to the strawberry which it seems worth while to notice in this paper, and having given under each species the most practicable or promising remedies for its ravages, it now remains to summarize the essential facts, especially those relating to remedies and methods of prevention. In order to present what I have to say on these topics as compactly as I can, let us imagine the worst case possible. Let us suppose that we have to deal with a large field infested by every known insect enemy of this crop, and then let us see what can be done with it. Let the roots be eaten by the root-worm and the white grubs, let the crowns be bored by both kinds of crown-borers and punctured by the crown weevil (*Otiorhynchus sulcatus*), let the foliage be devoured by grass-hoppers and leaf-beetles and carpenter bees and

leaf-rollers of all sorts, and by its various saw-fly and caterpillar enemies, and let the plant-louse and the false chinch-bug and the negro-bug and a variety of other hemipterous insects drain away the life-supporting sap of the plants, and then let us see what will be the effect of such measures as we may be able to devise; first, to destroy the insects without injury to the plants; or, failing in this, second, to destroy insect and plant together; and, third, to establish a new plantation, which shall be free from danger of infection by the old.

The first thing needful will evidently be a calendar of the injurious species, such as will unable us to tell in what condition every insect infesting the field will be at each season of the year. With this we may see at once what will result to each species from each measure proposed.

I have consequently prepared a table of dates and stages of the insects treated, by consulting which one may see at a glance the periods of the transformation, and the stages in which each species occurs at any time. This table is, of course, far from complete, since the life histories of but few species have been made out in full. In some instances it is not impossible that it may be found incorrect, although all possible pains have been taken to select the data from the best authorities, as far as they were not derived from our personal experience. Observations made in those years when the seasons are very much accelerated or retarded, will possibly, also, be found to differ somewhat from the particulars of this table, and differences due to latitude may likewise occasionally be noticed. This must therefore be taken merely as a general statement of the truth, subject to future correction, but understood with these limitations, it will be found useful for guidance in practical work.

CALENDAR OF STRAWBERRY INSECTS.

INSECTS.	WINTER.			SPRING.			SUMMER.			AUTUMN.		
	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
Strawberry Worm	L 1	L 1	L 1	L 1	P1, I2	I2, E3, L4	P1, I2, L4	I2, E3, L4	L 1	L 1	L 1	L 1
Crown Miner	L 5	L 5	L 5	L 5	L 5	L 5	L 5, P 5	I 6	.....	L 5	L 5	L 5
Leaf-Roller	P 4	P 4	P 4	.....	.....	I 6	L 4, P 4	I6, E4, L4	L 4	L4, P4	P 4	P 4
Cutworms	L 1	L 1	L 1	L 4*	L 4*	L 4*	L 4*	L 1, P 1	I6, EL	L	L 1	L 1
Angerona	.....	.....	.....	.....	.....	L 4	L4, I6, E	L 4, I 6	I 6	I 6	.....	.....
Smeared Dagger	P 4	P 4	P 4	P 4	P 4	P 4, I6	I6, E, L4	I 6, E	L 4	L4, P4	L4, P4	P 4
Stalk-Borer	I	I	I	I	I, E	E, L	L	L	L, P, I	I	I	I
Crown-Borer	I 8	I 8	I 8	I2?E5?	I2, E5 ?	L 5 ?	L 5	L 5, P 5	I5, L5	I5,L5 P 5	I 6	I 6
Root Worms: Colaspis	E ?	E ?	E ?	E ?	L ?	L 1	L1, P1, I4	L1, P1, I4	I 6	I 6	E ?	E ?
Root Worms: Paria	I 6	I 6	I 6	I 6	I 6	I 6	I 6	L1, P1	L 1, P 1, I 4	I 6	I 6	I 6
Root Worms: Scelodonta	L 1	L 1	L 1	L 1	L 1	L 1, P 1	L1, P1, I4	I 4	I4,6,L1	I6, L1	L 1	L 1
White Grub	L 1	L 1	L 1	L 1	L1, P1	L1, P1, I6	L 1, I 6	L 1, E 1	L 1	L 1	L 1	L 1
Goldsmith Beetle	L 1	L 1	L 1	L 1	L 1	L 1, P 1	P 1, I 6	I 6, E	I 6,E	I6, L1	L 1	L 1
False Chinch-Bug	I 8	1 8	I 8	I 8	.....	.....	.....	.....	.....	I 6	I6,L6	I6,L6
Plant-Louse	E 9	E 9	E 9	E 9	I 4	I 4	I 4	I 4	I 4	I 9	I 9	I9,E9

E, egg; L, larva; P. pupa; I, imago, or perfect insect; 1, in ground; 2, on vines; 3, in petiole; 4, on leaves; 5, in crown; 6, free; 7, on flowers; 8, on ground; 9 on crown; *, nocturnal.

The principal modes of fighting insects may be classified under three heads; modes of culture, barriers to progress, and topical applications. The modes of culture may be directed either to the destruction of the insect, or to the support of the plant under insect injuries, enabling it to rally against them. They are commonly the simplest, most convenient, and cheapest methods of controlling insect depredations, when they *do* really *control*, and should consequently be treated first. As a crop *must* be cultivated at any rate, if by varying slightly the times and modes of our culture we can take advantage of our insect enemies, this is, of course, to be preferred as a general rule to any method requiring special labor, apparatus and material.

The favorite method of strawberry culture in Illinois is that of growing the plants in rows, between which the ground is regularly cultivated for three years, after which the whole field is plowed up and reset with young plants. Of course, where this method is followed, if proper care be taken to set the ground again with plants free from noxious insects, few injurious species can make much headway; and if to these precautions we add that of taking measures to prevent the spread of insect enemies from an old field to a new one, we should certainly have the matter pretty well under control, as far as those species are concerned which pass their whole lives during all their stages in the strawberry field.

As an example of the use of barriers to progress, we may refer to the practice of opening new fields at a distance from the old, in order to prevent the passage of the crown-borer from one to the other — a practice to which I shall again refer farther on, while topical applications may be illustrated by the use of Paris green on the vines, or even the fire cure, as applied for the leaf-roller.

Little can be done for the direct destruction of insect enemies until the fruit is picked, unless it be the hand picking of grubs and cutworms, where they are very numerous, or the use of harmless insect poisons, like pyrethrum, for some of the minor larvæ which may perhaps require attention. In June, after the crop is harvested, some things may well be done. The field may be mowed, covered lightly with

straw if necessary, and fired when dry, thus destroying the leaf-rollers, and probably the plant-lice also, and perhaps the strawberry worms, and the eggs and larvæ of the Angerona and of the "smeared dagger." Some other insects would probably likewise be exposed to extermination at the same time by these means.

The summer months (June, July and August), are the proper ones for the application of poisons, which will take effect at this time upon the strawberry worm, some, at least, of the leaf-rollers, the Angerona (if it should happen to be in the field), and the beetle of the root-worm. Some other species, less common and destructive, would probably also be reached if present.

If, as is not unlikely in a badly infested field, such measures as the above are found after all ineffective, and the strawberry farmer finds himself reduced to the last desperate expedient of destroying the plants and their enemies together, he should carefully study the calendar in order to determine at what season the greatest number of the species actually infesting his fields may be exterminated by that means. At whatever season the plowing is done, if the ground is planted to another crop the following year, the crown-borer will be destroyed, since its feeble migratory power will not enable it to save itself by retreat. Still, plowing soon after berry-picking would most certainly effect the entire destruction of the brood, since at that time no adults are living, and few if any larvæ would be far enough advanced to transform in the dead crowns. Plowing in spring (March or April) would probably destroy such cut-worms as occurred in the fields; would certainly exterminate the plant-lice, which at this time would be found upon the crowns, either as eggs or newly-hatched young; and would probably kill the crown-miner also, which is at this time still in the crown, lacking some weeks of its full development. The strawberry worm, however, being imbedded in the ground, prepared for its final transformation, would not now be injuriously affected. Neither would the leaf-roller nor the smeared dagger, nor the root-worm, nor the white grub, nor the larva of the goldsmith beetle, be pre-

vented from completing their development. True, these insects on emerging would find no breeding places in the field, but this fact would simply force them to scatter to other situations, thus transferring, but, perhaps, scarcely mitigating their attack. If plowing be postponed until September or October, the crown-miner would doubtless be destroyed, and many, if not all of the root-worms, would be prevented from reaching maturity, especially if the field were plowed early in the first month mentioned or late in August. At this time, also, the young white grubs hatched from the eggs laid in June and July would perhaps also perish, and the plant-lice, collected upon the crowns, would share the same fate.

If it be desired to exterminate the crown-borer and the root-worm without changing ground and without alternation of crops, I see but one way in which this can be done. If the vines are thoroughly treated with Paris green or some other equally effective insect poison from the middle of June to the middle of August, when the beetles of the root-worm are on the leaves, there will probably be little trouble from these worms the following year; and if on this next year the field be plowed up immediately after picking, it will be impossible for the crown-borer to survive until the following spring, when I believe that the ground may be safely reset.

But I need not ring the changes on all possible methods of treating the field at each season of the year, as, with such an insect calendar as that herewith given before him, every intelligent fruit-grower, knowing the species with which he has to deal, can decide for himself what measures are best suited to meet existing conditions.

I will add only a few words on the establishment of new plantations in a way to escape infection by insects from old fields. Of course two points are to be considered; first, that of securing young plants free from noxious insects in any stage, and second, that of guarding the newly-planted fields from invasion. Here, again, everything depends on the insects occurring in the field. If it is the strawberry worm or the cutworm, or the root-worm, or the white grub which is to be guarded against, the young plants may be taken up any

time before April, but every care must be taken that none of the hibernating larvæ or pupæ are transferred among the roots. If the field should happen to be infested by the crown-miner, only the stools which formed in autumn would be certainly free from this pest, and the difficulty of distinguishing these from those of earlier growth, which might consequently contain the eggs of the moth, would make it imprudent to take young plants from a field where the insect was known to occur. Substantially the same remark must be made respecting the leaf-roller. Unless the field has been fired the previous year, all leaves of stools forming earlier than August will be liable to harbor the hibernating pupa, and it is prudent to get plants for a new stand elsewhere.

Concerning the crown-borer it is safe to say that the earlier in spring plants intended for setting can be removed from a field previously infested by this insect, the less will be their liability to contain the seed of future generations of this most destructive pest. If it is the strawberry plant-louse which we wish to exclude, the case is still more difficult. As already noted, this insect occurs on the plants either as egg or female, at every season of the year, and no security can be had against transferring it unless the plants be dipped, before setting, in some insecticide which will destroy both the lice and eggs. I know of nothing more likely to effect this than the kerosene emulsion, the use of which for horticultural purposes has been so widely and emphatically recommended by Prof. Riley.

For the protection of the new fields from invasion, I know of no resource but isolation. Either the entire plantation should be renewed at once, with proper precautions to destroy the insects existing, so that no old fields will remain to infect the new, or else fields of different ages should be separated from each other by areas devoted to other crops. If one grows raspberries and strawberries both, for example, and wishes so to manage his strawberries that he shall have about equal areas in bearing every year, the two crops might be arranged in alternating belts. If these belts were only a few rods wide, the spread of the crown-borer from patch to

patch would probably be prevented, and the other insects can be managed by other methods.

To summarize in a word what may be done, according to the best of our present knowledge, in the case of our hypothetical field infested by all known strawberry insects, I would say that we shall have to depend chiefly on insect poisons in June and July, and on burning in June, to exterminate all insects but the crown-borers, and that to rid the plants of these, we must plow up the field in the following June, resetting with young plants as early as possible in the spring. If the field is not exposed to immediate infection from others near by, we have fair reason to believe that these measures will be found efficient against the insects affecting the strawberry.

PROCEEDINGS

AT THE

SUMMER MEETINGS

HELD BY THE

Wisconsin State Horticultural Society,

AT

ROSENDALE, JUNE 21 AND 22, 1882.

In response to an invitation of the Rosendale Farmers' Club, the State Horticultural Society met in Rosendale.

At 9 o'clock A. M., on the 21st, the meeting was called to order by President Smith. Rev. Mr. Loomis made a brief and appropriate speech in behalf of the ladies and citizens of the place, extending a hearty welcome to their homes. Their "welcome" was expressed in the motto on the walls of the room in which we met; but that welcome extended not only to the hall, but to every home in Rosendale. Rosendale and Springdale are not large and enterprising places, yet they make pleasant homes. The farmers were practical men, and their greeting was the more cordial and earnest because it was extended to practical men who came to talk on practical subjects, intimately connected with the prosperity and happiness of the home and of its inmates. True taste, true mental and moral culture go hand in hand, each contributing something to the development of the other, and combined they will make our homes happier, our lives more useful and prosperous.

Mr. J. C. Plumb, of Milton, made a brief and happy response, thanking the people of Rosendale for their friendly greeting. He said that most of us were met for the first time, yet we were not strangers, for Rosendale, with its prosperous, live Farmers' Club, had long been well known to us and to all portions of the state. The papers read at their meetings and their practical discussions had been largely published, and through them we were, or seemed to be, well acquainted with many of those present. When, thirty-five years ago, he passed through this section of country for the first time, he thought that no portion of the state could surpass it in agricultural advantages. In meeting with the people of Rosendale we came not as strangers nor as teachers, but as those who were engaged in a common calling, laborers in the same field to draw from and profit by the experience of each other.

A letter from A. J. Phillips, of West Salem, giving the prospects of the season's fruit-crop, was read. He attributed his escape from injury by frosts to his elevated location.

In the course of the remarks following, A. L. Hatch, of Ithaca, stated that his orchard was in some respects similary situated with that of friend Phillips, on a bluff four or five hundred feet above the valley below. There was some frost on the hill, but the fruit was not injured by it. He thought this in part due to the elevation, and in part to the character of the soil and of the subsoil, which gave the buds and trees greater vitality. The bluffs there were worthy of the name. There was from eight to eleven degrees difference in the temperature on the hills and in the valleys. There was not as much dew on the bluffs as on the low ground, and a dry frost seemed to cause much less injury.

Mr. Abbott said that he lived on hills a thousand feet above the average level, and found that he was much less exposed to frost than on low ground. He coincided with Mr. Hatch in the opinion that the character of the soil had as much influence in lessening the injury by frosts as the elevation had. It gave trees and plants greater vitality than when grown on a black, alluvial soil, and that fruit there raised was not only a surer but a better crop.

Mr. Woodward, of Ripon, called up the subject of the cultivation of blackberries — how to plant, how to cultivate and how to protect in winter. He raised the Ancient Briton and some Snyders, but found it best to cover in winter, and also to mulch; he cultivated the same as for corn; bent the vines down all one way and covered. This cost from ten dollars to fifteen dollars per acre. He had used hay for this purpose, but not with the best success; the best way was to cover with dirt; bind the stalks closely together and bend them down, renewing the soil on the side towards the side bent over, and put on a sod to hold the ends in place, and then cover as convenient. He had had some injury done by mice, but, nevertheless, got 150 bushels of berries from three acres of vines.

S. J. Kellogg, of Janesville, had tried to get rich raising the Lawton, but without signal success. He tried to raise them with and without covering; those covered died, while those left exposed bore fruit, but failing to make them pay, plowed up the patch, and tried other kinds. He affirmed that what we want is a variety that will stand without protection, and the Snyder comes nearest to the mark, as its stalks may be injured so as to destroy the crop of fruit and yet live. With him the Snyder had proved hardier than Stone's Hardy, but he thought that there was but little difference between them. All that they needed was protection from the sun.

Mr. Hatch would protect so that the plants could have some air. He favored setting them in hedgerows running north and south, and pinching back early in the season, so that the stalks will branch out close to the ground, thus making the stalks stout, so that no trellis is needed, and a large portion of the vines will be so low that the snow will cover them; the top may be partly killed, but the portion thus covered will branch out and bear nearly as much fruit as the whole would have done. He would cultivate by horse power. He also stated that vines planted in the woods would often kill down.

Mr. Plumb said the practical point was to secure a hardy variety or a hardy growth, and thus do away with protec-

tion. Mr. Stone's plantation was on a hill where the soil was poor, and the growth of the vines slow and near the ground, making them easy to bend down and protect in winter. On such soil fruit ripens early, but mulching was necessary to success.

Mr. Scribner had never seen a hardy variety from the woods, as we cannot always have snow to protect the vines. The object of growing vines was to secure fruit, and to avoid failure protection must be given them.

Mr. Hill, of Rosendale, asked how and when to plant evergreens, and what varieties to select.

Mr. Kellogg answered that it was best to plant small trees; and not to put them too close together as most people are apt to do. To get handsome trees we should give them space and exposure, so that they would cover a rod square at the base. He would clip the growth and keep clipping so as to make the trees stocky and thick, and would bring them into shape if he had to cut them half down.

Mr. Plumb said that we had no trees that can be trimmed so freely and so arbitrarily as evergreens. The opinion used to be that it would not do to trim them; but that opinion was now known to be wrong, for they can be trimmed at pleasure. The Norway Pine is the best evergreen we have. It grows rapidly and needs to be cut back to check its growth and to thicken it up. It can be trimmed with a strip of sharpened lath, when the growth is tender. When the terminal bud is taken off three or four more buds start out and the tree growth thickens. The Norway Spruce is one of the best of our lawn trees. With age its limbs have a tendency to droop. He would like to see the White Pine—as handsome a tree, as fine in form and appearance as any foreign tree we have—cultivated largely for its beauty and for its timber. He would trim evergreens or not, set them singly or in clumps, thin out their branches or thin them up, as best suited his mind or the location or purpose for which they were set out. The Norway Spruce was the best for a wind-break, hardy, easily obtained in large quantities, and easily cultivated.

President Smith asked if White Pine could be grown on

rich soil. Mr. Anderson replied that his soil was a rich black loam, and that he had thrifty white pines from eighteen to twenty inches in diameter.

Mr. Kellogg said that one advantage in the White Pine was that where the lower limbs had died out the upper whorls droop down and conceal the bare trunk. Scotch Pine will grow on poor soil where nothing else will. Mr. Plumb answered, "Yes, and it is worthless when grown."

The Committee on Programme were appointed as follows: Messrs. Kellogg, Hill and Case.

The meeting then stood adjourned to 2 P. M.

President Smith opened the afternoon session by reading the following paper on

COMMON SENSE IN HORTICULTURE.

It is somewhere reported that after one of Napoleon's generals had fought a great battle, one of his enemies complained to the emperor that in his management of his army and in his conduct of the battle he had violated all the rules of scientific warfare, and deserved to be cashiered. "All that you say may be true," said the great Napoleon, "yet notwithstanding all this, he has been very successful, and has won a great victory. Success is what I want, and great victories I must have." Like many other sayings of that wonderful man, it contains a valuable lesson to many others besides those engaged in military science and on battle fields. Success is what we all want; it is what we all need in the varied walks of life. Engaged, as I trust we all are, in some calling that is useful not only to ourselves, but also to those about us, we ought to so conduct it, that success will follow with an almost absolute certainty.

It may right here be very properly asked: Do you believe that we can ever make the cultivation of apples, pears, cherries, plums, and other fruits that might be named, anything like a certainty in Wisconsin? Most certainly I do believe in just that.

The next request will doubtless be, "Please tell us how we may accomplish so desirable an object." Well, my friends, I do not pretend that I know enough about the culture of fruits to make them an unvaried success. As regards the cultivation of our larger fruits, such as apples, pears, etc., I do not believe that any man in the state will claim that he is sufficiently well educated in all their varied wants, in the different soils and localities in which it is necessary to place them, to give rules and directions which will in all cases make them grow and bear fruit successfully for a long term of years. What I do claim is this: We know much more about it than we did twenty-five years since; and that the entire tendency in our fruit culture in this state is toward success.

How soon shall we attain to a complete success, and what can we, or any one of us, do to hasten the time so much to be desired? I answer, By using our own good, sound common sense. This is only another term for scientific culture. He who cultivates in the best manner, whether it be a little garden or a large farm, cultivates in the most scientific manner. Why not apply this simple rule to the cultivation of our fruits and flowers?

If I should tell the farmers of this portion of the state that they did not know how to grow a good crop of corn, wheat, oats, or hay, or how to make good butter or cheese, a large proportion of them would say that I was insulting them, and it would be true; yet I presume but very few of them could tell whether their land was most deficient in nitrogen, potash or the phosphates, yet their experience in soils, their daily and yearly observations, in short, their intelligent common sense, has told them that certain soils are favorable for corn and perhaps not as good for wheat, and that another variety produces fine wheat but is not as good for corn, while a third is good for either corn, wheat or clover; and so through the list of farm crops.

Now, my friends, why not apply these common sense rules to the fruits, the flowers and the garden? It is not an absolute necessity that you should be educated in principles of landscape gardening in order to make fruits grow, or flow-

ers bloom. I trust that you will not accuse me of intending to boast of myself, if I say to you that I never received one hour's training in the principles of landscape gardening; and if I was called upon to lay out such grounds as some of those about Paris, Berlin, London and other places that might be named, I should certainly make a most magnificent failure. Yet I believe that I have sufficient common sense to so arrange my drains, both surface and underdrains, that they will readily carry off the surplus water when we have heavy rains. I can so arrange my grounds as to make it very convenient to get about among the growing crops without doing damage. I can so manure and cultivate the soil, that in ordinary seasons large crops will be the rule instead of the exception.

My wife pursues the same course. She arranges her flower beds according to her own taste. Still her plants never fail to grow, and in their season they not only bloom but are sources of unalloyed pleasure to all of our family, and the admiration of our friends. She has flowers by hundreds and thousands, and has the pleasure of distributing them with a lavish hand among the sick, the poor and the sorrowing.

Why should not all of our homes be adorned, to a certain extent, at least, with fruits and flowers? I know of no good reason for it. It requires only the same common sense that the good farmers display in the management of their farms to make their fruit, flower and vegetable departments a complete success. The difference may be stated as follows: The horticultural department of your farm may need a little richer land, and a little more care in its cultivation than the farm crops in order to make them thoroughly successful. Or, in other words, if you are a careless farmer your farm products will bear neglect better than those of the other department. Yet, how many men, who are very fair farmers, completely reverse this rule. Nay, more; they will not even exercise reasonable care in raising and marketing such fruit crops as they do grow.

A few years since, wife and myself, while out riding, called upon one of our farmers who is, in most respects,

better than the average, and, in fact, a very intelligent man. He had in his orchard some Golden Russet apples that I think were about as nice as I ever saw. I asked him to bring me a barrel of them when they were ready for market. In due time the apples came; I scarcely think they had been used for either base or croquet balls, still, from the bruises upon them, they might have been used for both. I knew his fiery temper too well to have any words about a trifling matter, and simply paid for them and said nothing. But one of my younger sons had the rashness to intimate to him that he ought not to have allowed them to become so badly bruised. He flared up instantly, and replied, "Sure, and it is much you know about it, isn't it? Indade it is. A young upstart like yourself taching ould people what to do." They were, in fact, almost worthless, and yet if I had asked the man to bring me a load of oats, hay or potatoes, I should doubtless have received a good article, and it would have been in good condition. Why should he lay all reason and common sense aside in the one case, while he uses it in the other?

Doubtless many if not all of you have seen similar cases, though I trust that none of my audience have ever been guilty of such an utter want of good sense in marketing fruit.

In growing some of the small fruits, success may be made almost certain. The best grape grower that we had in Brown county told me, some years since, that it was ten years since his vines came into bearing, and that they had not failed during that time to yield a good crop. "In fact," said he, "I consider them the most certain crop upon my farm." This was some four or five years since. I know that they have not failed since, and promise well this season. I have never seen finer samples of Delawares, Concords, Rogers' No. 3, 15, and some other varieties that have grown upon his ground. It is more than twenty years since I commenced growing strawberries for market, and during that time have never but once failed to have at least a paying crop; and most of them have been not only very large but very profitable ones. It is more than twenty years since my currant bushes came into bearing, and they have not once failed to load them-

selves with fruit. Raspberries may be made almost as certain in their yields as either of the others. If I were upon a farm where an acre of land more or less was no particular object, I should certainly set out all these plants in such a manner that they could be cultivated with a horse. But, my friends, whether you cultivate with a horse or not, be sure your plants are properly cared for.

I do not propose to take your time in following up this subject, and will bring this paper to a close. My own common sense, as well as all the time and ability that I possess, are required in watching and keeping may own land in proper condition for the growing crops. I do not wish to under-rate the knowledge obtained from books and papers in aiding one to a more complete success than could possibly be obtained without them, for I probably owe as much to such a course of study as any man in the state; yet, if I should fail to use the plain common sense with which the Good Father of all has endowed me, I should most surely fail in my efforts; and so would you, although you may have read and studied every writer upon the subject since the days when Cato told us how he conducted his farm, down to the last horticulture article of the day. But to your own good common sense add all the knowledge that you can obtain from books, papers or elsewhere, and you will find that you are successful almost beyond your hopes. You may say that it will require labor and care; that is true; but the Good Book tells us that when the Creator of all had placed Adam in the Garden, he commanded him to dress and care for it, even in his then happy state. After he was driven from it, he was condemned to a perpetual contest with thorns and noxious weeds. There is no evidence in either ancient or modern history, that this law has ever been repealed, or even suspended, for the benefit of any of his descendants. Then let us all accept the situation, and by steady industry, aided by our intelligent common sense, make the roses bloom where thorns and thistles have hitherto held undisputed sway.

Let us adorn our homes as best we can, each in his own individual way, making them more and more beautiful as the years roll by, until they shall be to us the dearest spots

upon the wide, wide earth — places where we can welcome children and friends, and make them feel that beauty, love and happiness reign in and about the dwellings which we call our homes.

Mr. Kellogg thought that President Smith's success in horticulture was good evidence of his good sense; but success needed money behind it, and how and where that was to be obtained he could not tell.

Mr. Plumb was of the opinion that any one visiting President Smith's home would be convinced of the important relations of practical common sense to success more than in any other way. It is to be seen there in a greater degree than in any other part of the country — common sense in cultivation, in enriching the soil, in adapting the crop to the land and to the market, in utilizing all that is not marketable for manure, and in trusting to the opinion and judgment of his wife.

President Smith, in reply to inquiries, stated that he started plants for early setting in hot-beds and in cold frames, and for later setting and the bulk of the garden, in the open ground.

Mrs. Loomis then read a paper on geraniums. In the discussion following, Mrs. Loomis spoke highly of the Rose Geranium, Lady Taylor, White Center and Pride of the West. Mrs. Skinner thought that the Apple Blossom was a very fine variety. Mr. Barter, of Markesan, favorably recommended Happy Thought, Lady Cullom and Mrs. Pollock. He did not regard Pelare geraniums as nearly so desirable as geraniums proper. They were single flowers, had but one, and that a limited, period of bloom, and the variety was small.

In the discussion of roses, Mr. Kellogg said that if he could have but one variety he would select from the ever bloomers. Of climbing roses he preferred Gem of the Prairie and Baltimore Belle. Of the Hybrid Perpetuals he preferred General Jacqueminot and La Belle France.

Mr. Hatch said that his experience in the cultivation of roses had been one perpetual funeral, and he was about tired

of it. He found the most satisfactory rose to be Madame Plantier. He had been so unfortunate as to lose fifty varieties of the Hybrid Perpetual. He would place the Moss Rose second to Madame Plantier, and of Moss Roses he would give preference to Glory of Mosses, or Princess Adelaide. Third, he would try Baltimore Belle or Queen of the Prairies, but they must have protection. The Tea or Monthly roses raised in greenhouses will not prove satisfactory, for their leaves will drop off. The name of the Hybrid Perpetual is a misnomer. These varieties have a nice description and are shown in fine form in pictures, but the attempt to cultivate them is far from satisfactory. They may bloom freely at first, but will grow less and less, as they have really but one blooming season, and then they do not bloom as freely as some of our standard varieties. Where good care of them is taken they may have a few scattering blossoms at intervals during the season, but usually they are few and far between. General Jacqueminot is the best of the hybrids—is the best rose known, but it needs protection and cannot be successfully grown out of doors. His preference in roses was: 1st, Madame Plantier; 2d, Moss; 3d, Queen of the Prairies, and would try General Jacqueminot. We might get a few roses to add to the joy of those who rejoice, and to comfort those who mourn.

Mr. Plumb stated that Mr. Jones, of Fond du Lac, was a very successful cultivator of roses, and when asked what kind was best and most profitable, he replied Gen. Jacqueminot. He regarded it as hardy, a free bloomer, and one that can be successfully raised in pots in the house. In Janesville, it stands better than Madame Plantier. He thought that the public ought to be better enlightened as to the varieties best adapted for cultivation here, for they are now at the mercy of peddlers, and often suffer great disappointment and loss.

Mr. Barter said he was very much interested in the cultivation of roses, found great pleasure in it, and had been quite successful. He regarded Madame Plantier the best white rose, as it blooms freely, though only once a year. He had been very successful in layering it; his method was to cut the stalk, laid down, half off, and then split it up to the

next joint, pinning it firmly to the ground. He put Louise Odier first of all roses. Its bloom does not fade, and if cut down will send up stout shoots; top these and they send out many side shoots which will be covered with a mass of bloom. He gave roses protection in winter, and if hardy they do better for it. He would not use manure in covering, as he had suffered much loss by so doing, but regarded clean straw as better for this purpose. If put on too early the mice will make trouble. The best time to cover is about the middle of November when the ground is frozen; he would take up about election time. The greatest enemy of the rose is the rose slug, and Paris green is an effectual remedy, one application being usually sufficiently sure. The varieties he regarded best are: Louise Odier, Madame Plantier, Centifolia, Joseph Paxton, Princess Adelaide, General Jacqueminot, Prairie Queen, Madame Charles Wood, Prince de Kewar, La Belle France, and La Reine. When brought from hot-beds and green-houses the ever-blooming roses are very unsatisfactory, their roots are few and small, and with the best of care the plants will not thrive, but many will die.

Mr. Hatch said that he could not protect satisfactorily with straw; and that nursery-men found it difficult to propagate Madame Plantier and the Moss roses by means of layering, and was surprised that Mr. Barter found it so.

Mr. Plumb had had different experience in cultivation of roses than Mr. Hatch.

Mr. Barter stated that the soil at Markesan was better adapted to the cultivation of roses, indeed was the best in the world for that purpose. He does not manure roses, sets them in the sod, and leaves a small space between each plant.

Mr. Plumb thought Mr. Barter's success in cultivation was largely due to brain work. Sod makes good soil for roses. Take thick sod and compost it with cow manure, layer on layer, with the drippings from the stables, let it lie and rot for a year, and it is ready for use. Peat bog, served in the same way, is perhaps the best soil we can have for roses.

Mrs. Ayers stated that she cuts slips of good thrifty growth, leaving two buds, sets the slips an inch deep in the

ground, and they start readily. She has no trouble in getting plants from slips of monthly roses. When the slips have rooted she takes them up and sets them out in good soil. About the middle of September she puts them in four-inch pots; the leaves soon drop off and she makes no effort to cause them to grow out again, but sets the pots in a cool, dry place, where the plants will remain dormant until January, then she gives them plenty of light and moisture, which causes them to bloom freely in February and March.

Mr. Plumb then read a paper on "The Mission of Horticulture," and the session was adjourned until evening.

EVENING SESSION.—Mr. S. Barter read a short paper on "The Pleasures of Horticulture."

This was followed by a paper on "Strawberries," by Mr. Kellogg.

President Smith did not agree with the opinion expressed that the Wilson was depreciating; he was one of the first to get it and has cultivated it largely ever since. He had set over 50,000 plants this season, and never had a better prospect of a large crop than at present. He should not advise others to set out many kinds, but if disposed to experiment with new varieties, to do so to a limited extent, and to depend on the Wilson for fruit and for profit. How it stands is readily seen by the amount of it in the market, compared with other and newer varieties. He had never failed to get a crop of Wilson but once, and had never made a dollar on any other variety. The Kentucky is a good berry for a late crop, and if asked what other variety he would recommend for home use, he would say the Kentucky. He would let it send out its runners, set in rows and cultivate between. When the plants got old would cut out every other row, and when the runners had spread over the part cultivated, would plow up all the old rows. He hoes the beds and pulls up the weeds in the beds in the spring up to the time when the fruit is half grown; takes off the winter mulch in the spring and lets the sun get to the soil; it is best to hoe the soil.

Mr. Kellogg thought it best to leave the mulch on, and not to hoe the plants after they are in bloom.

Mr. Plumb's experience the present season had been that more injury was done by spring frosts where mulch was left on the beds. There had been four frosts during the blossoming season, and twice as many berries were killed where the mulch had been left on the beds. A neighbor of his had cultivated the Crescent in hills the past season with remarkably good success, obtaining as many, if not more, berries as from matted beds.

Mr. Pilgrim stated that Mr. Ringrese lost nine-tenths of his berries this season by frost where the beds were mulched, but Mr. Baumbach's beds, unmulched, near by, were not injured at all. He thought that the character of the soil under the mulch had some influence on the amount of injury done by frost.

JUNE 22, A. M.—Before the hour of calling the convention, an executive meeting was held, at which the question of taking part in the exhibition at Milwaukee, and also that of the Mississippi Valley Horticultural Society, at New Orleans, was discussed. A committee of which President Smith was chairman, was appointed to confer with those societies, and to arrange for an exhibition.

Mr. Hatch moved that the secretary be authorized to furnish to the Milwaukee, Chicago, State Agricultural, and Oshkosh societies, a list of the fruit growers of the state and to aid in securing a larger distribution of their premium lists. The motion was carried. Messrs. Kellogg and Wilcox were appointed delegates to the Minnesota Horticultural Society.

The secretary spoke of correspondence with Secretary Garfield, of the Michigan Pomological Society, in regard to a new method of work entered upon by that society which promised great usefulness — uniting the local societies and making them a part of the state society. Secretary Garfield's intention, and one which gave good promise of being soon realized, was to have one or more branches of the state society in every county of the state. The Secretary said he

brought it up for consideration to see if the same plan might not be adopted here. No definite action could be taken at this meeting, but we would be better prepared to act upon it at the next meeting, if thought best to do so. He also again presented the subject of more rules and instructions to aid judges in our exhibitions. If this were done it would greatly relieve the embarrassment of judges in the performance of their duties, especially at exhibitions of the local societies, and would make their work more creditable and satisfactory. He also spoke of the feasibility of getting a collection of wax samples of our fruits, both standards, iron-clads, and more promising seedlings, for exhibition as the products of our state, and for comparison and reference. The funds of the society would not warrant much of an outlay, but the collection might be commenced and increased little by little without being burdensome. The secretary was authorized to correspond with Mr. Brackett in regard to the cost of such models, etc.

The convention was then called to order. Mr. Hatch gave a description of the model tree, and how to form it. When the limbs were growing out under a large one, he would cut off the lower ones at once, also all sharp forks. The usual fault lay in allowing too many limbs to grow out of one point, as they are apt to break down, especially if the union with the trunk is not good. All good forks radiate from the body of the tree like the spokes of a wheel from the hub. If there are double branches one should be cut away. It is not safe to prune in cold weather during the winter. In the spring the sap is abundant and the wound soon grows over and the wood grows black and decays. Spring pruning is good to secure fruit. He referred to evergreens as a sample of spring pruning, and what can be done by it. It is not a trimming up process but a stocking, thickening up of the foliage.

Mr. Hatch then read the following paper:

DEFENSIVE HORTICULTURE.

There is very little of the aggressive but plenty of the defensive in horticulture. Nature herself puts us on the de-

fensive. Her storms, frosts, heat and floods, capriciously bestowed, as far as the wants of the gardener are concerned, furnish plenty of opportunity to display skill in the protection and management of trees, plants, vines and shrubs. As we would define "Defensive Horticulture" to mean protecting, nursing, saving and securing our fruits and flowers from everything that may prevent their full fruition, the subject becomes a broad one, the consideration of which is always in order. We wish to make suggestions upon different topics in this field, such as we hope will be practical rather than exhaustive.

It is the misfortune of horticulture that there can be no fixed rule of procedure for all places, all varieties and all seasons. Now, it may be all right in some seasons and in some places, to allow your grape vines to remain down from the trellis from the first of May, when we usually uncover ours, until danger of frost is over — sometimes till June 1st, as has been recommended by some writers. Our experience, however, has been diverse from this method, at least two seasons, when late frosts killed all buds near the ground, and hurt none away from it. We are fully satisfied that for us it is far better to tie the vines at once to stakes as soon as uncovered, and that, too, not only as far as frosts are concerned, but as being better on account of the buds not getting hurt in handling, as is almost sure to be the case after they have started to grow.

Perhaps no time in plant growth is more critical than the start, either from the seed or after transplanting. Our common enemies, the weeds, have one redeeming feature, and that is that they compel us to root them out early in our defensive warfare, lest they conquer our pets and smother our friends. This defense usually serves to stir the soil near the plants just where and when culture is the most valuable. Yet of all garden work this is the most trying to the patience, and wearing to the body, because back-aches from stooping among the weeds are by no means very pleasant. For seven years we have used a form of hoe for nursery culture and for working among small plants which we know to be very valuable. As we use three or four each season our

experience amounts to about the same as twenty-five years' use by a single person — a test quite ample. To make this hoe take a common hoe and cut the upper corners off on a line from the lower corners at the edge to the shank. This makes a hoe of triangular form, the shank being at the apex. For working among small plants, for weeding out beds, and especially for working among strawberry plants, it has no equal. The sharp points permit close work, and the hoe will not bump against the plant or snarl among the stems, leaves and runners, as is the case with most hoes. Try it among the plants in the garden, in your strawberry beds, and among your sorghum in the field, if you have any, and we feel sure you will like it after you become accustomed to it.

No feature of defensive horticulture is more worthy of thought, perhaps, than that of protection from insects. We may still find it necessary to catch the curculio by hand, as we may all the wretched class to which they belong — the snout beetles. It would be strange, however, if we made no progress here, and stranger still if we do not have some wholesale plan of warfare with the bugs. The curculios, with their hard shells, may defy us with our dust charged with poison, or laugh at our sprinkling poisoned water, but we shall probably bid the currant worms, cabbage worms, aphis, and canker worms to "come down," just as David Crockett did the coon, and tell them to attend their own funerals. We shall do it perhaps with less of Paris Green, London Purple and other rank poisons, but more of Pyrethrum or the Persian insect powder, so efficient and safe. Yes, more than that; we shall yet grow the plant in our own gardens and be quite independent of the druggist. And better yet, perhaps we shall find that we have already plants in our fields, in the woods, or by the wayside quite as efficient in this warfare as Pyrethrum.

Some time since we wrote to the United States Agricultural Department, asking for a botanical description of Pyrethrum, and if any other plants might serve the same purpose, and received from B. Pickman Mann, Assistant Entomologist, the following reply: "The generic characteristics of Pyrethrum are given by Asa Gray, as the same

with those of Chrysanthemum and Leucanthemum; and P. roseum is called by Gray, Ch. roseum. I would not be surprised to find that our common 'white-weed' (Ox-eyed Daisy), was as effective as the foreign plants in the destruction of insects."

Now, what learned dignitaries think possible, common fellows like myself may hope for; and while we have no desire to have the Ox-eyed Daisy in our fields, we are glad to learn that it may have one redeeming trait, and that kindred weeds may yet be gathered from our fields and used to embalm our little foes and make mummies of the bugs, with our fervent hope that they will not be resurrected for three thousand years, when all good mummies are supposed to have served their time, and to be entitled to life again.

After several years of mental rebellion we have concluded to overcome our prejudices and whitewash our orchard. We shall thin the lime with water to the consistency of common paint, and add a spoonful or two of Paris green and two ounces or so of sulphur flour to each pailful. The Paris green will tone down the glaring white somewhat and poison many insects infesting the bark, and when winter comes perhaps some of it will be there for the rabbits and mice which are almost always willing to dine on our apple tree bark. The sulphur we hope will be death to the moss and fungus on the bark. We should be glad to do this as early as the middle of June before the growth was completed.

Now if we lose the foliage from some of our grape vines during the summer we wonder if it is from rust and mildew. Then if so, and rust is a form of fungus, and if sulphur dust destroys fungus, we wonder if we hadn't better put plenty of it on the vines now and on the soil. And if land plaster is sulphate of lime won't it work like a charm on our vines? We had some Agawam vines that last year gave us a noble crop — several vines gave fruit enough to sell for $1.50 each, and one old vine, planted about seven years, over $3.00. Yet they lost many of the leaves and didn't ripen all their fruit. If we could only save their leaves in some practical way so they would ripen all their fruit, we would be glad. We shall try what virtue there is in sulphur for this purpose, just as

the old man in the fable tried what virtue there was in stones when he pelted the young sauce-box down from the tree where he was stealing his apples. And this suggests another phase of our subject, that is the saving of our crops when grown from theft.

A few years ago we saw posted along the fences in Madison a notice by the Madison Horticultural Society offering five dollars reward for the apprehension of garden thieves. In the country away from many neighbors this is less to be considered than near cities and villages, where of all places fruit is most valuable. Our remedy has been to plant and grow more so we might not miss what was surreptitiously taken, or what the birds might claim from our garden or fields. While this plan is not practical to all individuals, it is practical as regards communities. And just here we find a sphere of usefulness for our horticultural societies, as it is plainly their duty to encourage the more general culture of fruits, that the supply may be more abundant and reliable. In no way can this be done better than by diffusing practical information, and, as horticulturists, ourselves growing good crops that shall serve as encouragement to others to "go and do likewise."

Our apologies are due the audience for offering so much of the common place in this paper. Our excuse is that we have not yet fully realized all our hopes in horticulture, and until then we must plod along with common workers, yet desiring that the Rosendale Farmers' Club and the Wisconsin Horticultural Society may be mutually benefited by this meeting, and that others may labor in the higher walks of our chosen occupation — fruit and flower culture — and produce more of the good, the pure, and the beautiful.

In the discussion which followed, Mr. Plumb spoke of pruning, as alluded to by Mr. Hatch, agreed with him in some points, but not as to best time. He agreed that evergreens were susceptible of pruning, could readily change their forms, and will bear cutting back better than most any other tree, but they cannot have a flat top and straight sides. The best time to prune them is when the new growth is well

started, but old wood can be pruned at other seasons. Deciduous trees are in their most delicate season the last of March and the first of April, and pruning at this season is injurious. The sap is just starting, and the wounds bleed and lead to decay. When the leaves begin to expand the wood growth commences so soon that, when pruned at this time, no injury results, as the wounds heal over. Also, about the last of September and the first of October the sap has become thickened and the injury, even where large limbs are cut off, will soon be repaired. This had been the result of his experience. Mr. Hatch said he had never lost a tree by early pruning, but when done late in June it lessens root-growth and weakens the tree.

Mr. Plumb had followed the method he mentioned, for thirty years, and had put himself on record many times during that period in favor of June and fall pruning, and should stand by it.

Mr. Kellogg stated that the apple-gouger had done a great deal of damage to the fruit in his orchard, and he wanted to know how to destroy it. At first it was confined to a few trees in a portion of the orchard, but was spreading from year to year and scattering all over it now.

The secretary stated that one of the best ways to destroy this pest was to gather all the fruit stung by the gouger and destroy it. The insect passed its larval state in the apple, and in this respect it was different from the codling moth. If the affected fruit was all destroyed the number of the former would be greatly lessened. It was a native of this section, and would thrive on the wild bitter crab, and it would be necessary to destroy the wild bitter crab-apples, as well as the standards, to lessen the evil caused by the gouger. The following paper was then read:

PEAR BLIGHT.

By H. FLOYD, Berlin.

I have selected this subject, not because I think I know more about it than any one who has ever written upon the subject, but because of its great importance to the fruit-grower at large; and thinking that a discussion of the various

theories as to the cause of blight, held by different writers on horticultural subjects, would be profitable to this convention, is my apology for opening and bringing the subject before you.

I think I have read every article that I have ever seen on the subject of pear blight, but never one that I could indorse from first to last as being a correct theory. All agree that it is a diseased circulation, or a decomposed sap, that kills; but this is not the cause, but an effect of a cause. I have noticed that severe blight follows rapid growth, and occasional blight follows even any growth, slow or rapid. Plant growth, as I understand it, consists in the addition of cell after cell, or system of cells after system. Now, may not the cause lie in an incomplete cell structure, or, before the cells are fully matured, either from too great a weight of sap, either rupturing the same by over-weight or pressure, or by violent agitation of the trees by high winds, during the rapid formation of cells, breaking up the organism and causing a stagnation, after which comes decomposition and that putrid condition which we all have seen and smelt — a condition of plant life corresponding to mortification in animal life. This theory has, to my mind, many reasonable points in its favor. First, all varieties are not alike subject to blight. Some cultivated varieties very seldom blight, whereas others blight everywhere. Flemish Beauty is, perhaps, the greatest blighter of the whole pear family. It has the reputation of blighting everywhere and anywhere in the United States, yet it stands at the head of all for hardiness in withstanding extreme cold. Now, if the theory is correct, our remedy is in selecting non-blighters and crossing the same with non-blighters. The Keifer Pear is an example of what may be accomplished in this direction. The Keifer is the result of a cross of the Bartlett on the Sand Pear of China.

Burrill, of Champaign, Illinois, has a new theory differing widely from any other that I have ever seen. The theory as published by F. W. Case, secretary of this society, in his annual report of 1880–1, is that the cause of this dreaded disease is a minute organism, belonging to a group of the low-

est fungi, best known as bacteria. Now if this form of organism is the cause, it must be found in the trees in advance of the disease, and in all varieties alike without any preference of one variety over another, whereas in the Siberians as well as in pears, it attacks the most vigorous and rapid growers, and also those of light and less solid wood. Many of the Siberians are entirely exempt, and a very great difference obtained in regard to the different varieties of pears in regard to blight.

Certain seasons also are more noted than others for the prevalence of blight; but if bacteria is the cause this would hardly be the case, since it would be no respecter of subjects in different families of plants or in different seasons. It would increase like any other parasite, until all subjects upon which it preys are swept away. Hence I must conclude that bacteria are not the cause of blight; but the putrid sap may be, and undoubtedly is, a home for bacteria after the development of the disease.

Feeble condition and slow growth would be the condition of all subjects of blight, if the bacteria theory is correct, since the cells would be robbed of substances to support the bacteria that should go to build up the plant. Our experience with blight, however, is quite the reverse. The more vigorous and rapid the growth in any variety the more sure it is to blight, as well as the most rapid growing varieties. Hence we see that it is not feeble condition that is most conducive to blight.

Another theory is that it is sporadic and attacks the limbs; also, another, that it is the same and attacks the root. The remedy for the former is branch pruning, for the latter is root pruning, by digging a trench around the tree and filling in with leaf mould, ashes, salt, sulphur, or anything else that will give healthy wood.

This treatment in practice would have a good effect in checking the growth by cutting off feeders, thus preventing that plethoric condition that blight loves so well.

Another theory, published in the *Western Rural* by a Michigan writer, is that blight is sour sap, occasioned by severe droughth following a wet season. The essence of this theory

is, that the supply of moisture being cut off by droughth the sap becomes stagnant, and sours, for want of moisture to keep the pumps at work and crowd it along.

According to this theory root pruning would be a dangerous operation.

Mr. Hatch stated that the best answer he could give to the vexed question, as to the cause of blight, was that of Dr. Downing, "we don't know." It had been studied and discussed for sixty years and we are still far from a satisfactory solution, in fact, know nothing definite in relation to it. The secretary stated that the claim recently made, that the primary active cause was the work of bacteria, was far from satisfactory, and, in fact, there were some of the attending phenomena that could not be accounted for on this theory. The claim that it was positive proof that they are the primary agent, because blight can be produced by inoculation, is fallacious, for inoculation would not, in all cases, produce the same result. When the virus containing the bacteria was applied to the leaves and tender bark where the germs could more readily obtain access to the cellular structure of the tree than in any other place, no injury was done in any instance; again, blight can be produced by other and physical causes, as injury to the bark, girdling a limb or the body of the tree; the part where the flow of sap is checked will be injured and full of bacteria. Again, in recent experiments made by Professor Rosenberger in Germany, inoculations have been made with diseased fluid in which all living germs had been destroyed by intense and protracted heat, and the disease was produced, and the same form of bacteria were developed in immense numbers. These germs are found elsewhere in healthy as well as diseased tissues. Their presence in healthy cells and plants did not seem to cause any injurious effect, neither did they multiply there; but where there was any disease seen they increased with wonderful rapidity, so rapidly that if they had the power to cause the diseased condition, it did not seem possible for plant life to exist. It was far more reasonable to suppose that they have existed from all time and

are natural agents to hasten the resolution of organized matter into its original elements when decay sets in.

After the reading of a paper on "The Orchard," by Mr. Huntley, the morning session adjourned to the grove on Mr. Hill's grounds, where well filled tables were arranged with substantial food and the luxuries of the season, which were enjoyed by a large crowd of hungry partakers.

After the dinner hour, Mr. Peffer read a paper on "How to Aid Nature in the Acclimation of Trees and Plants." The subject was discussed at some length, and the conclusion was reached that it was most important to adapt condition of soil, method of culture, selection of variety, and change of location so as to secure early maturity. Trees and plants taken from a southern climate northward, usually ripen later in the season than before, and grow later, especially where the change in latitude has been great; but some varieties of fruit grow larger and fairer when taken south.

Mr. Hill inquired if the Larch had depreciated as a timber tree; little was said about it now, when it used to be very highly commended.

Mr. Plumb replied that we have no tree more valuable for timber, or more generally useful. It was perfectly hardy, grew rapidly, was useful in all stages of its growth. The Catalpa is now much talked of. It is a rapid grower, and the wood is very desirable, but the tree is not hardy in this climate. Set in good soil and on high ground they will grow well in many places, but for general cultivation it will not succeed. It will usually do well in soil and location where the grape will stand without protection, but not in higher latitudes, or on low rich soil, in sheltered locations.

Mr. Plumb said that in his correspondence with southern and western nurserymen, he had been informed that grafts taken from the north and set in the south, started to grow earlier than those raised on the spot, so much so as to make them much more exposed to injury by frost. He had sent them grafts late in the season when their own sets had failed after the danger from frost was over.

The use of Pyrethrum was recommended for the destruction of insects. Mrs. Smith said she had tried it successfully

for killing house-flies, and it killed the flies but seemed harmless to persons. Rev. Mr. Wanless had tested it thoroughly in Turkey and in Persia, where Europeans find it impossible to sleep unless the sheets are covered with it. He and his family had used it freely without the least harm or annoyance. Pyrethrum is often called Persian powder. Mr. Wanless had kept it for five years, and found it to retain its strength so as to effectually destroy insects. The society then listened with interest to a paper on

FLOWERS WITHOUT MONEY.

By Mrs. D. C. AYRES.

I would not have it inferred from the title of this paper, that I believe any one can have just as fine and valuable plants without money, as if they could expend all they wished to in the cultivation of flowers. We cannot gather in the choice and rare from every land and climate, consulting their different needs of light and heat, moisture and air, without expenditure of money and time. The higher development of perfections in the details of floriculture may not be accessible to all, for the very reason that the difficulty of obtaining a plant decides its financial value.

If there were but one dandelion in the world, it would be worth its weight in gold, and its leaves would reflect its value; but now, it shows only the inborn sense of beauty in the minds of little children, who find in it a charming playfellow, recognizing its charms. But, while we must leave much that is beautiful to those who are blessed with the means to obtain it, we need not feel that our opportunities of enjoyment are limited to the amount of money which we may be able to expend—time is money; taste and appreciation are more valuable because more rare. Nature stands radiant at the door of her temple and says: "Come, take of my abundance; it is yours; gather in from my treasures riches of beauty, freely and without price."

There are wild flowers growing in untutored luxuriance, untrammelled in their liberty, glorying in their independence, shyly peeping from mossy beds, or flinging their scarlet leaves to the wind. Ferns, lilies, roses or violets, each

asserting its own claim, owning no gardener, save the Creator of all things beautiful. In these Wisconsin woods, with a greater variety of wild flowers than is to be found in most of our states, are roots, bulbs and seed life enough to make a garden of the whole world. Would you have a bed of spring flowers? no time is better than this. Violets, Hepaticas, and an endless variety may be taken up in clumps, and placed in their new position. You will not expect much of them this year, but next spring they will give you constant surprises, and be a source of perpetual enjoyment. Would you like to glorify your surroundings in August? Select a place not too shady, with a somewhat sandy soil, place in the center a dozen roots of the native scarlet lily — Conedeus; then the wiid species of Stevia, with its myriads of pure, tiny, white blossoms; around this Golden Rod — autumn's bright harbinger; — then the purple Aster; and around it all, ferns. No catalogue of plants will present flowers of a richer mass of color, and it is all yours for the claiming of it. I think one reason that many fail in cultivating wild flowers is that we forget how carefully nature provides for the protection of their roots, throwing upon them a covering of leaves, beneath which they sleep through the long winter with the snow for their coverlet.

But perhaps you say, we do not want these, we have but to walk into the woods to enjoy them; we wish for other flowers such as we see in city windows and gardens, but they cost money and we cannot spend money, yet we still wish for the flowers. It is true if you go to the green house for them, even in these days of cheap plants, you will be surprised at the inroad it will make on your purse; for no one can give the time and close attention a green house requires and not be obliged to charge accordingly; and the newer the variety or the more difficult to raise, the higher the price must be. But if you want flowers in your garden and around your house, and yet cannot spare much money for them, there must be others who share the wish. Twenty-five packets of seeds may be secured by ten persons paying ten cents each. "Oh!" you say, "that is using money;" so it is, but so small a sum that we may call it hardly any. This will give ten

packets of annuals, ten of perennials, and five of triennials. The annuals may comprise a list of those with which all are familiar, as: Balsam, Candytuft, Mignonette, Aster, Sweet Alyssum, Snap Dragon, Stock, Portulaca, Phlox, Drummondia, Zinnia; or if you have these or most of them, or can exchange with friends for them, then ten other varieties not quite as common, requiring a little more care, as they should be planted in a seed bed and transplanted to do well, such as Ageratum, Clarkia, Asperula, Godetia, Gillia, Verbena, Mimulus, Lobelia, Whitlovia, and Mesembryanthemum; these will all bloom the first year and self-sow for the next, and seed can be saved from them. Biennials, blooming the first year, may also be planted, and, with a little covering through the winter, early flowers will be obtained next spring: Daisy, Pansy, Violet, Myosotis and Pinks are of this class.

Perennials must be planted with no hopes of flowers this year, yet they will well repay the waiting.

Some of those which seem most desirable are: Phlox, Sweet William, Penstemon, Hollyhock, Canterbury Bell, Larkspur, Carnations, Rocket, Lychnis, Dictamnus. These may be placed in some retired bed, and in September or early in the spring transplanted to the beds where they are to bloom. These twenty-five varieties divided among ten persons would give to each one from five to ten plants out of each paper, enough to fill a moderate-sized garden, and they will have a constant succession of bloom throughout the summer. To them may be added a list of foliage plants which are easily raised from seed and are half hardy: Amaranthus, Perilla, Nonkiensis, Celosia, Salvia argentea, Golden Gem, Pyrethrum, Cineraria, Maritima; these will make beds the brilliancy of which can dispense with bloom.

Dahlias, Datura, Mirabilis and Canna-bulbs may be raised from seed, bloom the first year, and the roots preserved through the winter will be ready for the next summer. I had some of the handsomest Dahlias I ever saw last summer. I raised them from seed, and the plants are now a foot high from the same bulbs.

But, after all, the interest and pains we may take in our

own gardens in this northern climate, where the summer is so short and winter so long that spring and autumn appear to be left out in the cold, it seems as though house plants are the most enjoyable of all. Many think that raising them from seed is a slow, tedious process; but if you wish them in any quantity, without expending much money on them, this is the right way. Although it is now too late to secure them for summer bloom, it is just the time to prepare for winter. Fuchsias, Geraniums, Salvias, Primulas, Carnations, Pyrethrums and others, are half hardy perennials, and will bear a slight frost, and live comfortably in a room where the mercury does not rise over fifty-eight degrees. They may all be grown from seed. I raised, last summer, about forty Geraniums from half a paper of seed which cost five cents; some of them bloomed during the winter, proving fine varieties which are catalogued at thirty-five and forty cents. There is always a possibility of originating a new variety from seed. I have exchanged plants and cuttings with flower-loving friends, and have, to-day, seventy Geraniums, including, at least, thirty-five varieties, the actual cost being two and one-half cents. The seeds should be planted in boxes; after they obtain four leaves they should be potted in small pots, sunk to the rim in earth in a somewhat sheltered spot and watched to see that they neither dry out or damp off. A good rule is to let the earth become slightly dry before watering. It will be found that a fine collection can be made in this way, and many plants spared for friends.

It is one of the pleasures of having flowers to give and exchange seeds and cuttings, and in this way a large variety may be had for only the trouble, or pleasure, of caring for them. If a box about four inches deep, and of a size to hold as many cuttings as you wish to winter, is filled with sand and loam from the woods, an equal proportion of each, and placed in a shady part of the garden, kept moist, but not too wet, with a little of the morning sun shining on it, you will find it a convenient way of rooting cuttings for winter blooming. They can often be put in from bouquets or some friend's plants. I had a Heliotrope bloom steadily through

the winter, rooted in this way last summer; a Silonia Floribundi, gorgeous in its brightness, was grown from a cutting picked up without knowing what it was. If a number of roses is desired, whenever you cut off a bud, immediately cut the stalk down two eyes, and put in a box prepared in the same way; if this is done all summer you will have many more than you will care to keep over the winter, and the plants will be as large as those sent out by florists, at the price of a dollar for six, eight or ten. A few seedlings or cuttings of Mignonette — Miles' New Spiral is very fine for winter blooming — or Sweet Alyssum, etc., potted in September, will bloom all winter; a few roots of Lily of the Valley put in a box in November will flower in February. Experience proves that young, strong and well-rooted plants bloom far better in winter than old ones. They should always be potted at first in small pots, as they will bloom much earlier. Any one can have plenty of flowers in winter by paying a little attention to a few particulars. They require no more heat than to keep them green and fresh-looking. No more water than the roots actually absorb. Sunlight and air is the great need, and rooms where plants will not do well, are not fit for us to live in.

It is a noticeable fact that florists who have been successful both in a financial and professional view, have been those who have an enthusiastic love for their calling, to whom the dollar has not been as almighty as the plant. Vick and Henderson are proofs of this assertion. No money has been spared to find new, or improve old varieties, so that to-day Roses, Fuschias and Geraniums count their varieties by hundreds, when thirty years ago little difference was known among them; it seems as if every horticultural society in the United States should remember with gratitude James Vick.

Perhaps some one says: "I would be glad to have my home cheered and brightened by flowers. I see the pleasure a boquet, a plant, cutting or shrub may furnish me — the means of giving to others — but I cannot afford it." It may be that such an one has not time to take the pains for cultivation which these suggestions require. She may have little children, love's purest, holiest call for care; or an invalid

may require the unceasing watchfulness which the feebleness of the aged, or the helplessness of confirmed ill-health calls for. Home duties in parlor, dining-room and kitchen may seem to claim every minute and where is the time for planting and transplanting, for weeding and raking? Let me ask such a person if no money is expended in her home for other things no more a real necessity than flowers?

Does not time pass in wearily folding the hands, while mind and body alike crave, not so much rest, as change? Would not the sweet companionship of the plants you have sown and watched, the budding and the gathering, be more restful in its cheering interest? Would not the little Flower Club, gathering at each other's gardens to give mutual enjoyment and information, bring more real pleasure to your little ones and yourself than many ways in which money is spent. Our President requested me to write on "Flowers without Money," but I feel like putting in a special plea for flowers *with* money, for more healthful use of that necessary evil. I have seen a wagon load of children, accompanied by father and mother, sometimes even by grandfather and grandmother, come into the city to attend a circus; they could find the money easily for that purpose, but had you gone to their door and said, "you can buy fifty-five plants for three dollars, and they will fill your garden with beauty all summer long, and your house all winter long," they would wonder at you supposing them capable of such a piece of extravagance. I do not mean to say that they ought not to go to the circus. I only wish to hint gently that if they wanted the flowers they would as easily find the way as the road to the city.

There is an endless variety of ways in which we may fill our homes with beauty if we will. When every home has its flower garden and house plants, and every woman does half her house-keeping out of doors, making the home a source of pleasure and enjoyment outside as well as in, healthier minds and bodies will be the sure result.

We may dedicate our floral treasures to the Deity and humanity; and thus carrying the love of God and man into one pleasure, make it one of the means of doing our little

share of blessing and being blessed. Our floral missions, taking the brightness of fresh flowers into rooms filled with suffering and often times sin and grief, are like angels of mercy bringing tidings of purity and peace. May the time soon come when every heart may welcome them, and every eye rejoice at the presence of these gifts of love, fresh from the Father's hand!

After the reading of this paper the following resolution was introduced by Mr. Plumb:

WHEREAS, With the advancing agricultural interests of our state the field of labor of the Wisconsin State Horticultural Society is correspondingly enlarged; and,

WHEREAS, The work of this society consists largely in promoting the organization of local societies, and in aiding those already organized, in holding conventions and promoting exhibitions in every part of the state, a work largely volunteer and self-sacrificing on the part of those who actively participate in it; and,

WHEREAS, The work of the society should be enlarged in proportion to the field and the issue of our annual report increased, to secure which we need and will ask for more aid from the state; and,

WHEREAS, While we have hitherto received but five or six hundred dollars per year and the publication of our annual report, from the state, our sister state of Iowa gives one thousand dollars per year; Minnesota the same, and a permanent endowment of 116 acres of land of great value for experimental purposes in horticulture; Michigan two thousand five hundred dollars, and Illinois four thousand dollars per annum,

Resolved, the Rosendale Farmers' Club with whom we meet concurring, That we instruct the executive committee of the Wisconsin State Horticultural Society to make due efforts to secure such additional aid from the state, for the promotion of our work, as in their judgment the object demands.

The resolution was adopted.

Mr. Kellogg then introduced the following resolutions, which were adopted:

WHEREAS, We, the members of the Wisconsin State Horticultural Society, and their invited guests, have enjoyed the unbounded hospitality of our friends and co-workers in Rosendale, and especially that of the members of the Rosendale Farmers' Club; and,

WHEREAS, Owing to their cordial reception we have experienced one of the best summer meetings known in the annals of the society; be it

Resolved, That we extend to the citizens and Farmers' Club of Rosen-

dale our heartfelt thanks for the magnificent entertainment and kindly welcome which they have afforded us;

Resolved, That to Mr. G. C. Hill and his family we tender our thanks for the use of his beautiful grounds; and,

Resolved, That the President and Secretary of the Rosendale Farmers' Club, and the ladies who have read papers at this meeting be made honorary members of the Wisconsin State Horticultural Society;

Resolved, That our thanks are hereby tendered to the officers of the railroads which have given us reduced rates; and,

Resolved, That a copy of these resolutions be furnished the secretary for publication.

A paper on "Fruit for the Farmer," by Mr. N. N. Palmer of Brodhead, was read. Small fruits were then discussed, and the opinion of the members present on the three best varieties of strawberries was called for. President Smith gave Wilson, Kentucky, and Seth Boyden's No. 30; Mr. Plumb gave Wilson, Crescent and Charles Downing; Mr. Peffer, the same; Mr. Kellogg, Captain Jack, Crescent, and Kirkwood; Mr. Hatch, Wilson, Crescent, and Sharpless; Mr. Mason, of Ripon, Crescent, Wilson, and was waiting for the third; Mr. Hamilton, of Ripon, Wilson, Crescent, and Sharpless.

Under reports of the season's small-fruit crop, Mr. Plumb reported that strawberries would yield one-fourth of a crop; cherries more than an average; grapes at first promised to yield a very heavy crop, but they had been much injured by heavy frosts, still the prospect was very fair. Blackberries were loaded with bloom and would need propping and mulching if the fruit matured anything like they promised; Snyder and Stone's Hardy were the best varieties.

Mr. Huntley reported that the Ancient Britons were nearly all killed down; the Snyder was set more largely than Stone's Hardy and was doing well; a large number had recently got Stone's Hardy and its prospects of fruit were good. Cherries were heavily loaded; grapes promised well and would blossom full.

Mr. Hill reported that more interest was taken in small fruits. The season was backward but the prospect was fair. He would not advise setting trees where others had died out, but it could be done; he had them growing and doing

well three years after setting right where other trees had stood.

Mr. Smith reported that his strawberry beds were not so thickly set with vines as usual, but were heavily loaded, and if all matured and were of good size, the ground would be covered with fruit and in some places piled up. The Crescent had a wonderful growth of vines and an abundant show of fruit.

The relation of culture to hardiness was then brought up for discussion. Mr. Hatch stated that hardiness is the capacity in a plant to endure, without injury, the extreme heat and cold of our latitude. The growth of the tree is complete, or should be, by the middle of July, and if made after that it is immature and is called second growth. Culture should be early in the season and so as to push the growth by the first of July. The ends sought by cultivation are vitality, seasonable and mature growth, and not too excessive fruiting.

Mr. Kellogg said that culture includes selection of site, to secure a strong, healthy growth, and to escape early start and late growth in the season, and for this purpose a northern exposure is best. Trees should be cultivated until they reach maturity and bear fruit. The soil should be adapted to the tree and the tree to the climate. High culture induces blight and late culture winter killing. Any check caused by excessive fruitage or drought causes tenderness.

Mr. Plumb said that this question involves the first principles of constitution of tree and maturity of growth. Seasonable growth gives trees hardiness in winter, but culture often lengthens the period of growth and induces weakness. If growth is not made at the proper season the trees are not hardy. We cannot crop the land and rob the tree of required nourishment in the proper season, and then replace it by after-culture as by the application of manure; if a crop takes nourishment from the tree during the season it requires it, weakness must follow. He spoke of Hill's mulching about the trunk, which serves as a harbor for insects and mice; and then there are no feeding roots about the trunk. Mulch

should be applied away from the trunk out to the drip of the trees.

President Smith then spoke of the Rosendale Farmers' Club, saying that they had worked faithfully in the past, and had done much to promote the agricultural and horticultural interests of the state. It gave him much pleasure to meet with the Society and the citizens of Rosendale, and hoped that we should all meet many times on like occasions. The Society then adjourned to meet in the hall for a festival in the evening. The occasion was a pleasant social one in which music, toasts, speeches and refreshments, were mingled with many expressions of pleasure, good will and kind regards.

MEETING AT THE STATE FAIR.

FOND DU LAC, Wis., September 13th, 1882.

In response to a call issued by the President, the members of the State Horticultural Society who were able, assembled in Horticultural Hall, on the Fair Grounds, at 7 P. M., of Wednesday.

The meeting was called to order at the appointed time, President Smith in the chair.

The President remarked that there was no special programme, and no papers were reported to be read; but there were some matters of business to be attended to, and, in accordance with the usual custom of the society, an informal discussion of the lessons and experience of the season was desired.

The question was raised as to how many fall and winter meetings it was best to hold. Expression was given on the part of members to the opinion that it was best for us to hold as many as possible, and a resolution was passed authorizing the president, secretary and executive committee to arrange for holding as many meetings and at such places as seemed advisable and the funds of the society would permit.

The secretary reported his correspondence with Mr. G. B. Brackett, of Iowa, in relation to taking wax casts of our

fruit. The price given was one dollar for each cast. The secretary thought it would be advisable to commence a collection of this kind, adding a few casts each year as the finances of the society would allow. He would recommend commencing with our standard fruit first, taking first the most important varieties with us and then others, as means were at our disposal. Iowa's collection of wax fruit was said to form a fine display in itself, and to represent nearly all the varieties raised in that state.

Mr. Plumb favored this plan and suggested that it would be well to make selections of some of the earlier varieties at this fair. He inquired how many casts of each it was thought best to have, and whether it was advisable to select the best samples of each variety or medium.

This subject was discussed freely, and the opinions expressed that three of a kind would be better than a single specimen. Fair specimens of the variety in size, form and color were decided to be best.

A resolution was introduced that this subject be left to a committee, which should select such varieties and specimens as seemed best to it, and forward the same to Mr. Brackett for the purpose of remodeling.

The resolution was carried, and Messrs. Plumb, Kellogg and Peffer were appointed such committee.

President Smith read a communication from Parker Earle, President of the Mississippi Valley Horticultural Society, inviting the Society to join in a proposed excursion to New Orleans. It was not thought advisable to send a delegation of the Society, but the President was authorized to issue certificates as delegates to all members who could attend the New Orleans meeting.

By resolution, President Smith was also authorized to appoint one delegate to represent the Society at the meetings of horticultural societies in neighboring states, and to pay the traveling expenses of such delegates when the finances of the Society would permit.

Mr. Peffer reported attendance at the Montreal Forestry Convention, which held an interesting meeting. The plans for forest protection and planting in practice in Europe were

not deemed feasible here, as land was held mainly by private individuals, and the profits were not much of an inducement to owners, because they were too small, and the time before returns could be realized too long. It was there estimated that the timber in Wisconsin might hold out ten years; Michigan, eight years; Minnesota, six years.

Mr. Plumb stated that the fruit prospects in Illinois and southern Wisconsin were poor, but they were better further north; the best fruit was found in the northern part of the state, in Brown, Winnebago and the neighboring counties; it was of better color, fairer, and greater quantity than south. The nearer the line north where fruit can be raised, the better the quality.

President Smith reported very fair fruit in some portions of Brown county. Golden Russets good, fair and abundant. A friend of his from Baltimore expressed much surprise at the fine fruit in this region.

Mr. Plumb stated that the best fruit for market this season was the Hyslop, which brought five dollars per barrel.

Mr. Peffer said he passed through Michigan on his return, and the fruit he saw there did not look much better than with us. The secretary stated that there was a great diversity in the amount and quality of fruit this season, even in orchards in the same sections, some had a moderate crop, others none; some fair and good, others mildewed and worthless. The crop was evidently much affected by local causes. Such seasons were good for observing the influence of surrounding conditions. Many trees were full of blossoms and set well, but fruit dropped off blighted; on many trees, although the flowers were plenty, no fruit set.

Mr. Palmer gave an account of a man near him who put on slacked lime when his trees were in bloom; the fruit set well and there is now a good crop of apples for the season. Mr. Peffer said that many trees were affected with mildew this season, both leaf and fruit, but the Golden Russet was entirely free from it. The fruit is smooth, fair and of good quality.

Mr. Palmer, of Brodhead, had one hundred trees of the Golden Russet, but would not have two bushels of apples from them.

Mr. Plumb thought that fungus growth had been very general this season, which fact was mainly due to climatic conditions. Grape vines with him had been affected by it. Three cold nights came on when the berries were about half grown, and the leaves were struck with mildew. The weather soon came off moderately warm and the mildew stopped.

Mr. Kellogg said that apples would doubtless decay early this season and we ought to pick early, as they would keep much better and the quality would not be injured.

Mr. Peffer would pick as soon as the seeds had turned brown; apples should be picked with care, packed in barrels and put in a cool place, leaving the heads of the barrels open. When the apples have sweat, or cold weather comes, they should be headed up.

Mr. Plumb recommended picking early. The Fameuse and Utter do not ripen all at the same time, so it would be better to have two seasons of picking them. If those that ripened first were left on the trees, they would get too ripe; while, if picked, those left on the tree would be improved in size and quality. He asked whether apples sweat, or is there only a condensation of moisture on them from change of temperature.

President Smith reported the pear orchard near Green Bay as doing well; the crop was good, the fruit smooth and fine. Apples good and of a fine quality. Fameuse trees loaded.

Adjourned *sine die*.

FALL AND WINTER MEETINGS.

In accordance with a resolution passed at the annual meeting, announcement was made to local societies that the State Society would aid them in holding meetings for the reading of papers and discussion of horticultural subjects where there was sufficient interest felt to secure co-operation and attendance. To this responses were made by the Janesville Horticultural Society, Sauk County Horticultural Society, Waupaca County Horticultural Society and Richland County

Horticultural Society. At their meetings various members of the State Society were present and took part.

THE JANESVILLE MEETING was held at the Common Council Chamber in that city, November 20, at 2 P. M. Preliminary to the regular purpose of the meeting, — the consideration of horticultural subjects, — a special meeting of the local society was called to consider the propriety of changing the Janesville Horticultural Society into a County Society, to be called Rock County Horticultural Society. It was decided to make the change, and steps were taken to complete the organization at a subsequent meeting.

Mr. Peffer read a paper on "Causes of Failure of the Grape Crop the Present Season." In the discussion which followed Mr. Peffer said that in confirmation of the fact that the excessive moisture at the time of bloom was one of the causes of failure, was given the fact that varieties blooming before the heavy rains escaped and set full. The wind that caused most injury was the southwest wind. When mildew was first discovered, it was too late to check it by any external application; salt was put on the soil, but with no effect. He was confident that close pruning caused injury to the crop, and prevented early ripening of fruit.

The Secretary remarked that the unusual development of fungus growth had much to do with failure in the crop, injured the foliage and prevented growth and ripening of fruit. Fungus growth was usually regarded as the result of excessive moisture, not muggy weather. These conditions are favorable to the development of fungus growth, but it was also found under other conditions. Professor Sanders had caused it to appear and flourish by withholding needed water from plants in green houses; also by excessive heat, without excess of moisture; by sudden lowering of temperature. Anything that weakens the plant, checking thrifty growth, favors fungus. Two forms are often seen on grape vines, one affecting both leaf and fruit, the other the leaves and new wood, but not the fruit. The first is on the surface wholly, and may be checked by application of sulphur, etc., but the other extends through the cellular structure of the plant. It spreads over the surface, also, but strength of growth is internal and

not usually noticed until its roots are spread throughout the interior of leaf and stem, sending out threads through the pores on the under side of the leaves. These threads, if examined under the microscope, are found to bear oval-shaped bodies or spores, on their extremities. These are the conidial spores. There are also other spores, or mycelia, on the roots. The threads in the interior of the leaves are called the winter spores.

The former germinate at once where the proper conditions are found, the latter usually remain dormant in the leaves, or stems, or on the ground until the following season, then if conditions of plant and climate favor, they will start anew; hence it is best where vines have been affected with fungi to clear away under them, burning leaves and vines cut off in pruning. There is *no* hope of exterminating the seed, but they may be sensibly lessened.

From the character of growth it is evident that what is good to check fungus in one case will not be effectual in the other. Where growth is all external, sulphur will kill it, but in the second form, when applied, it will kill that part of growth which is external but has no effect on that within; the mycelia within will soon send up new threads, bearing spores as before.

Late fall growth of vine or exhaustion from heavy fruiting in the previous season, favors fungus growth, weakening the plant. Close pruning also has the same tendency, which may not always follow, but if climatic conditions are not favorable for thrifty growth of vine, are very apt to be struck with mildew. Close planting, or planting in locations where a free circulation of air is prevented favors fungus growth. Airy locations should be selected for vineyards, and soil and culture should be such as are favorable to healthy growth; also, there should be little or no pruning after fruit is set.

He spoke of the precaution in Ohio and other eastern states of putting a wide board on top of the trellis, to shed rain, which prevented grape rot, and which was said to be very successful. Another plan, spoken very highly of by those who have tried it, is to put cross bars on the top of the trellis, extending two feet on each side, put arms on these

cross bars, and train the vines up the trellis, and over these arms, letting the tops hang down, thus sheltering the fruit and body of the vine, the mass of foliage on the top shedding the rain as effectually as a board would.

Mr. Peffer gave a practical illustration of his method of fall pruning his vines, calling out many questions and comments.

Mr. Follensby, of Janesville, stated that he had a seedling grape, raised from the seeds of a raisin. He planted the seeds and had nine little vines, of which all but one died the first winter. This one lived through and had grown well; during the last year it bore twenty pounds of grapes; this season, twenty-six pounds of good quality. He thought it promised well.

Mr. Lawrence had heard of the seedling and tasted of the grapes; they were just prime, and he could not judge as to its merits. He thought the present season had been the poorest one for grapes we have had in fifteen years. Mr. Kellogg had tested the grapes under the same conditions. He thought in introducing new seedlings we should not indorse anything which is not superior in some respects, as hardiness, fruitfulness or quality, to any we now have.

Mr. B. B. Olds gave an account of a new method he had adopted of utilizing his apple crop, viz.: in the manufacture of apple jelly. By means of a Cooks' Evaporator he had made up twenty-five barrels of cider into the first quality of apple jelly. Eight or nine gallons of cider make one of jelly. He thought we could in this way use up much of our surplus fruit, in years of plenty, at a good profit.

Adjourned until 7:30 P. M.

At the evening session the subject of mildew was further discussed, and the sulphur remedy was recommended as the best; it should be applied when the conditions were favorable for the production of mildew, as it was more likely to be beneficial then, but, if left until well developed, little good would result.

The use of arsenic, Paris green, London purple, was recommended for destruction of gouger, codling moth and curculio as well as the canker worm.

Mr. Kellogg had received much injury from the apple gouger, which seemed to be extending through his entire orchard.

The best method of winter protection for grape vines was fully discussed. Various plans and preferences given.

Mr. Lowdon favored earth, either laying boards over vines and earth on top, or all earth. Some varieties, as the Ionia, kept better when covered with straw or hay than with earth.

Mr. Peffer trimmed his vines and laid them on the ground, but did not cover. Had covered only once in ten years, and then he lost the vines. He covered his Delawares with marsh hay. The ground was dry that season and the hay covering made it still drier. Usually there is some snow to protect when the vines are laid close to the ground. They should be laid down where water would not stand over them.

Adjourned.

MEETING AT RICHLAND CENTER.

The session held in connection with the Richland County Convention on the third of January, proved very enjoyable and profitable to the members of the society who were present. President Smith presided. Among the papers presented was one by J. C. Plumb, of Milton, showing that the growth and development of plant life depends upon a few simple principles, and the primary agents of light, heat and moisture, and that all our practice should conform to these material conditions. The first twenty years of our experiments were in a hopeful ignorance of our peculiar climatic conditions, and the result was a discouraging failure. The latter twenty years had given us a true knowledge of the conditions of success, and now none need to plant on any uncertainty, either as to location or variety.

J. S. Stickney, of Wauwatosa, from the subject, "Small Things in a Wholesale Way," showed that needless waste of farm implements and crops, want of a good market, of thrift and system, correct accounts and habits of life, aimless efforts, all tend to bring poverty and pain. The remedy is less land and better culture; special crops and in quantities to give special advantage in the market, and instanced

those who are eminently successful with small fruits, chickens, cucumbers, pigs and pickles; gave a history of the pickle business, and its making many sorry and few glad. Referred to the large areas of waste land in the suburbs of our cities, and even that improved in the ordinary shiftless manner, which did not yield one per cent. of interest on its valuation to the owners.

President J. M. Smith, referring to his gardening operations at Green Bay: "Commenced in a small way in 1875; had grown steadily until it now reached forty-five acres, besides that of his sons, about twenty-five more. His last October and November sales being about $8,000, and not over $50 of this in his own county, but mainly in the great mining region to the north, with frequent shipments to distant states in car lots. Prefers a sandy soil for early gardening, which he manures twenty-five to fifty loads of rich composted manure to the acre annually. Land all underdrained, and frequent surface drains, which are kept open in winter and early spring. Rotation of crops annually: First, peas; second, radish; third, Hubbard squash, the same year. Onions and cabbage the main crop, with all other vegetables in proportion to demand, and strawberries and currants besides."

George J. Kellogg, of Janesville, read an extended and characteristic paper upon strawberries, which put Crescent, Bidwell and Manchester ahead. Of the first named he had grown at the rate of 15,000 quarts per acre; but this variety must have some strong fertilizer near by, for which he commended the Bidwell.

C. A. Hatch, of Ithaca, read an instructive paper on "Grapes for Farmers," commending the Worden as having more merits for the farmer than any other, and the two-cane renewal system of pruning, which he illustrated on the board.

S. I. Freeborn, of Ithaca, in "Items of Fruit Culture," told of failures and success, after the years of trial and sacrifice common to the pioneer fruit growers of the northwest.

Geo. W. Putnam, of Ash Ridge, speaking on apples, stated that he found few varieties promising except Fameuse, Plumb-Cider, Wealthy and Utter.

FRUIT ON EXHIBITION.

Messrs. Freeborn and Hatch, of Ithaca, showed apples: Alexander, McMahan's, White, Perry Russet, Golden Russet, Fall Spitzenberg, McMahan's Bloom, Wealthy and others, fifteen varieties in all, of which the first five were exceedingly fine. Two varieties of grapes shown by them — Wilder and Salem — were fresh and fine as if recently gathered.

Another exhibitor whose name we did not get, showed six varieties of named apples and eight of seedlings. Some of the latter were of excellent quality, and all appeared well.

A. G. James showed remarkably fine Raules Janet and Walbridge grown in the valley, and President Smith showed good specimens of Grimes' Golden that were grown at Berlin, Wisconsin.

AGRICULTURAL ROOMS, MADISON,
FEBURARY 5, 1883, 7:30 P. M.

President Smith called the Society to order, and stated that it would be necessary to improve the time in laying out the business of the session, and in acting on such a part of it as could be considered this evening, as the time at our disposal was quite limited.

It was proposed that the usual committee be appointed by the president, and Messrs. Phillips, Kellogg and Peffer were appointed such committee.

The secretary stated that he had endeavored to have the programme for joint convention so arranged that the papers and discussions on horticulture should be distributed through all the sessions, and thought it had been so done; but when the programme came to be printed, he found that the great bulk of the horticultural papers had been crowded into one day and Thursday afternoon which was usually given up to the ladies' papers. There were too many papers to be presented, and it would be impossible to do any of the subjects justice, if there was time to discuss them at all. He was in favor of selecting from the printed programme those subjects most interesting to the members of the Society, and having

those papers read and discussed at special sessions of the Horticultural Society, at such times as the joint convention should be occupied in matters of little or no interest to fruit growers. He did not think that it was to the interest of the Society to pass over the subjects so hurriedly. While he was in favor of helping in joint convention, he did not like to have this, the main meeting of the Society, crowded into one or two half days. He had long felt that we ought to hold our annual meeting by ourselves. The subject of holding to leave it to the committee on programme.
special sessions was then discussed, and it was finally agreed

President Smith said that Prof. Beale, of Michigan, was to be present, but no place had been assigned him on the printed programme. He came on invitation of the society and must have an opportunity to address the convention; therefore, he would suggest that Professor Beale's address be given on the first evening and he would withdraw his own paper for that purpose. The proposal was agreed to.

Mr. Kellogg's paper was read and discussed.

Mr. Plumb inquired as to the cause of grapes ripening so unevenly. On vines and in vineyards similarly situated there was two and even four weeks' difference in the time of ripening.

Mr. Peffer was of the opinion that one, and perhaps the main reason was in summer pruning; where trimmed close, fruit ripened later, and where many leaves were left on the vines above fruit clusters, they ripened earlier. He had noticed that on the vines which were pinched back when the grapes were as large as big shot, the bunches did not ripen so as to be fit to take to the fair; but the same vines not pruned were ripe enough to make a good show. Said that Greenman's old vineyard at Wauwatosa had been ruined since he left it by short, fancy pruning, leaving two leaves beyond the cluster, and pinching back the new shoots as they start out to one leaf, two or three times. There were no grapes, no hardy, mature new wood, no roots.

Mr. Kellogg stated that Snell's vineyard near him had been pruned back close, and there were no grapes, but an abundance of mildew.

Mr. Plumb had visited Selenburgh's vineyard at Jefferson, where the vines bore over six tons of grapes last year. In July last he saw them and thought they would yield ten tons the present season, but when there in September, while Hartfords were ripening, the Concords did not even show color. No grapes ripened, and the wood did not mature. He thought the cause was to be sought in the method of pruning.

In his own vineyard he found that when he tied up vines, but did not prune a second time as usual, when he set in to do it he saw spots of mildew on some of the leaves and quit pruning altogether; and, as a consequence, the vines grew unchecked, the grapes ripened fairly, and mildew did but little injury.

Pres. Smith inquired as to the experience and views of members in regard to the benefits derived from wind breaks. He thought that general experience proved that they were not needed. Fruit did best in exposed locations, and the trees and vines grew more thrifty and hardy.

Mr. Kellogg thought they were beneficial, but would not favor breaks higher than the trees or vines to be protected.

Mr. Hirschinger took exceptions to Mr. Kellogg's recommendation of Duchess, and Duchess only for profit. There were many other varieties more profitable with him. Willow Twig were more profitable; they were a little tender when young, but good and hardy when grown.

Mr. Jeffrey said the Golden Russet was the most profitable tree with him.

Mr. Philips felt in regard to Willow Twig a good deal like the man did about raising ducks, "did not like to until they were a year old." Willow Twig did well when old. He had three trees that stood the hard winter of 1872–3, and were now doing well, and bore fine fruit. He had bought 100 young trees and all or nearly all died at once. He would like an explanation as to why young trees die and old ones are hardy.

Mr. Plumb said that Willow Twig when young, is a late grower, and the twigs are not ripened, the wood is immature and hence the tree is injured by winter. When the tree gets

older it matures earlier, and hence is more hardy. It is the same with them in orchard and nursery, the older they get the hardier they become. Fine trees are found here and there in isolated cases in many parts of the state. There are some good trees near Ft. Howard.

Mr. Peffer remarked that the Golden Russet does much the best in cool seasons, growing smooth, fair and large. In warm seasons it is apt to crack.

The Secretary said it was usual to have the Secretary's Report read the second day, but in view of the fact that time to-morrow was very limited for the work to be done, he thought, if there were no objection, it would be well to read it at this session. The suggestion was assented to, and Secretary Case then read the following report.

SECRETARY'S REPORT.

There is little necessity for a lengthy report in regard to the work of the Society during the past year, or its present condition for the information of those present on this occasion, as what has been done is the result of your own efforts, and thus is familiar to you all; but there are some things connected with the experience of the past which reveal the needs of the present, and are so closely related to the future prosperity and efficiency of the Society that it will be well to briefly review the season's labors and their results.

The plan adopted four years ago, of holding meetings in connection with local societies, has been continued with very encouraging results. The change made at our last annual meeting, when it was decided instead of holding a number, to hold but one exhibition and meeting for discussion, in June, appears to have worked very beneficially, for, either as a direct or indirect result, we secured a larger attendance of the members of the State Society, a better preparation on the part of those contributing to the literary portion of the entertainment, and a greater local interest. Surely no one who attended the meeting at Rosendale needs to be assured

that it was one of the most interesting, practical, and agreeable meetings of the kind we have held; and we trust that the pleasure derived, the beneficial results experienced, will incite to more earnest, faithful work in this direction.

Interesting fall and winter meetings have also been held in different parts of the state which were attended by various members of the society. I would repeat here what has been said before, that it seems to me that our society should make this kind of work its special mission. It is in this way that we can reach the largest number; can best learn the wants of the people; excite their interest; secure their co-operation in our work, and do the most to promote the horticultural interests of the state.

The exhibitions held in connection with the June meetings are necessarily attended with a good deal of labor and some expense, so much so as to prevent meetings being held in many places where it might otherwise be done to great advantage. If some means could be devised to lessen this labor and to secure some pecuniary return for the expense incurred, there would be a much greater call for meetings of this kind, and in places where their beneficial influence would be greater than in in the larger towns.

It has been said the exhibitions held in connection with the June meeting are necessarily of a local character, and that the practical benefit resulting from them is comparatively small, but the experience of the meetings we have held of this kind clearly demonstrates that these exhibitions are productive of great good, and that they not only add much to the interest and attractiveness of the occasion, but that they do as much or more to create a local interest and excite competition in the cultivation of flowers and small fruits as our discussions themselves. Precepts, theories, are good, but example, definite, tangible results seen are better, and have a more convincing, lasting, and *practical* effect.

In connection with the management of these exhibitions, and also in the preparation for our present winter exhibition, a want was expressed in the lack of definite rules for their government. Questions arise as to time, manner, forms of entry, rules governing competition, etc., which it is not ad-

visable to leave to the decision of the President or Secretary, and which it is not fully satisfactory to leave to the general practice on these points. On some there is a diversity in these regulations, and the rules laid down are not always such as tend to promote the best management and usefulness of such exhibitions. It would do away with much doubt in the minds of those preparing to exhibit, and also diminish the causes for complaint and dissatisfaction in the after management of the exhibition, if the society would adopt definite rules of its own on all the points that can be raised in relation to their government, and then have them printed in connection with each premium list issued for exhibition under its control.

That it is the duty of the Society to do all in its power to encourage and co-operate with local societies in promoting the interest of horticulture is admitted by all, and there undoubtedly is a general desire on the part of the members to do all in this direction that our means and time will allow; but I fear there is another part of our work which we are apt to lose sight of, or at least do not fully appreciate, and that is, earnest, careful, thorough work at home, in our own Society. At these summer meetings and at joint conventions the subjects considered are of a general character, and adapted to the common, practical wants of those who have not given much attention to horticultural subjects; but there are many other questions that should come before the Society for discussion and investigation and thorough study, which are not of interest to the general public, yet which must be considered and wrought out, if we would make any progress, and even if we would maintain what we have already gained. As it is now and has been for a number of years, we have no time at any of our meetings for the proper discussion of any subject. We have not been able to draw out each others' views, or profit by each others' observation and experience, and have thus lost that community of thought and interest, and failed to learn important, practical lessons, that one might otherwise have learned and enjoyed. There has been barely time for

the transaction of the mere routine business in a hurried and unsatisfactory manner.

In this way we are not only lessening our influence, our power, but we are also losing individuality, our society feeling and interest. It does seem as though it was time to make a change in this regard, and to hold at least one strictly society meeting each year, for thorough, earnest, hard word.

There is another phase of this same subject I would like to mention at this time, as it is probably the last opportunity I shall have of doing so, at least officially, and that is the manner of expending the funds appropriated by the legislature to aid the Horticultural Society in its work. We are but one of a number of societies that are thus favored. Each doubtless endeavors to use the sum thus intrusted to it so as to best promote the object for which it was given, yet they are individually anxious to make such a showing of their own work as to secure due credit for the earnest and faithful performance of their trust, in order to secure a continuance of the aid. It is politic, it is right, that each should thus look to its own interest in this matter, and that the means placed at the disposal of each one should be so expended as to but advance the peculiar interest it represents, and thus secure the greatest possible credit to the society. The welfare of the society and the interests it advocates, demand that it should thus work for its own advancement.

To state the matter more plainly, we do not ask or expect the State or the Northern Agricultural Societies, or the Dairymen's Association, or any other society to come in as a sort of a side-show to help out our conventions, and were we to do it, we ought not to expect it to be done at the expense of the funds of those societies, and there does not seem to be any good reason why we should pay for the privilege of serving as the tail of another's kite. It may seem selfish to some to criticise in this manner, but it is not a question as to whether the money and labor are not thus properly expended, and the public benefited, but as to whether it is the best use that can be made of it in promot-

ing the interests of horticulture. I have no prejudice or ill feeling towards any society, but on the other hand would not only like to see them prosper, but would aid them in carrying on their legitimate work in every way possible, yet, I can but feel, that until we are more advanced in our own work, and are more sure of our footing, it would be wise to work strictly in the horticultural line and to use the funds at our disposal for horticultural meetings alone. Surely the field is broad enough, the interests intrusted to us are of sufficient importance, to occupy all our time, means, and energies. For one, I think we can work more effectually in this way and can make our meetings more interesting, practical, and useful. Hog, hennery and apples, pork and strawberries, tobacco and flowers are not fitting associates. Each may serve well in its place, but they make poor sandwiches.

At our June meeting, and again at the regular meeting for discussion held Fair week, mention was made of the plan adopted by the Michigan State Pomological Society, of organizing local societies in every county, city or village in the state where there was sufficient interest felt in horticulture to make them successful, and to make them auxiliary of the State Society.

After reading his report the secretary placed on the table the samples of wax fruit procured in accordance with resolutions passed at the summer meeting, with the bill of Mr. Brackett and the correspondence in relation to it.

It was moved that the bill be accepted and ordered paid, and that the secretary, in making the payment, be authorized to present to Mr. Brackett the thanks of the Society for the excellent manner in which he had done the work.

By vote of the Society the wax samples were placed in charge of the secretary, to be put on exhibition in such a manner as to be secure from injury.

President Smith stated that the present secretary of the Society had informed him a number of weeks since that he could not fill the position of secretary any longer, and had reaffirmed his decision to resign this afternoon. He thought it proper to mention this to-night so that the members might have time to think of it carefully before the election of officers.

On motion of Mr. Kellogg a committee was appointed by the president to nominate a list of officers for the coming year.

President Smith appointed Messrs. Philips, Kellogg and Hunt such committee.

Mr. Kellogg stated that as a delegate to other state societies he had been treated with great kindness and courtesy, and that this had been the experience of all our delegates. He felt that we ought to reciprocate, and moved that a committee be appointed to see to the proper care and reception of delegates from other societies. This was approved, but it was decided to intrust this duty to the executive committee of the Society.

The Society then adjourned to meet at 9 o'clock A. M. of the next day.

FEBRUARY 7th, 9 A. M.

Society called to order, President Smith in the chair.

The committee on programme made their report.

As the secretary's report had been read and partly considered at the evening session, the Society took up the question of summer meetings.

Mr. Plumb thought the more that could be held and made successful, the greater would be the benefit to the public as well as to the Society. He did not think it advisable to have these meetings held subject to call, but each one should be definitely arranged for, and announced some time in advance. He would also advise that they be made a special stimulus to the formation of new local societies as well as an encouragement for those already organized.

President Smith said that a good deal of labor was required to arrange for such meetings and to see that they were conducted successfully. If left largely to local secretaries, in many cases they would fail to draw out even a limited number of persons and be lacking in interest. He was in favor of as many as could be arranged for and sustained creditably.

The secretary thought that exception might perhaps be taken to some things stated in his report, but he was con-

vinced that it was for the interest of the Society and the good of the public to hold as many of these meetings as could be made successful. If the proper means were not taken to prepare for the papers and discussions to be presented and to attract and draw out the public, they would fail in interest and do comparatively little good. We had tried holding a number of June meetings, and he believed it was the conviction of all, or nearly all, that it was difficult to secure a large attendance, either of members of the Society or of the people at this the busy season of the year, and as the main preparation for and the main labor in conducting them must fall on members of the Society, it did not seem advisable to attempt more than one or two June meetings. On the other hand, late in the fall and in the winter, members can better spare the time and there will be a larger local attendance. Better preparation could be made and they would be much better sustained. One great difficulty in carrying them out to the best advantage, seemed to him to be the general desire to extend the sessions to two, three, or four days, and to have a large list of subjects presented. He thought it would be better and more interesting to hold short sessions, a day, or a day and a half in length, in some cases even an afternoon and evening session, selecting two or three subjects that would be of the greatest local interest, having them announced some time beforehand and well prepared for by two or three members of the Society. Then to fill in the time, if anything more was wanting, let the local wants and interests of those present call out other topics. In this very thing they could be made much more interesting and practical. A larger number of meetings could be held and the aggregate expense would be less.

Mr. Plumb spoke of the interest he saw manifested in the Iowa State Horticultural meeting. They had the work thoroughly laid out there. The state was divided into twelve districts, and there was a live Horticultural Society with many earnest, intelligent workers in each. They have in this way created such an interest in horticulture as to secure good addresses at their home meetings. He would like to see our society work in some such line. There are

live horticulturists in all parts of the state, La Crosse, Appleton, Oshkosh, Ripon, Waupaca, Racine, etc., but they are not of us. We ought to bring them in, and this can best be done by means of these meetings. He did not think it necessary that many old members should attend the meetings; enlist and draw out home talent. The Iowa Horticultural Society was strong in numbers and influence, was much stronger than the Agricultural Society, and more influential in the state and legislature. They have a working committee in each congressional district, on whom they can call for service if need be, and whose duty it is to make full reports on all matters of interest.

Mr. Kellogg then moved that the subject of summer meetings be left to the executive committee. Carried.

An invitation was given by Mr. Hirschinger to members to attend and take part in a joint Agricultural and Horticultural Convention, to be soon held at Baraboo.

The subject of rules governing entries of fruit, and the management of the society exhibitions, as presented in the secretary's report, was discussed and finally referred to a committee consisting of Messrs. Kellogg, Adams and Springer.

The best method of expending the funds at the disposal of the Society, was referred to the same committee with instructions to report at a future session.

On the subject of more time being needed to properly consider the questions before us, it was the general opinion that we were very much crowded as to time and could not give that careful thought and consideration to the work before us that its importance required, and while it might not be expedient at this session to hold separate meetings to discuss horticultural subjects as proposed in the secretary's report, some remedy ought to be provided for the future.

To this end Mr. Plumb introduced the following resolutions:

Resolved, That we deem it for the best interest of the Wisconsin State Horticultural Society, as conducing to its extended usefulness, that our organic law should be so changed as to provide:

First, That our annual meeting and winter exhibition shall be held in

the month of December, at such time and place as may be deemed wise from year to year.

Second, That we also favor the holding of a joint convention and exhibition at the state capital as at present.

Third, That the matter be referred to a special committee which shall report on it during this session.

After brief discussion the matter was referred to a committee appointed by the president, consisting of Messrs. Plumb, Stone and Adams.

The subject of procuring wax casts of the leading varieties of apples was then taken up. Messrs. Plumb, Kellogg, Peffer and others favored doing this as fast as the funds of the Society would allow, and a resolution to this effect was introduced and carried.

Mr. Plumb also moved that the selection of the varieties and specimens to be cast be assigned to a special committee of three, appointed by the president, to serve for the year. This motion was carried.

A motion was also made and carried (introduced by Mr. Kellogg), that members of the Society and private individuals who wished to have casts made at the same time could do so by paying the cost of their models.

Mr. Philips presented his report for the ninth district, as a member of the committee of observation.

"Reports of delegates" were called for.

Mr. Kellogg gave a brief account of a meeting he attended at Richland Center and at Weyauwega. The session in the latter place was a short one and the attendance limited in numbers; but the exercises were very interesting; good exhibition of fruit on the tables.

He also attended the annual meeting of the Northern Illinois Horticultural Society. No special preparation had been made for this meeting, no regular programme laid out, but the exercises were most interesting and of a very practical character. He thought no programme was to be preferred to too full a one. The session was really a fine one. Free entertainment was given to delegates abroad, and a hearty desire was expressed that our State Society would send delegates to all their meetings.

Mr. Philips, delegate to the meeting of the Minnesota Society, reported a good attendance and an interesting and profitable session. Part of the time was spent in joint convention with the Cane Growers' Association. He found that most of the members of that society had lost faith in securing from the Russians what we need, and were looking with confidence to the experiment being made in crossing or hybriding the hardy varieties of Minnesota and northern Wisconsin. Conciliatory measures were taken to

RESTORE HARMONY AMONG THE MEMBERS

and do away with past differences. A fine collection of seedlings was on exhibition. Messrs. Gibbs and Harris were appointed delegates to attend our annual meeting. The members of the Minnesota Horticultural Society are earnest, live men. The professor in the agricultural college there, did much to promote the interest of the session by taking an active part. He offers to try any promising native seedling we may send him, and to give us the benefits of the experiments.

Mr. Kellogg made a supplementary report in regard to the summer meeting of the Minnesota State Society, which he attended, speaking of it as a very fine meeting, and as being very cordially received and entertained.

Mr. Plumb reported his attendance at the winter meeting of the Illinois State Horticultural Society. Was not present at the whole session. Found the usual gathering of the old members engaged in thorough, earnest work. Like those of our own Society, the members were mainly those who had long been engaged in horticultural work, there being few young men or new hands in the society. They have some advantages over us, and some difficulties that we have not. They are more liable to receive injury from late spring frosts, and there is more injury done by insects, etc. The year had been a hard one for fruit, and they were now using southern fruit.

He was not in favor of the no-programme system. More interesting and beneficial results would be derived if a definite plan was laid out and thorough preparation made. He was much pleased with the way the work was carried on by the

Iowa State Horticultural Society. Their programme was full, papers not all read. They have papers in form of reports from all parts of the state, which are a daily history of horticultural matters in the different districts of the state, congressional, northern, central, southern, eastern and western. They had also reports from an *ad interim* committee who travel throughout the state, to take observations and report on all matters of interest to horticulturists. The expenses of this committee are paid by the society. They have a body of strong men, specialists and experts in entomology, meteorology, and geology, in their relation to horticulture and other subjects. A number of prize essays on entomology, which were of great interest and value, were read. The first prize of $50.00 was awarded to the essay of Mr. Dixon; the second, of $25.00, to the paper of a lady entomologist. In this way the society encourages and draws out home talent. The collection of fruit on exhibition was large and fine, there being over 600 plates. He noticed that fully three-fourths of the fruit came from the river counties and a large portion of this was from Clayton county. The collection was made up and arranged with great taste and care. Enough attention is not paid to this matter, for if proper pains were taken our exhibitions would be much more attractive.

President Smith made a brief report of conventions he had attended at Minnesota, Elkhorn, Weyauwega, Richland Center, and other places. Much more work had been done in this direction the past season than ever before, and he had no doubt but that great good would result from them.

Mr. Peffer reported the convention at Janesville of which an account has been previously given.

The revision of the fruit list was then taken up, and a few changes made, which appear in the list as it now stands.

In the afternoon session the rose list was considered, and after some discussion, the entire list, as it now stands, was adopted.

The committee on premium list and rules governing the exhibitions of the Society reported as follows:

PREMIUM LIST FOR THE WINTER EXHIBITION OF THE WISCONSIN STATE HORTICULTURAL SOCIETY.

APPLES.

† Best ten varieties of Winter Apples adapted to Wisconsin	$7 50
Second best	5 00
Third best	3 00
‡ Best five varieties of Winter Apples adapted to Wisconsin	3 00
Second best	2 00
Third best	1 00
Best five varieties of Winter Apples for market purposes	3 00
Second best	2 00
Third best	1 00
Best five varieties of Fall Apples, with written statement of manner of keeping	3 00
Second best	2 00
Third best	1 00
* Best plate Plumb's Cider	1 00
Second best	50
Best plate Haas	1 00
Second best	50
Best plate Fameuse	1 00
Second best	50
Best plate Walbridge	1 00
Second best	50
Best plate Westfield Seek-no-Further	1 00
Second best	50
Best plate Tallman Sweet	1 00
Second best	50
Best plate Golden Russet	1 00
Second best	50
Best plate Willow Twig	1 00
Second best	50
Best plate Wealthy	1 00
Second best	50
Best plate Pewaukee	1 00
Second best	50
Best plate Utter	1 00
Second best	50
Best plate Ben Davis	1 00
Second best	50
Best plate Wolf River	1 00
Second best	50
Best display of Show Apples, not to exceed ten varieties	5 00
Second best	3 00
Third best	2 00
Best exhibition of New Varieties, including Russians, not exceeding ten	3 00
Second best	2 00
Third best	1 00
Best exhibition or show of Seedlings, not to exceed ten varieties	5 00
Second best	3 00
Third best	2 00
Best Local or County Society exhibition	10 00
Second best	7 00
Third best	5 00
Best New Variety	2 00

† By a subsequent vote a fourth premium of $1.00 was added.
‡ By a subsequent vote a fourth premium of fifty cents was added.
* The premiums on single plates were subsequently raised to $2.00 and $1.00, by a vote of the Society.

Best single Winter Variety, Seedling	$3 00
Second best	2 00
Third best	1 00

CRAB APPLES.

Best and greatest display	$2 00
Second best	1 00

PEARS.

Best and greatest display	$2 00
Second best	1 00

GRAPES.

(In good condition for use, with written statement of manner of keeping.)

Best and greatest display	$5 00
Second best	3 00
Third best	2 00
Best plate single variety	1 00
Second best	50

MISCELLANEOUS FRUIT.

Largest and best display of Fruits of all kinds	$7 00
Second best	5 00
Third best	3 00

FLOWERS.

Best exhibition	$3 00
Second best	2 00
Third best	1 00

RULES OF EXHIBITION.

FOR EXHIBITORS.

I. All articles must be entered in the *name of the grower*.

II. All exhibits must be upon the tables by 2 P. M. of the first day of the exhibition, unavoidable delays excepted, properly arranged and labeled, and accompanied with a complete list of the same, by the exhibitor. After that hour no change will be allowed until after passed upon by the Judges.

III. Exhibitors, if requested, must certify to the Judges that the articles were grown by them.

Exhibitors are requested to notify the Superintendents of this department at least one week before the exhibition of the number of plates desired for their exhibits.

The committee on nomenclature will assist in naming fruits if desired. Printed labels will be furnished to exhibitors by the Secretary.

Persons not members of the State Horticultural Society may become exhibitors by the payment of an entry fee of one dollar, to the President or Secretary, at the time of making application. This fee will entitle them to all the rights and privileges of members of the Society for the coming year. Impartial Judges will be appointed at the meeting.

FOR JUDGES.

I. No article can compete in two classes or twice in the same class except in exhibitions made by local societies.

II. Where the premium list specifies the number of each kind necessary to compete, the *exact number* must be presented, *no more, no less*.

III. "Best" shall be understood to include: 1. Adaption; 2. Productiveness; 3. Quality; 4. Size and Color.

IV. Three specimens should go to a plate, except for show displays.

The list and rules proposed by the committee were adopted, after which Mr. Kellogg presented the following:

Your committee recommend that the executive committee of the Society shall continue to use the funds of this Society, as in the past, for the advancement of the horticultural interests of the state by the dissemination of practical knowledge by aiding in local exhibitions, by sending delegates to the conventions of neighboring states, and by holding a December meeting each year, at suitable places, for horticultural discussions and the exhibition of fruit.

The committee appointed to consider the expediency of a change of the time for holding the annual meeting, and a consequent change of the constitution, reported that they deemed it advisable to change the constitution so that Article 2 should read: "Its object shall be the advancement of the art and science of horticulture throughout the state." And Article 5, so that it shall read: "The Society shall hold its annual meeting in the month of December of each year."

Mr. Kellogg moved that the election of officers be held as at present, and that the annual meeting and exhibition be held some time in December. These amendments were carried.

President Smith invited the Society to hold its first December meeting at Green Bay.

As the time assigned for the election of officers had arrived, the president declared that the next order of business.

The committee on nominations reported the following list of officers for the ensuing year:

President — J. M. Smith, of Green Bay.
Vice President — J. C. Plumb, of Milton.
Recording Secretary — William Trelease, of Madison.
Corresponding Secretary — B. S. Hoxie, of Cooksville.
Treasurer — Matt. Anderson, of Cross Plains.

An informal ballot was then taken on the adoption of the report of the committee. Whole number of votes cast, twelve; of which ten were for the adoption of the recommendation.

A vote was taken making the informal ballot formal and unanimous, which was carried, and the list of persons recommended were declared elected as officers of the Society for the ensuing year. The retiring secretary was made an honorary life member.

The committee on nomenclature was appointed as follows: Messrs. Plumb, Peffer and Kellogg.

The committee of observation was appointed as follows:

First District — Rock, Walworth, Jefferson, Racine and Kenosha counties, B. B. Olds.

Second District — Waukesha, Washington, Dodge, and Fond du Lac counties, G. C. Hill.

Third District — Dane, Green, LaFayette, Iowa and Grant counties, B. F. Adams.

Fourth District — Milwaukee county, J. S. Stickney.

Fifth District — Ozaukee, Sheboygan, Manitowoc, Calumet, Kewaunee and Brown counties, Warden Reynolds.

Sixth District — Winnebago, Outagamie, Waushara, Marquette, Green Lake and Adams counties, A. Anderson.

Seventh District — Sauk, Juneau, Monroe, La Crosse, Richland, Vernon and Crawford counties, A. J. Philips.

Eighth District — Jackson, Trempealeau, Buffalo, Pepin, Pierce, St. Croix, Dunn, Eau Claire, Clark, Polk, Burnette, Douglass and Bayfield counties, J. S. Dore.

Ninth District — Wood, Portage, Waupaca, Shawano, Marathon, Lincoln, Oconto and Chippewa counties, William Springer.

The president appointed as committee on resolutions, Messrs. Stone, Hoxie and A. Anderson.

As committee to prepare a separate exhibition list for professional and amateur cultivators, Messrs. Hoxie, Smith and Kellogg.

A paper by Mr. Wakefield, urging the growth of more fruit for home consumption, was then read by the secretary.

Mr. Tuttle said we had originated some good seedlings in

the southern part of the state. The Pewaukee was one. It is of good quality and a late keeper, a good market apple, selling the past season for a much higher price than the Fameuse.

Mr. Springer thought the reason why Waupaca county had brought out more and better seedlings than other portions of the state was because more attention had been paid there to this subject. They had thirty varieties of good quality, some of them very fine; the seeds from which they were raised came from Canada and northern New York. He thought seeds raised in the north gave hardier stock than those from the south.

Mr. Tuttle said it took twenty years to properly test our seedlings, and he would report what he had said in favor of the Pewaukee.

Mr. Peffer said that in our meetings thirty-five years ago he had stated that to get hardy trees we must look to the seedlings, and he was of the same opinion to-day. He was in favor of bringing in Russian varieties, but to get hardy trees and fruit we must raise seedlings. In raising seedlings the question of fertilization is a very important one. The flower must be fertilized of pollen from itself, and the oftener this process of raising seedlings from seedlings, self-fertilized, the hardier and better the stock will be.

Mr. Tuttle remarked that much had been said about the crab-apple stock for hardiness, but he had tested it thoroughly and regarded the crab root theory as a big humbug. His Tetofsky grafted on crab roots had nearly all died when standard trees had done well. On the crab roots it would grow well for six or seven feet, but then died.

Mr. Haskins had tested this theory fully in Vermont and had come to the same conlusion. He said he did not know of one good orchard grafted on crab roots.

Mr. Peffer thought this was largely due to their different characters of growth, and the non-assimilation of sap. In some varieties the character of wood growth is so dissimilar that the union is imperfect and the vitality is impaired; in others it is not so.

Mr. Plumb said he was surprised that any one should

question the relation between hardy seeds from hardy varieties and a hardy stock. It is this kind of stock that we must have to increase the hardiness of our trees. Mr. Patten, of Iowa, had stated to him that we had in Wisconsin varieties that would be more valuable to us and better than any imported varieties we can get. He himself had no doubt but some would prove valuable, but from personal experience he had learned that many of the seedlings which appeared at first very promising were really worthless. It takes over six years to perfectly test a variety.

In response to an inquiry in regard to the value of the Tetofsky, Mr. Peffer said that two trees were enough for any family. The fruit matures a month earlier than the Duchess, earlier, even than the Early Harvest. The tree is hardy and productive, but the fruit is of poor quality and not a profitable market apple.

The motion to adjourn, to allow the exhibitors to appoint judges for the fruit on exhibition, was carried.

FEBRUARY 7, 8:30 A. M.

The Society met in the Fruit Room, in the capitol, President Smith in the chair.

A motion of Mr. Philips to appropriate the sum of fifty dollars from the funds of the Society for the purchase of a present for the retiring secretary, Mr. F. W. Case, as a recognition of his long and faithful services, was carried.

On motion of Mr. Hoxie, Messrs. Stickney, Pilgrim and Hoxie were appointed a committee to make a suitable selection and to transmit it to Mr. Case with a statement of the Society's appreciation of his past services and its regret at losing him as one of its officers.

A committee consisting of Messrs. J. M. Smith, B. S. Hoxie, and G. J. Kellogg was appointed by the chair for the further revision of the premium list for the next annual meeting.

The Society adjourned at 9 A. M., subject to the call of the president.

FEBRUARY 8, 8:30 A. M.

The society assembled in the Fruit Room, at the capitol, pursuant to a call from the president.

On motion of Mr. Phillips, the salary of the recording secretary was fixed at $100 per year, payable quarterly.

The presentation committee reported that by private subscription the sum voted had been increased to $118, which had been put into a gold watch that had been forwarded to Mr. Case.

A resolution of Mr. Kellogg, establishing two premium lists, one for professionals, the other for amateurs, was, on motion, laid on the table.

A motion was carried providing one general premium list for the December fruit meeting of the Society.

On motion of Mr. Plumb, the executive committee were directed to provide for exhibition of our fruit and send delegates to the biennial session of the American Pomological Society, in September next, at Philadelphia.

The president stated that it has been his custom to pay the traveling expenses of ladies who read papers at the conventions of the Society, though he had never been authorized to do so, and asked that the Society take some action with respect to the expenses of lady delegates.

A motion sanctioning the president in his past course, and authorizing him to use his judgment in such matters in the future, was unanimously carried.

On motion of Mr. Stickney the sum of $25 was appropriated as a contingent expense fund for the benefit of President Smith, and a vote of approbation and thanks for his efficient services for the past year, was tendered.

On motion of Mr. Kellogg, Mr. Peffer was instructed to select a small collection of our fruits for the New Orleans exhibition of the Mississippi Valley Horticultural Society the 22d inst.

A motion of Mr. Kellogg, increasing the premiums on the best single plates to $2.00 and $1.00, was carried.

On motion, it was decided to add a fourth premium of $.50 to those already offered for the best five varieties, and a

fourth premium of $1.00 to those now offered for the best ten varieties.

A motion of Mr. Kellogg, to offer a premium of $5.00 for the best single plate of a seedling variety at the next winter meeting, was laid on the table.

The Society adjourned at 9:30, to meet at the same place at 8:30 the following morning.

FEBRUARY 9, 8:30 A. M.

The Society met in the Fruit Room at the capitol, as per adjournment, President Smith in the chair.

The following report of the treasurer was read and referred to the finance committee:

To the Members of the Wisconsin State Horticultural Society:

Your treasurer wishes to report that the receipts and disbursements of the Society for the past year have been as follows:

RECEIPTS.

February 4, 1882.	Balance in treasury	$417	07	.....
February 5, 1882.	Received of F. W. Case, membership.	3	00	.....
February 10, 1882.	Received of F. W. Case, membership	33	00	.....
June 18, 1882.	Received of State Treasurer	500	00	.....
				$953 07

DISBURSEMENTS.

February 6, 1882, to voucher No. 151, expenses of fruit exhibition at Milwaukee	$6	00	.....
February 7, 1882, To voucher No. 152, postage and express charges	7	78	.....
February 9, 1882, To voucher No. 153, premiums for fruit at annual exhibition	100	50	.....
February 9, 1882, To voucher No. 154 incidental expenses of President	25	00	.....
February 9, 1882, To voucher No. 155, on salary of Secretary	50	00	.....
February 9, 1882, To voucher No. 156, M. L. Marsh, services	10	00	.....
February 9, 1882, To voucher No. 157, B. F. Adams, exhibition expenses	3	50	.....
February 9, 1882, To voucher No. 158, entertaining delegates	6	50	.....
February 9, 1882, To voucher No. 159, Mrs. Willard, expenses at annual meeting	7	32	.....
February 10, 1882, To voucher No. 160, entertaining delegates	4	25	.....
February 10, 1882, To voucher No. 161, Mrs. D. Clark, expenses at convention	6	75	.....
February 23, 1882, To draft sent J. M. Smith	75	00	.....
June 22, 1882, To voucher No. 162, on salary of secretary.	30	00	.....
June 22, 1882, To voucher No. 161½, F. W. Case, postage and stationery	10	25	.....

June 22, 1882, To voucher No. 163, premiums at Rosendale meeting	$33 25	.....
June 22, 1882, To voucher No. 164, members' expenses at summer meeting	36 28	.....
July 22, 1882, Paid G. J. Kellogg	13 60	.....
July 22, 1882, Paid E. Wilcox	6 80	.....
November 2, 1882, Paid G. J. Kellogg	8 85	.....
November 16, 1882, Paid voucher No. 165, on salary of secretary	70 00	.....
December 14, 1882, Paid voucher No. 166, F. W. Case, postage	5 00	.....
January 11, 1883, Paid J. C. Plumb	16 75	.....
		$533 38
February 5, 1883, Balance in treasury		$419 69

All of which is respectfully submitted.

M. ANDERSON,
Treasurer.

PREMIUMS AWARDED. The committee chosen to make awards of the premiums offered for fruit on exhibition, reported their decisions, as follows:

Best ten varieties of winter apples adapted to Wisconsin, H. Floyd, Berlin	$7 50
Second best, A. J. Philips, West Salem	5 00
Third best, Charles Hirschinger, Baraboo	3 00
Best five varieties of winter apples adapted to Wisconsin, Charles Hirschinger, Baraboo	3 00
Second best, A. J. Philips, West Salem	2 00
Third best, W. A. Springer, Weyauwega	1 00
Best five varieties of winter apples for market purposes, H. Floyd, Berlin	3 00
Second best, A. J. Philips, West Salem	2 00
Third best, Charles Hirschinger, Baraboo	1 00
Best five varieties fall apples, with written statement of manner of keeping, A. J. Philips, West Salem	3 00
Second best, Charles Hirschinger, Baraboo	2 00
Third best, Wm. Reid, North Prairie	1 00
Best plate Plumb's Cider, A. J. Philips, West Salem	1 00
Second best, Geo. P. Peffer, Pewaukee	50
Best plate Haas, Charles Hirschinger, Baraboo	1 00
Second best, A. J. Philips, West Salem	50
Best plate Fameuse, H. Floyd, Berlin	1 00
Second best, Charles Hirschinger, Baraboo	50
Best plate Walbridge, A. J. Philips, West Salem	1 00
Second best, W. A. Springer, Weyauwega	50
Best plate Westfield Seek-no-Further, H. Floyd, Berlin	1 00
Second best, W. A. Springer, Weyauwega	50
Best plate Talman Sweet, H. Floyd, Berlin	1 00
Second best, Charles Hirschinger, Baraboo	50
Best plate Golden Russet, George Jeffry, Milwaukee	1 00
Second best, Charles Hirschinger, Baraboo	50
Best plate Willow Twig, Charles Hirschinger, Baraboo	1 00
Second best, A. J. Philips, West Salem	50
Best plate Wealthy, A. J. Philips, West Salem	1 00
Second best, Geo. P. Peffer, Pewaukee	50

Best plate Pewaukee, H. Floyd, Berlin	$1 00
Sec nd Best, F. D. Libby, Madison	50
Best plate Utter. A. J. Philips, West Salem	1 00
Second best, Geo. P. Peffer, Pewaukee	50
Best plate Ben Davis, Geo. Jeffry, Milwaukee	1 00
Second best, Charles Hirschinger, Baraboo	50
Best display of Show Apples, not to exceed ten varieties, A. J. Philips, West Salem	5 00
Second best, Charles Hirschinger, Baraboo	3 00
Third best, Wm. Reid, North Prairie	2 00
Best exhibition of new varieties, not exceeding ten, E. Weightman, Weyauwega	3 00
Second best, W. A. Springer, Weyauwega	2 00
Third best, A. J. Philips, West Salem	1 00
Best new variety, W. A. Springer, Weyauwega	2 00
Best single winter variety, seedling, Geo. J. Kellogg, Janesville	3 00
Second best, A. J. Philips, West Salem	2 00
Third best, Geo. Jeffery, Milwaukee	1 00
Best and greatest display of crab apples, A. J. Philips, West Salem	2 00
Second best, George P. Peffer, Pewaukee	1 00
Best and greatest display of pears, George Jeffrey, Milwaukee	2 00
Second best, Geo. P. Peffer, Pewaukee	1 00
An additional first premium was recommended on a display of pears received too late for entry from C. B. Dawley, Plymouth	2 00
Best and greatest display of grapes, Wm. Reid, North Prairie	5 00
Second best, Geo. J. Kellogg, Janesville	3 00
As there were but two displays no third award was made.	
Best plate, single variety, Wm. Reid, North Prairie	1 00
Second best, Geo. J. Kellogg, Janesville	50
Largest and best display of fruits of all kinds, Wm. Reid, North Prairie	7 00
Second best, Charles Hirschinger, Baraboo	5 00
Third best, A. J. Philips, West Salem	3 00

Your committee find a very fine collection of apples and pears from C. B. Dawley, Plymouth, which came too late for entry. We have recommended a special first premium on the pears.

There was also a fine show of apples (13 varieties) from John Parkinson, Sun Prairie, as well as specimen fruit and wood of the Salome apple from E. C. Hathaway, Ottawa, Ill.; three fine varieties of seedlings from G. W. Cairns, Ellsworth, and seven varieties of good seedlings from Samuel Hunt, Evansville.

J. S. STICKNEY,
SAMUEL HUNT,
A. G. TUTTLE,
Committee.

The report was accepted.

Mr. Plumb announced the death of Arthur Bryant, Sr., and tendered the following resolutions:

WHEREAS, In the recent decease of Arthur Bryant, Sr., we recognize the loss to the state of Illinois and to the whole country, of an ardent and progressive horticulturist, a very father in the pomology and forestry of the West.

Resolved, That we hereby tender our sympathy to our mutual friend Arthur Bryant, Jr., of Princeton, Illinois, and the family friends of the deceased.

On motion, the resolutions were adopted, and the secretary was directed to record them and transmit a copy to the family of the deceased.

A motion authorizing the president to pay any small expenses incident to Mr. Peffer's display of Society fruit at the New Orleans meeting of the Mississippi Valley Horticultural Society, was carried.

Mr. Adams reported that the expenses of the fruit exhibit at the annual meeting amounted to eleven dollars.

On motion of Mr. Kellogg, an appropriation of eleven dollars to cover these expenses was made.

The Society adjourned at 9:15 A. M., subject to call.

FEBRUARY 9, 9:30 A. M.

A special business meeting was called in the Fruit Room at the Capitol, President Smith in the chair.

The Finance Committee reported the treasurer's account as correct. The report was accepted and the committee discharged.

Mr. E. G. Partridge, having attended the meeting and read a paper, with the understanding that his railroad expenses would be paid by the society, it was moved by Mr. Kellogg that an appropriation of $11.46 be made for this purpose.

After some discussion the motion was carried, although it has not been the custom of the Society to pay the expenses of members in attendance on our conventions, and it was not intended that this should serve as a precedent for future action.

On motion the sum of —— was appropriated to pay the traveling expenses of Mr. H. J. De Vry; and a sum of —— was appropriated for the expenses of Prof. W. J. Beal, both of whom had attended the convention with the understanding that their expenses would be met by the Society.

The Society adjourned at 10 A. M.

REPORTS OF COMMITTEES ON OBSERVATION.

SECOND DISTRICT — GEO. J. KEELOGG, JANESVILLE.

As is known to all, the winter of 1881–82 was very mild and favorable to the wintering of trees, shrubs and vines.

The coldest weather indicated by the thermometer in December, 1881, was: December 10th, 8°; 15th, 8°; 30th, 5°; 31st, zero.

January, 1882: Eight mornings below zero; coldest, 17th, 16° below; the aggregate for the eight days below zero, one observation daily, was 60° While the twenty-two days below zero in January, 1881, aggregated 292°, the coldest being January 10, 35° below — note the contrast.

February, 1882, had only two days (February 22d, 1°; 23d, zero) at zero or below, while 1881 had nine days below, which aggregated 86°.

The difference between the two winters will be better understood by contrasting the fifty-two days below zero of 1880–1881 aggregating 606° below zero, with the eleven days below zero of 1881–1882, aggregating 61° below zero. 1881–1882 reminds us of the winter of the mud blockade of 1877–1878, when there were only five days below zero, aggregating 24°.

The hot sunshine of our winter days, however agreeable to man and beast, is not enjoyed by our tender shrubs and fruits. Where the thermometer varies 75° in twenty-four hours it causes mischief. But few realize that a bright winter will take the thermometer up to 75°— 90° in the middle of the day, to be followed by hard freezing at night; this so often repeated is the great cause of winter-killing, and, while it does not affect fruit trees, raspberries often kill back badly with an open winter.

In February, 1882, the thermometer in the sun stood for eleven days from 75° to 100° during the hottest of the day.

In March following, for nine days it stood at from 82° to 102°.

In April, for eighteen days it was from 75° to 100°; while fourteen mornings of the same month gave ice, and on the 12th the ground was frozen so deep that the frost did not get out till after noon.

May gave eight icy mornings, the last being the 25th, while the 29th was frosty. June gave us frost on the 1st and 5th. The frosts of May 15th, 16th and 17th found the native plums out in bloom and just in the condition to take the full benefit; the cherries were three-fourths in bloom, but the blossom is not so easily injured. May 23d, ice formed; there was a light breeze, and the sky was cloudy, the sun shining out at 6 A. M.

May 25th, ice formed, with the wind south all night; there was a heavy white frost, but a fog and mist coming up at 4 A. M., so heavy that the trees were dripping wet and the sun did not shine forth till 7:30 A. M., thus saving much of the bloom of apples and strawberries which came out after the 23d.

The cold rain with north winds of May 27th to 31st inclusive, with frosts June 1st and 5th, would seem enough to blight all the hopes of the Horticulturist; and yet in most of the southern part of the state we had too heavy a burden of apples, one-fourth to one-half a crop of strawberries, no plums, three-fourths a crop of cherries and black and red raspberries, and an over crop of blackberries, with a very abundant set of grapes.

The wild crab apple blossoms fell June 4th. The first eggs of the potato beetle June 8th. June 9th I commenced spraying the orchard with London purple, one teaspoonful to a pail of water, hoping thus to destroy the codling moth eggs and the work of the apple gouger; the apples were a little larger than a pea; at this time the currant worm put in his appearance, and the 7th, 8th and 9th were about the first nights that the moths seemed to have a good time, and the 13th of June gave the first and only a few May beetles.

I continued the application of London Purple, one pound to eighty gallons of water, up to June 15th; in some places the poison burned the foliage. I then applied arsenic, one teaspoonful to two pails of water on certain trees; this burned the leaves, and in no case did I see any diminution of the codling moth or apple gouger. I am inclined to believe that spraying should be done just after the blossoms fall; and then I think the horticulturists of western New York will have to recommend something more effectual.

The first wild strawberries appeared June 11th; the first cultivated strawberries appeared June 17th, eighteen days later than in 1881.

The leaf and twig blight made its appearance about the 10th of June, and so severe was it that very much of the foliage of the apple was lost, and thereby caused great mildew and the loss of nearly one-half the set of fruit.

The large blackberry crop commenced ripening with the Dewberry in July; Snyder, August 4th to September 2d; Stone's Hardy, August 18th to October 4th.

The cool nights of August 9th, 10th and 11th, the thermometer falling to forty-three degrees, seemed to develop the potato rot and grape mildew. All potatoes suffered rot that had not ripened their tubers; but early varieties that were not planted late, very generally escaped, while every late variety lost from one-fourth to three-fourths, and in some cases the entire crop. Light soils suffered least, and heavy soils and those most highly enriched suffered most. The grape suffered very badly, according to soil and variety; all the hybrids and everything that had not the healthy leaf of the Concords mildewed and dropped the foliage and left the fruit immature. In some cases the Concord with wet feet lost all its fruit. All varieties that partake of the Concord leaf usually escaped and gave a fine crop of fruit, though late in maturing. It was feared the frosts of September 21st to 25th inclusive, would have damaged the crop, but the warm weather which lasted till October 17th, gave us a fair, remunerative crop of grapes.

The apple crop, owing to insects, blights and mildew, was quite imperfect, yet those who carefully picked in season and handled with care received about $1.00 per bushel for select fruit of very early and for winter varieties. In the flush of fall fruit many shiftless farmers shook and knocked off their winter fruit, taking it to market in bags in lumber wagons and sold for 40c, when the same fruit properly handled would have brought $1.00 per bushel. I had application to ship apples the past season to southern Michigan.

From the observations of the past we may learn that well directed efforts, with favorable locations, few and choice

varieties will pay, although it may take a good deal of common sense and a wagon load of grit to surmount some of the difficulties. Though the seasons are very unfavorable, if we do our part well, seed time and harvest will not fail.

Each succeeding warm or cold winter has its lessons.

For the present outlook for 1883, we expect death among the apple trees, with a good crop of most of the hardy varieties, no crop of cherries, a heavy crop of strawberries, two-third crop of raspberries, a light crop of blackberries, and a full crop of grapes where the vines have been properly protected.

Touching the circular and questions sent out by your corresponding and recording secretaries, I should think they were going to compile a patent office report. If their questions were widely diffused and properly answered the matter would make a quarto volume of 1,000 pages. Horticulture has received no great impetus for years in this section. There are many who are filling up old orchards and a few planting new. Occasionally an amateur is putting out fancy and tender varieties and giving them proper care and protection. As an instance of this, D. P. Smith, of Janesville, has planted a choice selection of peaches, is training them on a trellis, has them all nicely tucked under for the winter, and expects fruit the coming season.

Many city residents are planting evergreen hedges, and are ornamenting their grounds; occasionally a farmer has surrounded his orchard and buildings with evergreen wind-breaks and screens. As an instance of this I mention H. Tarrant, of La Prairie, who has a large orchard surrounded by evergreens ten to fifteen feet high, which is a success, and the evergreens are an ornament and comfort when the planter shall be no more.

The following letter from Mr. Tarrant will explain the manner in which his orchard is protected by wind-breaks of evergreen trees:

LA PRAIRIE, February 3, 1883.

BRO. KELLOGG — Your letter is received, but rather too late to be of service to you. I will give you the information as near as I can ascertain. I have about a thousand fruit trees, of which number nine hundred are apple trees, and the balance cherry and plum trees. During the past season

I raised two hundred and fifty bushels of apples. My wind-break is composed of evergreens, set two to the rod. There are four hundred rods of evergreens, from nine to twenty feet in height, though for the most part they measure twenty feet in height. On one street there is a mile, lacking forty rods, of shade trees; on the other street there is a half-mile of shade trees, and a hundred rods of evergreen and catalpa trees. All the shade trees are a rod apart. I have received programmes for the meeting next week, and, though I should very much like to attend, I hardly expect to be present.

I am yours respectfully,

H. TARRANT.

I know of another ten acres with Norway spruce, four feet apart on one end and one side, and six feet apart on the the other side, and another row across near one end. I think the owner ten years hence would want $10 each for any of those trees.

The demand for small fruits is increasing year after year, and the tons of strawberries annually shipped into our small towns is astonishing.

Occasionally we find a planter with a few acres engaged in this business, but when one firm in our inland cities handles 500 bushels in a season, who is going to supply the demand? Why let Michigan ship in millions of bushels every season just at the time when our strawberries are ripe? If Michigan growers can pay expenses 200 miles and make money, why not our farmers and gardeners, and save that expense and largely grow berries for their own use and market. The most important question asked by your secretary is in regard to the "Injury caused by Insects."

If we could exterminate the codling moth, apple gouger, canker worms, curculios, tree borers, leaf rollers, caterpillars, bugs, worms and slugs, in number one million and one, we would turn our attention to the blights and mildew. I know of no better remedies against the first than the stock at large in the orchard — hand picking for the second, spraying the trees for all foliage-eating insects, as strong as the leaves will bear. If you win you must fight.

The most profitable apples are Duchess and Duchess of Oldenburg, and Wealthy, Fameuse, Pewaukee, Golden Russets and Willow Twig — the most profitable of most the other kinds will be the trees that never leave out.

Of pears this is doubly true of all varieties; of plums, true of all but De Soto; of cherries, nothing but Early Richmond, Late English Morello and Kentish Fill Basket or Red English. Of grapes the most successful are those varieties which approach nearest in leaf to the Concord and Worden type. Of strawberries if I could have but two kinds for profit, I think with my limited experience it would be Crescent and Bidwell. Of raspberries, Graff and Cuthbert; of blackberries, Snyder and Stone's Hardy; of currants, that kind the worm does not like.

FIFTH DISTRICT — H. FLOYD, BERLIN.

COUNTIES — *Green Lake, Waushara, Marquette and Winnebago.* — In portions of this district a greatly increased attention and interest is manifest in regard to general horticulture, but is especially so in regard to small fruits. This condition of things is being brought about by the introduction of new and improved varieties. Also, modes and methods of culture, protection, etc., are better understood now by the masses than at any former time, insuring greater success in results, as also a desire to supply their tables with fresh, ripe, luscious fruits of the seasons.

Oshkosh and vicinity is noted for its fine grapes and strawberries, but, probably the low, undrained country northwest, west, and southwest of Oshkosh, covering more than one-half of Winnebago county, is the cause of the almost total destruction of the apple and pear orchards of this section.

In my report of last year, I estimated a very heavy loss of trees from insect depredations, caused by the tent caterpillar and canker worms. In all of this affected territory north of the Fox river, with but few exceptions, the orchards were barren of fruit during the past season, and not over fifty per cent. of the trees bore leaves, none showing vigor or making much wood.

The tent caterpillar appeared in great numbers last May, but before attaining much size or doing much harm, they were overtaken by some wholesale destroyer and nearly annihilated. The canker worm did not appear in great numbers in any part of the district, hence did no damage to fruit trees.

All the orchards in Green Lake county, and a portion of Winnebago adjoining, were heavily loaded with fruit of superior quality. This part of the district is naturally well drained. and has all the varieties of aspect which obtain from gently rolling surface to low bluffs. The soil is burr oak and prairie.

The varieties of strawberries cultivated are, Wilson, Charles Downing, Sharpless, Crescent, Minor's Great Prolific, Kentucky, and some others; of these varieties with common culture, Wilson still holds the lead for quantity of fruit, with but one exception that I have heard of, where the Crescent beat it one and a half to one when growing side by side. With me the Crescent has been almost a total failure, but it is probably due to want of fertilization.

Raspberries are being planted more than ever. Varieties are Philadelphia, Turner, Doolittle, Seneca, Mammoth Cluster, Purple Cane. The latter and Turner are the most hardy. Turner stands at the head of all varieties tested here for hardiness and productiveness, as well as quantity of fruit. Mammoth Cluster is not hardy enough to stand our coldest winter.

Blackberries are being planted quite largely and with great profit. Ancient Briton is almost the only variety cultivated. When laid down and covered for winter protection and planted on ground not affected by drought it has produced over five hundred bushels per acre. In this case the vines were three by four feet apart. Large planters prefer to plant three by eight feet, to support the canes by stretching a wire on each side of the row inside of stakes driven firmly into the ground. Strings tied across from wire to wire hold the plant in an upright position. All varieties of blackberry should have winter protection, as well as a grape vine; this is so easily done, and the yield will be so much greater, that the labor of covering will pay larger profits than any employed in the growing of this berry. When planting, set the plant so that the roots will run out at nearly right angles with the row, then by lifting the soil on the inside of the plant to a point a little below the roots, the canes may be pushed over with a four or six-tined fork

and held in place while an assistant lays on soil enough to hold them in place, after which plow around each row two or three times, and the work of covering is easily finished by hoeing or shoveling the loose dirt upon the plants.

Quite a large number of varieties of grapes are grown about Oshkosh and the vicinity of Lake Winnebago, also in some other favored localities; but the grape for a reliable crop in all parts of this district must be earlier than Concord or Delaware, and should be better than Janesville. The Worden comes nearest to requirements of any variety that I know. Its fault is a habit of dropping berries from the cluster like all other seedlings of the Concord.

Cranberries are grown in the southeastern part of Waushara county, in the towns of Aurora and Warren. Nearly two thousand acres of vines are now standing on the marshes in these towns, but are generally poorly cultivated, as the yield conclusively shows. Insects, summer and early fall frosts are the great drawbacks to cranberry culture. He who can manage a marsh so as to steer clear of these obstacles, will be counted a successful cultivator. Any less than twenty thousand barrels of fruit for this locality is counted a failure of the crop.

The apple crop of 1882, over a small portion of this district, was not only large but very fine in quality, and also profitable. Fameuse, Golden Russet, Westfield Seek-no-Further, and Grimes' Golden outdid themselves in quantity and quality of fruit. Varieties cultivated are Tetofsky, Red Astrachan, Duchess of Oldenburg, Lowell, Sops of Wine, Fall Harvey, Fall Orange, St. Lawrence, Alexander, Utter, Plumb's Cider, Fameuse, Perry Russet, Baltimore, Grimes' Golden, Pewaukee, Walbridge, Blue Pearmain, Westfield Seek-no-Further, Willow Twig, Sweet Pear, Baily Sweet, Talman Sweet, Golden Russet, and a few of a number of other varieties.

Transcendent is nearly ruined by blight; Talman Sweet and Golden Russet hurt to some extent; mildew dwarfed Sweet Pear and Walbridge so that they were only used for grinding or feeding stock. Walbridge under any conditions is too small for a market variety. I regard the Olden-

burg as the most profitable fall variety, where the entire crop can be utilized; and Grimes' Golden as my best and most profitable winter variety; it is the best variety to work on to the Transcendent that I have ever found. The next best varieties I will name in order of merit as I have tested them: Fameuse, Westfield Seek-no-Further, Baltimore, Pewaukee and Blue Pearmain; these are the red varieties, please the eye, and sell well. Wealthy is a new variety, very hardy, rapid grower, early and heavy bearer, of large, handsome fruit; I wish it might have been a winter variety. Northwestern Greening, another new variety of great promise, a long keeping, large, smooth, handsome apple of excellent quality, is being introduced by E. W. Daniels, of Aurora, Wisconsin.

NINTH DISTRICT — A. J. PHILIPS, WEST SALEM.

COUNTIES — *La Crosse, Trempealeau, Jackson, Buffalo, and valleys of Chippewa and St. Croix.* — As no written report was made by your observer for the year 1881, this report will give some items for the year 1881–82. The winter of 1880–81 was very cold; trees grew late in the fall of 1880, and it was very evident in the spring of '81 that apple trees would have all they could do to recover their lost forces during the summer without bearing fruit. But, on looking around in the fall, I found Whiting No. 20, Orange, and Transcendent crabs bearing fair crops; found Wealthy, Duchess, and Utter bearing light crops, but fruit smaller than usual; found Fall Orange bearing in some quite unfavorable places; Fameuse exhausted, but so far recovering as to be bearing some fruit; Ben. Davis, Rawle's Janet, Jonathan and Red June had in most places been numbered with the things that were; Pewaukee bearing only on high land; Walbridge looking fine, but bearing no fruit, from which I conclude that the fruit buds of that tree are not sufficiently protected to endure a very cold winter; I found some seedlings on my own grounds and some in other parts of the district hanging on and bearing some fruit. The trees so far recovered that after the mild winter of 1881–82, the crop of fruit would have been very great had it not been for a hard frost about the 20th of May, which destroyed nearly all the blossoms on the low lands, but when fall came, it was found that

on the high lands the crop of fruit was good and of fine quality.

I found in my travels this winter that the Talman Sweet is staying with the people better than any other variety; in fact I have found several old orchards in this district where they are the only trees left, and are still bearing fruit. Fameuse has more friends than any one of the old varieties; Wealthy and Duchess are coming into favor as they begin to bear. I have found one orchard that the present owner set twenty-three years ago, and carried his trees on his back thirty-five miles in one day. He pointed out a single Fameuse tree that had, since it came into bearing, paid for all the trouble and expense of his entire orchard. I found a seedling, which the present owner transplanted in 1852, that has borne as high as thirty bushels in a single year. It is a small winter apple. The tree is over fifteen inches through, growing on rich soil a little higher than the lowest land in the valley; the wood resembles the Orange crab. Have received from Uncle Wilcox reports from several orchards in Trempealeau county which are proving themselves to be profitable. One in particular, W. Johnson's, near Galesville, contains five hundred trees set in 1872; the vacant places are kept filled. For the crop of 1882 the cash receipts were over five hundred dollars; this crop, the owner estimates, pays for trees, all work, rent of land, etc., to say nothing of the former smaller crops it has produced. I saw some very fine fruit last fall grown in Monroe county, on the high ridge lands, also some good fruit grown in Jackson county, but as a rule the chances for growing apples in that county are not as good as in some others. Observation in this part of the state will soon convince the most skeptical that, by planting the high oak ridge lands with apple trees of the right varieties, it will be but a few years before this part of Wisconsin will produce a large amount of fine fruit. The weather this winter up to this time, especially through January, has been very cold, as low as 40° in many places, but trees ripened their wood last fall so well that, while many are predicting injury, I have so far no fears of the trees on the high lands; but we can judge better next sum-

mer. As our time is limited for our horticultural papers, I will draw this report to a close, and leave the report on small fruits for next year, when I hope a man more conversant with and interested in that class of fruits will be selected as reporter.

REPORT OF GRAND CHUTE HORTICULTURAL SOCIETY.

This society has held four meetings the past year. The average attendance has been larger than ever before. The experience of the members in the different branches of horticulture has been much the same as in former years; success and failure, disappointment and gratification have been strangely intermingled. Some orchards have borne heavily, while others in the same locality have yielded but little fruit, none for winter use, and many of our best and hardiest trees died last winter. Tallman and Fameuse, which had borne well for some years, which had been considered healthy trees, were found dead last spring.

The war with the tent caterpillar still continues, but they are diminishing in numbers, and by great vigilance in destroying the eggs and young worms, we hope to conquer this destructive enemy of our orchards.

Nearly all our members are growing small fruits. Some have had very gratifying success, while others have failed.

As we take a retrospective view of the year, the lesson is apparent that fruit-growing in northern Wisconsin is more a matter of skill than of soil or climate. Trees will live, with proper care, till they have borne enough fruit to compensate for the labor given them; if they die, more trees must be set; if strawberries winter-kill, another bed must be planted; this is a warfare in which we shall never give over.

The interest in floriculture is not diminishing; although the culture of flowers in country homes is attended with many difficulties, nearly every dwelling has its flower-bed by the door or flowers in the window.

Another evidence of the increasing interest in floriculture is the great demand for plants and cut-flowers. The green-

house in Riverside cemetery, erected two years since, has received immense patronage; within the last year two new buildings have been erected to supply the demand.

Apart from the benefits received from imparting and receiving instruction on horticultural subjects, the social features of this organization have been a source of much pleasure.

One of the most delightful occasions in the history of the society was an excursion to Depere and Green Bay, and a visit to the garden of J. M. Smith, president of the State Horticultural Society, on the first of July, 1882. The day was one that will long be rembered by all present.

The annual meeting was held January 13.

The exhibition of fruits and flowers was one of the best ever made by this society.

The following officers were elected for the ensuing year: L. L. Randall, president; Mrs. D. Huntley, secretary; A. H. Brush, treasurer.

MRS. D. HUNTLEY,
Secretary.

REPORT OF THE JANESVILLE HORTICULTURAL SOCIETY.

There bas been but little change since the last report of this society. Meetings have been held during the year.

The Janesville Horticultural Society had charge of the fruit and floral department at the last fair of the Rock County Agricultural Society, and made a fine show of fruit and flowers.

November 10th, 1882, the society held a meeting for the purpose of organizing a county horticultural society, and if successful, to merge the Janesville society into same. The project seemed to meet with favor, and the secretary was instructed to call a meeting for such purpose. Circulars were sent to all interested through the county, and at the time, November 25, quite a number had gathered at the council rooms at Janesville. The meeting was called to order by F. G. Lawrence, president of the city society, in

the chair. Committees were appointed on permanent organization of a county society, etc. Mr. G. D. Peffer, of Pewaukee, gave an interesting paper on "Grapes," showing the causes of their failure to ripen this year; also some valuable points on pruning, which he illustrated. W. S. Follensbee, of Janesville, showed grape from a raisin grape, fruited the first year three bunches, the second year twenty pounds, and the third year twenty-six pounds.

Mr. F. W. Case, secretary of the Wisconsin State Society, gave some remarks on blight and mildew, and their prevention.

Considerable interest being taken, it was decided to hold an evening session, which was held and well attended.

December 2d, a meeting was held at the court house. By-laws presented and general business transacted, and adjourned, to meet at the court house January 9th, 1883.

This meeting was not largely attended and no business was transacted.

January 22, 1883, a meeting of the Janesville society was called and met. The question of county society was brought up and it was decided that, owing to the lack of interest, the matter would be deferred until some future time, and the city society elect officers, etc.

The election of officers resulted, viz.:

President — F. S. Lawrence.
Vice-President — George J. Kellogg.
Secretary — E. B. Heimstreet.
Treasurer — J. B. Whiting.
Executive Committee — B. Spence, J. J. R. Pease, D. E. Fifield, James Helms, A. D. Wickam, O. P. Robinson.

The treasurer reported one hundred dollars in the treasury, and he was instructed to invest the same.

F. S. Lawrence and George J. Kellogg were elected delegates to the State Society.

Our society now has a membership of fifty-two life and honorary members.

E. B. HEIMSTREET,
Secretary.

REPORT OF THE NORTHWESTERN HORTICULTURAL SOCIETY.

This society, organized in 1879, and including La Crosse county and the southern part of Minnesota, reports as follows on two of its meetings:

The first quarterly meeting of its fourth year was held in Temperance Hall, La Crosse, December 4th, 1882.

A general discussion upon the best method to adopt for the future maintenance and advancement of the society, occupied the entire morning session.

On reconvening at 2 P. M., E. A. Wilcox read an essay upon the pickling, canning and evaporating industry of the country. The great and increasing popularity of this line of business and the profits yielded wherever it was judiciously established, were pointed out, and La Crosse capitalists were advised to invest in a home enterprise of this description, rather than the more uncertain ventures, such as mining.

In a discussion of grape culture, which followed, the Concord and Delaware were by general consent accorded the preference for general cultivation in this climate, under which they prove both hardy and prolific.

J. S. Harris then produced a bunch of canes, of several varieties, with which he illustrated the right and wrong way of pruning, the results of different methods being explained in detail.

After a long debate, in which several of our most prominent members took part, the society proceeded to the election of the following officers for the next year, viz.:

President — J. S. Harris.
First Vice-President — Mrs. W. P. Powers.
Second Vice-President — S. A. Salser.
Third Vice-President — A. J. Philips.
Secretary — M. H. Cram.
Treasurer — Emil Wilcox.
Executive Committee — E. A. Wilcox, S. A. Salser and L. W. Alger.
Delegate to State Horticultural Society — A. J. Philips, with power of substitution.

Adjourned.

M. H. CRAM,
Secretary.

MEETING OF MARCH 16, 1883.

For the committee on fruit, Mr. J. S. Hosmer stated that the valley fruit crop of 1882 was a partial failure, being injured by late frosts, but the crop on the surrounding high land was very good, both as to quantity and quality.

Mr. Wilcox said frost had killed most of his apples in the valley, but on the bluffs the crop is good. He gave reports from many fruit growers, showing that some had cleared the expense of attending a large orchard, from two trees alone.

Mr. Wilcox exhibited limbs taken from his orchard, which show but little injury from the past severe winter. The damage to apple trees is principally confined to the tops of the branches, the Utter and the Walbridge suffering worst.

The speaker then exhibited a new variety of plum, called Moore's Arctic, brought from New Brunswick, which has thrived and borne remarkably well in this climate.

Mr. J. S. Harris reported considerable damage to late planted orchards in Ohio.

Mr. J. C. Kramer, of La Crescent, reported his side hill orchard as doing well. He also reported successful grafting of plum trees by what is known as whip grafting, a process not generally looked upon as expedient.

Mr. Kerringer, of Cleveland, Ohio, made some very interesting remarks on fruit culture.

A large attendance marked the afternoon session. Mrs. Tilson read a poem written by Mrs. M. M. Manville, which was heartily appreciated.

The report of Mr. A. J. Philips, delegate to the State Society, was read by the secretary. A letter was read from Mr. Oliver Gibbs, of Lake City, regretting his inability to be present.

The following committees were appointed:

Flowers—Mrs. W. W. Webb, Mrs. Holmes.

Strawberries—Messrs. Markle, Kramer and Quackenbush.

Insects—Dr. Renggley, Mrs. Tilson, J. S. Harris.

Fruit—A. J. Philips, J. Van Loon, J. F. Hosmer, E. Wilcox, J. C. Kramer, S. S. Luce, L. Pammel.

Mr. J. S. Harris then continued his paper on grape pruning, a subject which was commenced at the last meeting, after which some time was taken up in discussing the pickling and canning industry. Messrs. Wilcox, Hosmer and Calvert being appointed a committee to investigate and report on this subject.

Mr. William Frazier, of Vernon county, gave an interesting account of his experience in manufacturing sugar from cane, and exhibited granulated samples.

Mr. F. H. Raynor, of Enterprise, Vernon county, related his experience in fruit growing, stating that the Duchess was his favorite among apples for the early market, and the Haas for a late variety.

Mr. Charles Linse gave his experience, as far as it had gone, with the silo, but up to the present time he was unable to give figures.

The afternoon session closed with a discussion on grape culture.

In the evening Mr. Wilcox said that he had made some experiments in preserving apples in hard plaster, but without unusual results.

The June meeting was then adverted to, and the executive committee was authorized, if it thought desirable, to prepare a festival at that time.

A paper on "Flowers" was read by Miss Belle Mars, following which Miss Ida Tilson read a paper on "Northern and Southern Homes," which was warmly applauded.

This session of the Horticultural Society was one of the most interesting and important that has ever been held in the city. Fine collections of plants and flowers were exhibited by Messrs. Salzer and Keenah, the florists, and the well known fruit growers mentioned in the minutes of the meeting exhibited many varieties of apples. Specimens of sorghum sugar, flowers and fruit, both canned and preserved, were also brought in by various persons. The June meeting will be unusually interesting, and the ladies of La Crosse, who are interested in the culture of flowers and house plants, and in gardening, will find the discussions not only interesting but profitable. The members of the society are greatly

encouraged. A vote of thanks was extended to Mrs. Manville, Miss Tilson and Miss Abby T. Madocks for papers and gifts, Miss Madocks having exhibited some fine paintings of flowers. The thanks of the society were also extended to Mr. E. Wilcox for premiums collected by him and turned over to the treasury of the society.

M. H. CRAM,
Secretary.

REPORT OF THE EXCELSIOR FARMERS' CLUB AND HORTICULTURAL SOCIETY, SAUK COUNTY.

The above named society was organized January third, 1883, as the Excelsior Farmers' Club, but as the members are largely interested in fruit culture, and the discussions of the society have been mainly horticultural, it was decided at one of the regular meetings which have been held semi-monthly through the winter, to change the name of the society to its present one, thus indicating more fully the scope of our work and strengthening our organization through connection with the State Horticultural Society. At the annual meeting of the society, on the first Wednesday in January, the following officers were elected:

President — John Foster, Ableman.
Vice-President — A. B. Case, Baraboo.
Secretary — Wm. Toole, North Freedom.
Treasurer — Mrs. Albert Britton, Ableman.
Executive Committee — Alex. Toole, P. Stackman and J. Odell, all of North Freedom.

The best situations for apples in this locality have been sufficiently favorable to encourage hopes of extensive planting in the future.

J. Foster, who has the largest orchard, shipped, of the crop of 1882, upwards of 900 barrels, in addition to manufacturing a considerable quantity of vinegar.

The northwest is looked to principally as a market for apples and cider. Picking fall varieties a little in advance of ripeness, gives the dealer an opportunity to dispose of them without loss from rotting. Carefully selecting only the best specimens for shipping, and making inferior fruit into vinegar has proved most profitable.

A liberal supply of small fruits for farmers' use was advocated, and the experience of members has shown that its provision generally results in a surplus profitably disposed of in the market.

None of the newer varieties of strawberries have been tested in this neighborhood. Of the older kinds the following have a preference: Crescent with Wilson, Chas. Downing, Kentucky, Green's Prolific. Some growers choose Boyden's No. 30 for its flavor.

The Gregg raspberry will be largely planted the coming season. Grapes have not yet been considered at our meetings.

At the last meeting of the society, previous to the present time of writing (March 26th), votes were cast by different members present for choice of varieties of apples for profit. The following are the names of varieties receiving votes with the number cast for each:

Duchess	10
Fall Orange	5
Talman Sweet	3
Wealthy	1
Plumb's Cider	11
Willow Twig	10
Golden Russet	2
Utter	1
Fameuse	5
Pewaukee	12
St. Lawrence	4

Only twelve of the members present voted on this list, all protesting against the idea of limiting even a commercial orchard in this vicinity to but five varieties. A general opinion was expressed in favor of including all of the above list with Westfield Seek-no-Further included, for profit. For home use the following varieties were added: Red Astrachan, Tetofsky, Drap D'Or, Pomme Gris, Russet, Red Romanite, and in favorable localities, Sops of Wine and Early Joe.

The experience with pears has not warranted extensive planting. One member thinks he will venture planting a pear orchard, having an elevated location with soil which he considers peculiarly adapted to this fruit.

The present membership of the society numbers about thirty-four, including nearly as many ladies as gentlemen, and representing fourteen families.

WM. TOOLE,
Secretary.

REPORT OF THE FREEDOM HORTICULTURAL SOCIETY.

The annual meeting of the Freedom Horticultural Society, held January 16th, 1883, the following officers were chosen:

President — Chas. Herschinger, Baraboo.
Vice-President — W. C. T. Newell, North Freedom.
Treasurer — Geo. Armbuster, Baraboo.
Secretary — Geo. Faller, Baraboo.
Executive Committee — J. M. Haines, North Freedom; J. M. Blachley, North Freedom; J. B. Ashley, North Freedom.
Delegate to State Convention — Chas. Herschinger, Baraboo.

GEO. FALLER,
Secretary.

MARKET GARDENING.

Address of President J. M. SMITH.

Mr. President, Ladies and Gentlemen: When I was invited to deliver an address before you upon the aboved named subject, I suppose I was expected to tell you something that would be both practical and useful, and I shall attempt nothing else. Whether I shall succeed in doing this, remains to be proved. If, in my remarks, I often refer to my own experiments, successes and failures, it is only that I can make myself better understood in this way than in any other. Any one who attempts the business of market gardening and expects to leap thereby at once from poverty to wealth, will assuredly be disappointed. There are no large fortunes lying ready made upon this route any more than upon the farm.

I have tried both, and know whereof I speak. In fact, I believe that an ordinary farm will bear more neglect, and still keep starvation at bay, than a garden. The garden is no place for an indolent man, as such an one will surely come to an ignominious end. He must be willing to work patiently and faithfully, and bring to his aid good common sense and an intelligent use of all the means of information within his reach. He must learn by his failures, as well as by his successes, and strive each year to avoid the mistakes of the last,

and make some sure gain. It is for such men as these that this paper is written.

In the first place, let us consider soil and location. I prefer a light, sandy loam to any other soil for our purpose. It will grow no larger crops than a heavy clay, or loam with a clay subsoil, but it will be ready to work earlier in the spring, and crops may be ready for market from a week to ten days earlier than upon the heavy soils, and this difference in time may make the difference between a good paying crop, with a nice profit on your labor, and selling below the cost of cultivation. You know the old proverb, "The early bird catches the worm." Then, if possible, select a light sandy loam, and if it slopes somewhat to the south, all the better. It *must not* slope toward the north, and must have sufficient fall in some direction to give good drainage, or we are doomed to at least partial failure from the start. We will assume that it slopes slightly to the south, and that it has been well and thorougly drained the preceding fall. Also that it lies convenient to your market, not more than two miles at farthest, and half that distance is better. Perhaps it contains ten acres, which is plenty to begin with, and probably more than you can well handle at first. Have you plenty of manure near by where it can be had without delay, or better still a good heap which has been well worked once and is all ready for use?

Now do not begin to tell me that your land is so rich that you need no manure. I know that we have good land in Wisconsin, but not an acre of land that is fit to garden on, or that would not be benefited by being heavily manured. Remember that if you are gardening successfully, you are often taking two, and sometimes three crops off some of your land, in a single season, and, if you do your work well, when the season is over your land should be as naked of vegetation as when you commenced plowing in the spring. No land can stand such a continuous drain without good manure and plenty of it; not less than thirty good loads to the acre. Now for the selection of seeds. This is to me about the most perplexing business of the year. Of course we want the very best of everything and are willing to pay for it; but how are we to know? About New Year's day the

catalogues begin to come in with their lists of seeds, old and new. The number and names of even the most common varieties of vegetables are absolutely bewildering, and when you come to put in your strawberry plants the case is, if possible, still worse. After many years of guessing, and trying one new variety after another, I have adopted the following plan as about the best: There are certain varieties of almost all kinds that we know to be good and reliable. I select my main stock from these, and then try some of the most promising of the new kinds very carefully in a small way. I will give a list of the most prominent of such as have done best with me. Of asparagus, Conover's Colossal; beets for early use, Early Egyptian and Early Bassano, and for main crop Blood Turnip. For beans, after trying many sorts, I am now growing German Golden Wax. For cauliflower, the Early Erfurt is as good as any that I have grown. Celery, Henderson and Boston Market are both good. Cucumbers, Early Frame and White Spine. Sweet corn, if the Early Minnesota, Crosby's Early and Stowell's Evergreen are all planted at the same time, they will all come on in the order named, and give a regular supply through the season. Melons, White Japan and the Hackensack among the Nutmegs, and Mountain Sweet among the Watermelons. Tomatoes, nothing has given me so much satisfaction as the Trophy and the Acme.

Peas, after many trials and much annoyance, I have for some years past grown the Extra Early Dan O'Rourk for main crop. Landreth's Extra Early is good, if you get them true to name for very early, but I have failed to do so several times in the past few years. It is with me a poor bearer, and only valuable on account of extra earliness and maturing all at once. For late crop and home use we like the Champion of England best. Among new varieties the American Wonder promises well with me. Potatoes, I have succeeded best with Early Rose. Parsnips, I like the Dutch Hollowcrown best. Onions, a few Shallots are desirable for early spring, are worth nothing later; for second supply, those grown from the small onions from black seed of the previous year. Seed of the White Queen sown very

thickly makes nice sets, but are not desirable for bushel onions For the third supply the Top onions are used, being a little later than the others. These will make a full supply until the Early Red Globe from the seed are ready, For bushel onions, I have found Early Red Globe, Yellow Danvers and Red Wethersfield the most reliable. Of radishes, the Convent Garden and French Breakfast. Of turnips, Purpletop Strap leaf. Squashes for summer, Small Scallop; and for fall and early winter, the Turban and Boston Marrow are good, but for winter the Hubbard is the standard. These are the most prominent of our garden seeds, perhaps not quite satisfactory to you or to me, but as near so as I can make it.

Tools of every kind must be on hand and in good condition for immediate use at a moment's notice. Spades, shovels and hoes must be of the best steel and ground to a fine edge and kept so. For rakes nothing but the best fine pointed steel ones will answer.

On a fine pleasant day, early in April, we find, on examination, that the land where we wish to plant early peas is in good condition to plow, and we hasten to begin the season's planting. We plow the land and give it a liberal top dressing of manure and harrow it well with a fine stub-tooth harrow; then with a shovel plow make furrows three and one-half feet apart, from center to center, and four to five inches deep; let the seed sower drop one pea to the inch when you are on a moderate walk. The bottom of the furrow made by the shovel plow will be six or eight inches wide, sow a row on each side of this furrow making what we call a double row. Peas are one of the few seeds that the sower will not cover sufficiently. Take a rake and draw back part of the earth into the furrow, or turn your harrow upside down and harrow it over crosswise. When finished you have a space of nearly three feet between the rows which the peas will not use for some time, and while waiting for them to grow, we will have a couple of rows of nice radishes grown which will help to pay expenses. The radish fly may spoil part of them, but they will cost but little and will be all out of the way before the peas will need

to use the spaces. If the weather should be cold enough to freeze the ground somewhat after they are planted, it will do the peas no harm, and they will gain a little every warm day. As fast as the land is fit to plow go on putting in hardy seeds. Onion sets will not be damaged if the ground freezes some, even after they have started to grow, and you cannot get them ready for market too soon. Black seed onions should be sown very early. This is an expensive crop to raise, and a failure entails heavy loss. The brown cut-worms came in such numbers one year as to destroy nearly my entire crop. The land must be very rich; put on at least fifteen loads of manure to the acre and plow it in, and as much more fine well-rotted manure on top and harrow it in.

I make my beds in lands about two rods wide. After the manure is harrowed in, the alleys and water-ways are so arranged that no water can stand on the beds, or in the alleys between them for any length of time. In short, this is one of my invariable rules in all my planting, never to plant any piece of land until means of good drainage are secured. I make the alleys two feet wide, to allow persons to pass each other, and also room for a man with a wheel-barrow, which we shall find to be an absolute necessity. This done, the land is raked by hand with fine steel tooth rakes. The seed drill is now set to drop, say three seeds to two inches, or three and one-half to four pounds to the acre. The markers are set to make the spaces between the rows twelve and fourteen inches alternately. In the latter part of June, when the weeds are well destroyed and the onions in good growing condition, take from your hand cultivator all but the center tooth, and run through the fourteen-inch space as deep as the boy can run it. Then follow with the seed drill and sow carrot seed at the rate of two seeds to the inch. By the time they really need the ground the onions will be ripe and may be topped, pulled and cured, and then taken from the ground. Run through the carrots with a horse cultivator, and they will then grow until cold weather, probably giving you a good crop of carrots in addition to the onions. I have raised many thousand bushels of them in this way. But to go back

to our spring planting. By the time the onions are all in, it will be late enough to risk sowing beets, carrots, turnips and parsnips, which will all bear a slight frost, though not as much as peas and onions. Prepare the ground as for onions but make the rows for beets and turnips sixteen inches apart, for carrots, fourteen inches, and for parsnips twenty inches. Celery seed may now be sown, but with great care, or a failure is certain. Make the rows fourteen inches apart, and very shallow. Sow the seed by hand, and do not cover it, but lay a board on the rows and press down by walking over it. This will cover the seed sufficiently. If the ground gets dry before they sprout, it must be watered by hand.

The asparagus beds must be cared for at the earliest possible moment. Cut off the old tops and burn them. Manure heavily and dig under with forks, being careful not to dig deep enough to injure the crown of the plants, then rake over nicely and your beds are ready to grow with the first warm days. Last spring, in addition to the above, I put on, after raking, about fifty bushels of unleached ashes to the acre, and the yield was enormous. My sons say that we get more food per acre from our asparagus beds than from any other land we cultivate, and I am not sure but they are right. There is a great deal of nonsense in some places about the manner and expense of making an asparagus bed. I will tell you in a few words how I make mine. Chose a deep rich soil and put on about all the manure you can plow under. Plow as deep as you can, and harrow smoothly, then take a shovel plow and make furrows three feet apart, from centre to centre so deep that the crown of the plant will be from four to six inches below the top of the ground, when the bed is finished; then take good strong roots either one or two years old and place them in the bottom of the furrow with the roots as nearly as possible in their natural condition, and from twelve to fifteen inches apart. Put some more manure on the plants, then fill up the furrows and level off the ground and your bed is made. Cut nothing from it the first year but keep clear of weeds. The next and every spring thereafter follow the directions given for caring for your bed, and it will last your life-time and probably longer. Cut lightly the

second year and after that you will have plenty. Always cut clean leaving no small stalks to grow up to seed or your bed will be ruined. The hardy seeds all planted we must now set cabbage, cauliflower and lettuce.

I have taken it for granted that you all know how to make hot-beds, and that every one who comtemplates gardening, even on a small scale, has one or more of them filled with plants ready for setting. I think it a good rule to plant your hot-beds about six weeks before you expect to set your plants in the open ground. I think twenty-eight inches a good distance to set cabbage. This will allow a horse and cultivator to go through each way. If radishes or lettuce are set between the rows we use the hand cultivator for the early cabbage. If lettuce is set put them twelve inches apart in the rows. I think the Curled Simpson the best. Don't spare the manure for cabbages, there is no fear of getting the land too rich. Now, if the weather is fine, we will plant corn, beans, melons, etc., and set tomato, pepper and egg plants, etc. But in the hurry of planting we must not forget the strawberry beds. No garden is complete without them. For market, I have never found any equal to the Wilson. After many years' practice and many experiments, I have adopted about the following method of cultivation: Make the land rich and the rows two feet apart, with plants set twelve to fourteen inches apart in the rows; cultivate well and keep the ground clear. When the runners start it is well to go through and train them in about equal distance around the plant, particularly with the Wilson, as it throws out comparatively few runners, but is a magnificent bearer. As soon as the ground is frozen in the fall, cover the beds with marsh hay if it is to be had, as it contains no foul seeds, and on that account is preferable to straw. Put on enough to hide the plants, and leave on until the spring thawing and freezing is over, then remove and put on a coat of fine manure or fifty bushels of unleached ashes to the acre, keep clean and you may expect a large yield of fruit.

If the yield has been very large, and the plants look exhausted and are throwing out but few runners, it is better to

plow them under at once, although you may have had but a single crop from your beds. Perhaps this should only be said of the Wilson. I have never been able to make any other variety bear itself to death the first season, while this has repeatedly come so near to it as to make the beds not worth caring for another year. I have been trying other varieties as they have come to notice for the last twenty years and am still trying, but thus far have found, all things considered, none which I think equal to the Wilson. I have a method of planting melons and cucumbers which I think preferable to starting them in hot-beds. Plant them in hills, say six feet apart each way, first making the hills rich with fine manure. After planting take a box six by eight inches on the outside and six inches high, made from a piece of fencing; place this on the hill and with a hoe draw the earth around the box and press it down until it will retain its place after the box is removed, and having it slope a little to the south. After removing the box, cover with a light of 8x10 glass and you have in reality a miniature hot-bed where the seed will come up and grow nicely, although it may be quite cool outside. When the warm, settled weather comes on, gather up your glass and pack away safely for another year. Draw the earth back to its place and you have nice plants two or three weeks more advanced than if planted in the open ground. In the mean time you may raise a crop of radishes or lettuce upon the ground before the vines will need the room, and you will not be in danger of letting the spaces between the vines become covered with weeds. Plant beans the same as peas. Last season I set lettuce between the rows of beans and had a fine crop of it, and the beans were all I could ask. The bean vines were removed in time to sow flat turnips, which were also a good crop.

But I fear I shall exhaust the patience of my audience even if I do not exhaust my subject. We now have the garden all planted at least once over and it is June, and the strawberry season is just upon us. You have been very busy thus far, but now comes the season of almost incessant activity, which will tax both brain and muscle, to its greatest capacity. You have been selling asparagus and

a few other things for some time, but now you are in the midst of the season of green crops, bunch onions, radishes lettuce, beets, etc., with peas to pick and strawberries ripening almost or quite by the wagon load each day. Perhaps I cannot do better than to describe a day in my own garden at this season. We receive our principal mail at 10 P. M, or about 6 A. M. Here are orders for from one to two thousand or more bunches of green stuff, including asparagus, onions, radishes, lettuce, etc., with bushels of peas and strawberries; most of it is still growing in the garden when the 7 o'clock bell rings, and from seventy-five to one hundred hands are supposed to be ready for work, perhaps three-fourths of them boys and girls. They are divided into gangs of from fifteen to twenty-five each, with a foreman to each crowd. Some gather the crops and bring them in wheel barrows to the packing house, where others are assorting, cleaning, washing, bunching, tying, packing, checking off from the order book, and directing packages to their different destinations. No matter how large the orders are we have only just so much time to get them all filled and shipped, and each one is put to his or her best efforts to get them off in time. Another train calls for another lot and before that is off a boat comes in, and sends orders for so much of this and that in time to go out with the boat. We perhaps get these all off and start to do some much needed work when a telegram comes from some good customer, "send me so many cases extra of berries to-night *sure*, and such and such of other goods." It is almost impossible to get our berries picked to fill our standing orders, but by extra exertions we succeed. Teams are put to their best to get to the different depots, boats, and customers in time. Night comes, and tired and hungry we gather around our table for refreshment and a little rest, when a neighbor comes in and says, "Mamma is going to have company to-night and wants so many boxes of nice, fresh berries, and so and so of other things." You cannot help feeling annoyed, but they are good neighbors and friends, so you go back to the garden and get what they wish. Well, does this end the day? By no means. Your sales must be copied into the journal and

bills to from fifteen to thirty different customers be made out, besides letters of explanation to others, and all must go to the office in time for the mail. Perhaps at nine or ten o'clock you are ready to go to rest for a time, but you must be up early in the morning and do it over again, until when Sunday comes you may be thankful for a few hours of real quiet.

If you have done your work systematically and well thus far, you will probably have this one thing to comfort you during these long weary days, that you are doing more than paying your expenses, and this is a great encouragement. At the close of the strawberry season the weeds have doubtless got the start of you in some places, and must be destroyed at any cost, and you must hasten the work of putting in second crops when it is not already done. I set cabbage until the fifteenth and not later than the twentieth of July. Set celery up to the fifth of August. Transplant beets and rutabagas up to the same date. Sow purple top flat turnip until the fifteenth of August. Chinese rose winter radish may be sown the first of September, and they will, in an ordinary season, be nice for winter use. This finishes our planting for the year. Marketing crops often requires as much or more skill than to grow them. In the neighborhood of the large cities of the east, there is always a market at some price, and the demand is so great that the price is not affected by the amount that any one man can produce. Experience alone can tell you how much you can handle profitably of any one crop. My rule in selling is one that I have rarely varied from without loss. Whenever I can get a fair price for an article I let it go, no matter what may be the the prospect of a rise. This rule, of course, cannot apply to perishable articles, which must be sold as soon as ready for market. In these cases I adopt the following rule: There is a gradual increase in the demand for certain articles. I know how much I sold last year of each variety, and wherein I had a surplus, or was short of a supply. In planting next spring I shall allow for the increased demand, in addition to what I had last year.

It sometimes happens that I find myself overstocked with

some article, asparagus, for instance. To crowd it on my own customers would seriously injure my market, so I pack it nicely and carefully and ship it to one of the commission houses of Chicago, to be sold for what it will bring. By this means I save my own markets and am rarely obliged to sell for less than cost.

Now just here let me say, that with the adoption of the most systematic plans of work and with the best of tools to work with, the profits of gardening are not large, and I can see no prospect of their becoming so in the near future, while with a slipshod, haphazard method of cultivation and marketing, losses would be inevitable in any market with which I am acquainted. I have thus far taken it for granted that you have what money is necessary to conduct your business. But suppose you have not; what then? Why you must commence in a smaller way, work harder, and live more economically than would otherwise be necessary. One can begin with almost nothing as I know by experience. I have traveled over every foot of the road, and it seemed at times to be not only up hill, but very steep, and the road very rough, and success, if in sight at all, was very far in advance of us. It came gradually, but came at last, as we hope, to stay. Allow me here to relate a little incident.

Soon after I had succeed in getting a span of horses and a market wagon, I was one day standing on one of our sidewalks talking with an old gentleman who had known me from my arrival in this state, and who knew a little of how hard I had worked to get started. The team was driven near to where we were standing and stopped. He looked them over for a moment, and then turned to me and said: "Well, Smith, that is a fine looking team and wagon. Years ago it was hand-baskets and wheelbarrows, then a hand cart, after that a one-horse rig, now a good two-horse establishment. I suppose next year it will be a four-horse concern, and who can tell what will come next." I replied: "Perhaps hand-baskets and wheelbarrows again." He replied: "No, there is no danger of your going backwards; you have been too careful and are still so. You will surely succeed."

Last year I cultivated forty-five acres, keeping five horses constantly employed besides a hired team part of the time. My market has spread north, south, east and west, and time only can determine its limit. I mention this to show that it is possible to succeed with very little financial means as a basis.

My friends, I have in this hasty manner named some of the things that are, in my opinion, most necessary to make market gardening a success. Much more might be said, but I have already made this paper longer than I intended, and hasten to a close. You will see at a glance that it is a laborious business, and one requiring constant care; but on the other hand it is a pleasant and healthful occupation, and one that, if rightfully followed, is almost certain to bring a reasonable return for your labor as well as being useful to the community in which you reside. To me there is an unending pleasure in placing the tiny seeds in the well prepared soil and then watching them from the first show of life to the final harvest of the crop.

As I watch the growing plants, the question comes again and again, why has the little inanimate seed sprouted any more than a pebble would if put in its place? Yet each as it grows is true to its kind, and year by year repeats the law of its growth and proclaims to all the wisdom of Him who clothes the earth with all things necessary for the life and happiness of His creatures. My friends, I know of no business into which, if I were again young, I could enter with more zeal and enthusiasm than my present one. It has not made me, nor will it make you a Vanderbilt, a Jay Gould, or a millionaire of any other sort, but it has made me a nice living, a comfortable and happy home, with a prospect of all we may need in old age, should wife and I live to see it. I believe it may do the same for you. Years hence it may perhaps be said of some of our bonanza farmers in the northwest, "He has made a large fortune from his farm, but he has impoverished a whole township of land to do it."

Let no such thing be said of any of you, but rather as they stand around your newly made grave, may they say, "His work is done; he did it well; and there is one little spot upon

the earth that is much better for his having lived upon it, and all around it are the homes of those whom he taught to cultivate so that their farms are better and more valuable and their homes happier for his having lived near them."

A YEAR'S EXPERIENCE IN THE ORCHARD.

By B. B. OLDS.

As every year brings to each of us new experience, a new lesson ought to be learned by which we, and others also may be benefited. The moral of the old adage of our early school days, "don't count your chickens before they are hatched," may well apply to some of us in the apple crop of 1882. In southern Wisconsin, if not in all parts of the state, at the time of blossoming and the setting of the fruit, up to the time of apples becoming of the size of little bullets, the promise of a large crop could not have been better. While viewing such a prospect, and almost groaning under the anticipated weight of coming labor and trouble in saving and disposing of such a crop, we were suddenly made to see that the main portion of the crop was on the ground. What is the cause of this, was the common inquiry? A few days' careful observation revealed a dreadful blight upon the leaves, giving the same appearance as though they had been poisoned by a strong solution of arsenic. As the season advanced, that same effect seemed to hold its sway, especially with nearly all the tender or half-hardy varieties, with such power that the trees were not only devoid of fruit, but made little or no growth during the season, and in many cases died outright. The hardy varieties mostly held their fruit, but in general very few were fit for market; Red Astrachan, Monmouth Pippin and Golden Russet being less affected than any other kinds, Fameuse entirely unfit for market, Talman Sweet but little better and very few in number.

One singular feature in this blighting influence was that different orchards in apparently similar locations were so differently affected. For a neighbor's orchard not more than two miles distant from mine, had a crop of fine Fame-

use. But those referred to, though fair, seemed to have no keeping qualities.

As the remaining part of the crop of blighted apples approached maturity, the question arose, What use can so poor a quality be put to? For, if made into cider and sold for drinking purposes, it would seem, at least in the minds of some of our earnest temperance workers, not conducive in advancing temperance principles nor in harmony with prohibition. Then again, if it should be put away to make into cider vinegar, after allowing for cost of packages, natural wastage and trouble, and since nature has to compete in the market with the cheap manufactured stuff labeled pure cider vinegar, there would be next to nothing left for the outlay. Looking at the business a more encouraging prospect opens in the manufacture of apple jelly. Although wholly inexperienced, and finding eastern men who are engaged in this business; very slow to communicate concerning the process, I launched out and fitted up works according to the best knowledge I could gain. The result was more of a success than was anticipated, and the poor blighted apples were worked up into nice jelly and boiled cider, very valuable for a variety of domestic purposes, in any way jelly can be used, and when well known, may become a staple article in the market. The conclusion is that this process is the most practical way of disposing of low grade apples.

This year has proved more than ever the importance of good handling for market apples. That is, procure good new barrels, if intended for shipping, before they are needed, so that as soon as any variety is ripe enough to answer, hand pick, sort carefully, and get them off to the best market at once. Don't wait for apples to ripen and fall, or to get mellow after picking, but pack nicely, facing the bottom course, which is the end to mark and open, and pressing in and heading snugly.

The ordinary farmers, with small orchards, as soon as they have a small surplus of fruit, are the first to become discouraged, and begin to say, "fruit raising don't pay." Simply because in hauling their apples to the nearest small town to

sell, as they would wheat or corn, they fail of finding a ready and paying market, as they may have anticipated. To remedy this state of things, I think those of us making a specialty of the business in almost any locality, who have something of a reputation, should give instructions and inducements to such persons by offering to buy their fruit at a fair price when put in suitable condition for shipping. By so doing we may be safe, and thereby prevent a drug in the local markets, as so often is the case. The question now is, is there anything in fruit culture we can do to prevent another such failure? Nothing but to plant iron-clad varieties, and keep them in good, healthy condition.

An incident at the late Janesville fair between fruit exhibitors and the judges, which caused quite a sensation among the former class, may be regarded as an item of some importance among fruit-men in time to come. The work of the judges went on smoothly and satisfactorily till coming to the selections adapted. After some consideration as to the best method for doing justice to all the parties and giving new exhibitors an opportunity to become posted as to the standard kinds, the board decided to fix upon a list of ten such varieties as in their judgment would come nearest to a perfect list, as a basis to work on. Then the one who should come the nearest to filling that list should win, provided his specimens were good. When the work was being completed many fine looking and showy collections were left entirely in the shade, much to the disappointment of their owners, as well as to outside lookers on. Some were so much grieved as to almost enter a protest against the decision, claiming that young exhibitors, though not experts, having nice fruit, should share in the premiums. After quite a labored argument on the part of the judges to show the aggrieved that that particular class was of more importance to the people in general than all the rest of the show of that department in serving as a guide to inexperienced orchard-planters, they concluded that the decision was made wisely, and that it was just as necessary for fruit judges to be able to establish points of excellence in kinds of fruit as judges of any kind of live stock.

Mr. Toole, of Baraboo — On how small a scale could one commence conducting the canning business? I have raised red raspberries for our local market and I chose the black, for I knew I would not be at the mercy of the merchants, because I knew I could dry the surplus if they tried to beat the market down. Latterly, instead of drying, I have canned some of the surplus, and I could sell in Baraboo all that we could find time to can in that way. But glass jars are not handy to move about. I would like to know on how small a scale one could commence the canning business so that he could can his surplus or all of his crop and dispose of them in a shape in which he knows he can find a market for them.

Mr. Olds — The method of drying fruit has been urged upon me by those having evaporators to sell, but I have objected to it as being impracticable on account of the amount of labor that must be expended in preparing our fruit for drying, and it does not dispose of our low grade apples then. There is a vast amount of apples that are unfit for drying and will go to waste unless worked up in some different way.

Mr. J. M. Smith — Do you think the low grade of apples make as good a jelly as those of first quality would?

Mr. Olds — I believe if they are free from rot and worms the blight that came upon them would not affect them; the quality of the jelly is equally as good.

Mr. Toole — Perhaps I do not make myself clear. My experience has been with the black raspberry. I choose to raise that because I know something of the temper of our market. There are times when they get very good strawberries in Baraboo as low as five cents a quart, and if they wait and watch their opportunity perhaps they can get them for less, and they seem to expect they must have black raspberries at the same price. Take one year with another, I do not think black raspberries can be raised at so low a price per quart as strawberries, but I choose to raise them because I knew I could dry them. A friend of mine had set up a dry house, consequently I can insist in the market on their giving me ten cents a quart, and if they will not give me that I can dry them. I have, however, been com

pelled to dry but very few. I have canned some. I was not obliged to go elsewhere to do that. I have had a large surplus and find a good deal of inquiry for our canned berries, although there is complaint of the canned fruit in the market. I think I could put up in glass jars all we are likely to raise and sell them quite rapidly within the range of our local reputation, but we could not handle many glass jars. I want to know on how small a scale I can commence the canning business. What might be the expense of commencing to put up raspberries and strawberries and perhaps other fruits. I wish to know how I can find out something about the expenses, beginning in a small way, or if one can do it in a small way.

Mr. Plumb — While among the practical fruit growers at Marengo a short time ago I put that question to them. They have a large dry house there. The Crystal Lake men came up there to set up a dry house and evaporating house as they call it. I said to them, now you have been growing berries for years; I want to know whether you have been able to make anything out of your berries in a small way, in what might be called a domestic way. He said, no, we have not; I only know of one man that has made anything out of caning berries in a small way. A gentleman at Rockford tried that for years and finally set up a full-fledged canning establishment, commencing with cherries, of which he grows two or three thousand bushels in a year, and ending up with sweet corn. They are doing the same as Crystal Lake; they are doing the same as Marengo. But their testimony is that with any fruit that can be evaporated, that is the most successful and economical way of disposing of it. Canning is always expensive and always attended with more or less risk; it is bulky in transportation and the public are not willing to pay what it costs unless it is done in a wholesale way. That is what I have found out by careful inquiry. As far as Mr. Toole is concerned, I am satisfied he can put up a dryer and dry his surplus raspberries with greater economy than he can possibly put them on the market. They dry very readily, and with very little expense a dryer can be put up.

CONDITIONS OF SUCCESS IN FRUIT CULTURE IN THE ST. CROIX VALLEY.

BY E. G. PARTRIDGE, Warren, Wis.

The obstacles to successful fruit culture in the St. Croix Valley are so numerous and so great that unless one is willing to study patiently the conditions of success, it is vain to expect any other result than failure and disappointment.

The farms of St. Croix county are almost exclusively devoted to wheat culture, and since the farmer's income depends largely upon this crop, it is but natural, that a great share of his time and thought, during the brief season of seedtime, is engrossed by this pursuit; so that he is unable or unwilling to devote to his future orchard that degree of attention which is essential to success. It is difficult to make the average farmer comprehend that it requires any greater degree of skill, or more careful culture to raise a crop of apples, than a crop of corn or potatoes.

Usually, after the other crops are all in, he digs up his trees purchased the previous autumn, and buried according to the nurseryman's directions, sets them out more or less carefully, and then leaves them to their fate, and waits for results. He does not have long to wait.

If the early summer is hot and dry, many of the trees refuse to grow at all. A few of them make a feeble growth during the summer and autumn, and if the succeeding winter proves mild and favorable they will start into growth the following spring, and continue a sickly existence, bearing, perhaps, a crop or two, until there comes an Arctic winter—like the present — and then the places that knew them know them no more. Again and again, perhaps, he replaces them with fresh stock, to be each time disappointed, until, finally, finding that his repeated attempts result in uniform failure, he curses the climate, and the tree agent, who, as he concludes, has cheated him, either in the varieties recommended, or in the quality of stock delivered, and resolves that henceforth he will eschew both trees and tree-peddlers. Nor is he altogether to be blamed for his maledictions or his conclusions.

The climate *is* about as unfavorable as it well can be, and nurserymen and their agents *do not always* recommend the most suitable varieties, or send the best quality of stock, to their customers. There is a great temptation, hard for some men to resist, to dispose of the stock on hand without much regard to the interests of the purchasers.

Three-fourths of the failures within the range of my observation, have been inevitable from the start, in consequence of planting unsuitable varieties or unhealthy stock. Indeed, some dealers seem to have come to the conclusion that apple-trees set in this part of the state are doomed to destruction anyway, so that it matters little what kind or quality of stock is delivered. But our people are becoming a little more wary, and it is not as easy to-day as it was a few years ago, for a tree agent to introduce new and untried varieties on his own personal recommendation.

Thus, while most have become disheartened, a few still persevere; and, though failure and disappointment are the rule, and partial success the rare exception, I still believe that any one gifted with the requisite amount of common sense, energy and perseverance, who lives with his eyes open, and is ready to avail himself of all the favorable conditions within his reach, who is quick to profit by experience and observation, and who is willing to labor and to wait patiently for results, will assuredly deserve success, and will in a good degree achieve it.

And now, what are the main obstacles to success, and how may they be overcome? First, the unfavorable climatic conditions. These are beyond the power of man to remove, but they may be modified in some degree by a careful selection of location, by the planting of protecting tree belts, and by summer and winter mulching.

The second obstacle is, that, as yet, no single variety has been discovered or produced that is entirely adapted to withstand the alternations of cold and heat to which the trees are exposed, from the rigors of our Arctic winters to the heat and drought of our semi-tropical summers — amounting in some years to a difference of more than one hundred and thirty degrees. This can only be met by careful experiments with

new varieties of seedlings. It has been abundantly demonstrated that none of the so-called iron-clads, recommended from time to time by this society, can be depended upon. The Duchess, hardiest of all the old varieties, will sometimes retain vitality enough to produce several crops, but sooner or later it inevitably succumbs. I am entirely convinced that our only reliance must be upon seedlings produced here, where the trees are to grow. We have a good beginning in the Wealthy, a Minnesota seedling, originating north of latitude 45°, which has proved even hardier than the Duchess, and is superior to that variety in every respect. I look with hope and confidence to the Minnesota Experimental Fruit Farm, under the charge of Mr. Gideon, the originator of the Wealthy, for the coming apple for the north-west.

Another, and crowning obstacle, in my opinion, has been the inherent defects of the trees that have been planted — defects that are inseparable from our present mode of propagation, and which cannot be entirely obviated, until every tree-planter becomes his own nurseryman.

This is a point that I present with a great deal of diffidence in the presence of this society, composed, as it largely is, of practical nurserymen and orchardists, because my experiments in this direction have not been sufficiently extended to warrant such radical conclusions as I have adopted. But so strong are my convictions, that until I am convinced of their fallacy, my future practice will conform to the theory here presented.

First, it is a fact which will not be disputed, that in order to withstand the vicissitudes to which it is exposed in this climate, a tree must possess the utmost degree of health and vigor attainable.

Second, this degree of vitality cannot be attained without a perfect system of roots and branches, nor unless a proper balance be maintained between them. That is, the root system must be sufficient to furnish a proper amount of nourishment to the tree, and the branches and leaves must be able to digest and assimilate the nourishment afforded by the roots, and to exhale the watery remainder.

Anyone who has watched the growth of a seedling apple

tree, knows that there is a perfect harmony of development between the subterranean and aerial parts of the tree. While one end of the embryo pushes straight down towards the center of the earth, the other end, pushing exactly in the opposite direction, breaks through the surface and shoots upwards into the light and atmosphere, a stem, corresponding to the root below; and, if the soil and surroundings be favorable, the two parts will at the end of the first season exactly balance each other. The root will penetrate to a depth equal to the attitude attained by the stem, and neither root nor stem will usually make much lateral growth.

During the second season, while the terminal points still continue their downward and upward growth, each will put out various lateral shoots, still, however, maintaining a perfect balance of parts, and if the subsoil is in a suitable condition to a sufficient depth, this method of growth will continue so long as the tree shall live. Of course the nature of the subsoil will usually arrest the downward development of the root, within a few feet of the surface, but in any suitable soil the penetration will be sufficient to place the lower roots beyond the reach of frost and drought. When the maximum of penetration has been attained, nature still preserves the balance, either by checking the growth of the top and branches or by a more vigorous pushing of lateral rootlets.

Now, experience has shown, I think, that just this condition of things is essential to the well-being of the tree, in our rigorous climate. All practical nurserymen teach that when any mutilations of the root system occur, as in removing trees from the nursery to the orchard, the top must be cut back correspondingly, in order to restore the balance of parts. But, though this practice is necessary under our present system, it is a mistake to suppose that this second mutilation will restore the tree to its pristine vigor. Two wrongs never make a right. The fundamental law of homœopathy, "*Similia similibus curantur*," will not apply to tree culture, though, when from any cause, the mutilation of any part of a tree becomes necessary, as sometimes occurs, by all means apply the remedy in homœopathic doses.

In the usual mode of propagation by piece root grafting, the tree is placed in an abnormal condition from the start. Not one tree in five will develop harmoniously under this system. A majority of them will lack a tap root — a defect which will generally prove fatal in this climate. Of the few which do develop a perfect root system under this mode of propagation, the larger part are ruined in the process of transplanting. It is almost impossible to remove a three year old tree from the crowded nursery-row to the orchard, without such mutilation of the roots as will induce disease which will result in premature decay and death.

What, then, must we do to be saved from all these evil, resulting from this unnatural mode of propagation? I answer, follow nature. Avoid as far as possible all violation of the laws of growth and development. Do not sacrifice the future well-being of the tree to present convenience. If the apple tree would only come true from seed, the problem would find an easy solution. But, since varieties can only be propagated by budding or grafting, let these operations be performed in such a manner as to disturb as little as may be the economy of growth and development of the tree.

My plan is as follows: Prepare the ground for the future orchard in the fall, and plant the seeds of Wealthy or some other hardy seedling variety, if procurable, in hills, twenty feet apart each way, putting ten to twenty seeds in each hill, and separating two or three inches apart. Thin out the weakest seedlings during the season, leaving only two or three of the strongest. In the fall, or the following spring, bud or graft those remaining. If budded in the fall, protect thoroughly the first winter by covering with earth. If grafted, they will need no other protection than a mulch, which, should never be neglected.

The scion buds should be carefully selected from healthy, vigorous, trees of the hardiest sorts procurable. After one, or at the most two, seasons' growth, select the very best and strongest plant in each hill and remove or destroy the rest. By this plan, I firmly believe that you will lay the foundation of an orchard that will prove a success wherever success is possible.

Of course, there are numerous localities all over the northwest, where the conditions are so unfavorable that it would be folly to plant orchards at those points; but by a wise selection of location, and careful attention to the details of propagation and culture, as indicated above, there is great reason for hope, that, in the near future, we shall be able to produce apples all over the valley, and that the next generation may be supplied with this noblest of fruits by home production.

Mr. Kellogg thought Mr. Partridge's plan a good one, provided we were sure of hardy seedlings to graft on. He would plant his seed where the tree is to stand. His experience is not in favor of budding in this locality.

Mr. Tuttle said that in all probability hardy seedlings adapted to this climate will yet be found — perhaps there are some, now, but he recalled the fact that some thirty years ago this question had been thoroughly tested and that the results were unfavorable. New seedlings should not be considered thoroughly tested until they have been proven from twenty to twenty-five years and in many localities. The speaker was well pleased with the Pewaukee, for this climate. He did not think the destruction of the tap-root in transplanting young trees caused any permanent injury, arguing from the fact that many hardy trees of cold latitudes have no tap-root.

Mr. Philips spoke in favor of planting the stock where the tree is to stand. Pewaukee trees growing where the root graft was set are thriftier and better than those obtained from the nursery and set out.

Referring to Mr. Tuttle's remarks, Mr. Partridge said that it would not do to argue from the absence of a tap-root in pines that the removal of the tap-root of an apple tree would do no harm. The comparison should rather be between trees which agree in this respect, as between the butternut and apple. Removal of the tap-root of either of these certainly is injurious.

Mr. Philips agreed with the last speaker. Forest trees or

fruit trees that naturally possess a tap-root are sure to suffer more or less if it is removed.

Mr. Tuttle stated that he failed to find any difference in trees grown where they were to stand, and in those properly transplanted, aside from what can be attributed to peculiarities of the varieties grown.

In answer to a question by Prof. Beal, Mr. Carson said that peaches could be grown in this section, by giving the trees proper winter protection. One winter he had successfully sheltered his trees by setting shocks of corn about them.

Prof. Beal said that in Michigan he has been successful in protecting trees in this manner. Others that were buried, died.

Hon. A. A. Arnold stated that he had been successful with peaches by trimming the trees in the fall, bending them down, and covering the tops, raising them in the spring. Without this protection they did not do well.

Mr. Floyd said that for more than twenty years he has grown peaches in Wisconsin. He covers the rows each fall, after the trees are trimmed, with a crinoline frame, on which is placed a layer of marsh hay. A couple of inches of dirt is then thrown over the hay. Trees protected in this way winter perfectly unless the roots freeze, which does not often happen. The speaker said that the yield of his trees is heavy. Peaches protected in this cheap way can be grown for one dollar per bushel. They sell for from four to eight dollars.

Mr. Peffer then gave the results of his long and successful peach cultivation in the state. He prefers evergreen boughs to earth for protection, believing his method to be cheaper. The first fall of snow effectually buries the trees. In open winters there is some winter-killing, but only when the mercury falls to—16° F., or below.

PAGINATION
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FRUIT CULTURE IN THE NORTHWEST, AND HOW TO MAKE IT SUCCESSFUL.

GEORGE P. PEFFER, Pewaukee.

I see by the programme that there is not much time for discussion. The papers to be read are numerous, and discussions are sometimes of more importance than papers. Hence I will give but a short one or none at all.

I desire, however, to put some questions that are important, though to some extent they have already been answered in our annual reports and public transactions.

Small fruits, such as grapes, strawberries, raspberries, etc., have already received their share of attention. The raising of apples and pears, however, has not been so thoroughly discussed.

Why is it that some horticulturists raise apples and pears very successfully, while others equally well situated do not? And again, why is it that the greatest variety of fruit trees in the north-west are so short-lived?

In regard to this last question all may not agree. One may say the varieties planted are not hardy enough for our climate; another may think the soil is too rich, hence the trees grow too fast and the wood does not get ripe enough. Some may attribute it to the situation of the orchard, to pruning, cultivating too much or not enough. Still others may assign their ill success to the trees coming from the east or west, or that they were too large or small when set out, or to fire-blight or frost-bite, etc., etc. While in some respects any of these causes may be detrimental to the lives of trees, yet all varieties are not affected by them. A little forethought may guard against them and enhance the life of many a tree, particularly those varieties which have given the most satisfaction.

To prevent short life and failures in fruit trees, plant seedlings, and those from the hardiest sort of fruit, either raised here in the northwest, or from countries latitudinally similarly situated. In planting seedlings prepare the soil just as if setting out nursery trees. Stake out the ground

and dig out a good-sized hole, the larger and deeper the better; replace the soil, well mixed, tramp it well and set the stake where the tree is to grow, then plant the seeds (two or three of them) on the north side of the stake. If the seeds are fresh and the ground is prepared, plant them in the fall and cover with about one inch of loose earth or mold; but if seeds are dry, and the ground prepared in the spring, soak the seeds a few days, and cover lightly with one-half or three-quarters of an inch of mellow or loose earth. In a few days the seeds will be up. Then keep the ground around them about the same as a hill of potatoes or corn.

If too many seeds have come up, transplant to places where some may be missing, or for the purpose of enlarging the orchard. In transplanting be careful to save all the roots possible. If you do not do this, those undisturbed will get the start of the transplanted ones. Mulch the first winter, and if transplanted to an exposed situation, mulch any way in order to prevent the frost getting below the tap-roots. The second year it will not be necessary to mulch, as, if the hole is dug deep enough, the tap-roots will be below the frost. Mulch might not injure the second year, but it will serve to harbor mice which girdle the little trees. If the holes are dug deep, the trees will withstand droughts as well as frosts. When the trees are young and the ground freezes dry in the fall, water must be supplied.

We are convinced that pears of hardy sorts can be grown in this way, as the farther the tap-roots descend, the less can the weather affect the growth of the trees or cause fireblight. Of this we have many examples among apple and pear trees.

To have a good orchard, it should be situated on high or naturally drained soil of which at least the subsoil should be either clay or limestone. The slope should be to the east, northeast, or even north.

The lateral branches should be pinched in occasionally to protect the stem or body and form a good head. But always leave the lower branches to protect the trunk and only remove them gradually, as the limbs that are trained to form the head of the tree expand and shade the body. Trees thus planted and trained will bear fruit in from four to six years.

Some may say it is small business to start an orchard of this kind in this western country, and it would be death to the tree agent and nursery man. But there is no fear of this, although we acknowledge it a rather small beginning.

It is only the amateur that has patience, is persevering, is industrious, and is capable of entering into details and of estimating the value of small things. He must also be a close observer, quick to detect any unfavorable influences or enemies at work among his fruits; capable of making experiments, and tracing effects to their causes; fertile in expedients, and above all have a love for his business. Added to these qualifications, he should possess judgment, shrewdness and suavity required to enable him to market his products to good advantage. Such an one only will be successful. Such an one will take advantage and raise small fruits and other crops, e. g. strawberries, currants, grapes, etc., that will not interfere with the growth of the small trees, and in only a few short years his industry will be rewarded.

Mr. Plumb thought Mr. Peffer's plan a quarter of a century behind the times. The average farmer has neither the skill nor the time needed to successfully raise seedlings. He further said that in theory the tree should have a tap-root; practically it would have one reforming it, no matter how many times it is cut off.

Mr. Peffer—Old trees that have had it cut off, don't.

Mr. Plumb—After the first few years the tap-root is very small relatively to the other roots, and often it will be found to have disappeared entirely. In time the tap-root of the apple is lost by the natural process of growth. The same is true of white oak, hickory and other trees, to a certain extent. The feeding roots of all trees are in the surface soil. Ordinary varieties do not need to possess an entire tap-root. In buying trees, men ask for surface-roots, not for tap-roots. There is not one man in ten or even a hundred who will get up an orchard in the way recommended by Mr. Peffer. Too much labor is required when trees are planted where they are to stand.

Mr. Tuttle said that twenty-five or thirty years ago it was shown that raising seedlings is not practicable for the general fruit grower. To revive it now is like inventing a machine for picking hops — it may appear plausible on paper, but it cannot be made a practical success.

Mr. Philips believed Mr. Peffer's theory to be correct in certain cases. Mr. Peffer certainly has shown that he can make money by raising fruit, on seedlings raised where they now are, but he was inclined to admit that the ordinary farmer cannot carry the theory out successfully.

Mr. Floyd stated that in his experience a tree grafted on a tap-root will form only tap-root; a tree grafted on side roots will form only side roots. Hence to secure a well balanced tree both should be present in the stock, and in dividing roots a proper division should be aimed at.

MULCHING PLANTS AND FRUIT TREES.

By HON. B. F. ADAMS, Madison, Wis.

Mulching is used on fruit plantations to mitigate drought in warm weather, to retain frost in the ground in the spring, and thus retard blossoming, to keep fruit grown on vines and bushes clean, to smother weeds and also to act in some degree as a fertilizer of the soil. Many years ago my attention was directed to this subject when living on a prairie farm in Dane county. I used large quantities of the straw that annually accumulated in various ways with more satisfactory results than the burning of it would have produced. My first trial of mulching was on a plat of ground planted with four hundred currant cuttings set three feet apart each way. The second year after planting, this ground was covered with wheat straw about one foot deep, and what few weeds appeared were pulled or cut during the growing season. Each successive year thereafter for thirteen seasons, a heavy mulch was added, and some years a shovelful of manure from the pig pens was thrown around the roots of each bush. After the bushes had made sufficient growth to produce fruit in quantity for a period of ten years, the crops produced

were enormous — no failures. As there was no market for the fruit at that time, what we did not use was scattered among those who had no currant bushes, or having them, had no fruit in consequence of neglect. Birds and fowls picked all they wanted, and finally some fruit was wasted on account of scarcity of consumers. This plantation was pruned some, but was not disturbed with a plow or cultivator after the first season's growth. Ten years after I had vacated the premises, curiosity prompted me to examine it to see what improvement had been made with it. I found a few straggling bushes and a thicket of wild plum trees growing on the site, that would bother a rabbit to penetrate.

A farmer whose main business has been growing crops of grain and grass, and caring for a dairy, is not expected to know a great deal about fruit growing and the proper management of a fruit plantation. Thus situated, I have given it only limited attention, desirous at the beginning of simply supplying family wants. What we learn in hard lessons of experience we are apt to retain in memory longer than by other methods. The first orchard I planted was never mulched; the trees lacked hardiness and died young. I knew little of the varieties planted, and possibly the man who sold me the trees, less. My second orchard was planted on the recommendation of an Ohio man, whose hobbies were seedlings and mulching. These seedlings flourished wonderfully with cultivation and mulching after the growing season had passed. In due time they bore fruit, no two trees alike, but three distinct qualities were perceptible among the fruit; first, bitter-sweet; second, very sour; third, dry and tasteless. The longest keeper in the lot resembled a kind I have seen at fairs labeled "Green Everlasting." All this seedling fruit lacked juice, and hardly furnished any satisfaction for my labor, except one season, when I swapped the entire crop of it to a temperance man for two barrels of cider.

The cultivation and mulching of these poor seedlings, with the discovery of the methods of mice and the appetite of rabbits for apple tree bark in winter time, prepared the way

for a more successful orchard experience in later years, with trees that are more satisfactory in fruit.

I would not mulch trees during the growing season, unless during the year they were planted. Mulch may be applied according to circumstances late in the fall or in early winter, or much earlier if a season be dry; care being taken that the mulching be removed a little from the trunks and earth packed closely around them as a guard against mice.

Take away the mulching after blossoming in spring, and cultivate the ground. Our remedy for the depredation of rabbits was a shot gun and traps. Poison is better to destroy them, but, if used, neighbors' dogs will get some of it and end their usefulness. This creates unpleasantness among friends of valuable dogs and promising pups.

The vine growers mainly agree that better methods prevail in cultivating vineyards than to mulch the vines during the season; yet some advocate using it abundantly, even to covering the entire surface. Our volumes of transactions contain the views of some growers in relation to this practice, but the prevalent theory is, that the earth needs all the warmth of the sun's rays, as well as good cultivation to hasten the growth and ripening of the fruit before autumn frosts. Mulching, while it keeps the ground loose, cool and moist, does not hasten the maturity of the fruit.

Covering strawberries as a protection is now so generally practiced, that little need be said on this subject, but the management of this covering in spring is not so well understood. Some rake it all off as early as possible, to give the plants a chance to come forward rapidly; the result is frequently early blossoms and frost-bites. Others wait until there is less danger, and then remove the mulching and cultivate between the rows, until blossoming time, and some until near fruiting, and then put the mulch back. This culture is liable to disturb the roots of the plants, and more or less dirt is cast upon the green fruit, which may not all be washed off by rains previous to ripening. This treatment may give fair crops, but it is better practice not to disturb the mulching more than is necessary to permit the plants to grow through it, pulling by hand what few weeds appear, until fruit time.

Of course, we believe in thorough cultivation of the soil, and would give a strawberry plant such treatment until we had grown a field of plants free from weeds. Cover it properly at the beginning of cold weather, and trust this mulching to do the rest in making a crop. The largest, the cleanest and the best crops of strawberries may be grown in this manner.

The most noted growers of this country have practiced this plan successfully. Knox, of Pittsburg, in his life-time adopted it, and surpassed all competitors in raising mammoth Jucundas, especially. Later, Parker Earle, of Illinois, with his eighty acres of strawberries, by the same treatment, annually produces car loads of the fruit for market. If we look for authority in these methods of cultivation, let us observe the practice of men who make the business of raising this fruit a great and permanent success.

The general rule for covering plants is put on enough to hide the foliage from view, but when there is no snow during the winter, more is needed in this latitude. Dry, piercing winds, prevailing during low temperature, rapidly sap the life of strawberry plants unless heavily covered; but look carefully in spring that this heavy mulching does not smother the plants, and remove a portion if necessary.

I have used all kinds of straw grown here, leaves, cornstalks, and coarse marsh hay, which is the best.

Raspberry bushes, black and red, and blackberries need heavy mulching along the rows, and cultivation between them, except that blackberries, after the second year, I think will do better if the entire surface is heavily mulched yearly.

Trim the bushes as low as practicable, say pinch them at 2½ feet growth. Cut the old wood and drop it between the rows and pile the mulching over it. The whole will decay and enrich the soil.

Though we do not raise fruit enough for home consumption in Wisconsin, we are increasing the quantity largely of late years by care and intelligent management. Small fruits yield the largest and quickest returns for the outlay, if such plantations are properly cultivated and protected, otherwise they do not.

Once in five years, in this region, a large part of our small fruit plantations are either badly damaged by hard winters and careless management or totally destroyed. If the present winter does not kill all raspberry and blackberry bushes in this vicinity, above the snow line, they will disappoint us in hardiness. If this winter should pass without injury to such varieties of fruit, we shall take courage and plant more, and if they are all killed to the ground we will set a large plantation and try again.

BEAUTIFYING HOME GROUNDS.

By H. J. DEVRY, Chicago, Ill.

As so much has been said and written already about the beautifying of our homes, by our ablest landscape gardeners and our agricultural societies, I should hardly venture to touch this subject any more if I had not been urged by friend Case to express my views and ways in regard to this matter, as according to his opinion too much cannot be said about it.

It is a fact that by riding through the rural districts we find the surroundings of many homes in a deplorable condition. The farmer is during the growing season, very busy with his crops, and thinks it rather too much to spend just then any of his valuable time around the house for this purpose. I shall try to explain how to overcome this difficulty, and yet have our homes surrounded and decorated with ornamental and flowering shrubs, and trees, and beautiful flowers.

The front of a house is something similar to the face of a person; a neglected house front leaves rather a poor impression on anybody's mind.

To get a nice lawn and a fine entrance is one of the first considerations. Preparing and sowing lawns the first part of September, when crops are mostly secured, answers the same purpose as sowing in April or May, when your time is so much needed elsewhere. It is late in the fall, too, when the foliage is off the trees, but before the soil has frozen too hard, that you can do most if not all your plant-

ing of trees, shrubs and vines around your premises — at a time which you can best spare for this kind of work.

In regard to the selection of ornamental trees, shrubs and vines, it certainly depends a great deal on the locality, hence I think a few remarks and hints about this perplexed question would be appropriate.

One of the most graceful trees on lawns is undoubtedly the White Birch. Its silvery bark, slender and drooping branches, and the fine-cut foliage of some varieties, render it very effective on lawns. There is the Red Bud (*Cercis canadensis*) deriving its name from a profusion of delicate pink flowers with which it is covered before the foliage appears, which is also well deserving of our recommendation. The *Cratægus*, or Thorn family, gives us some nice trees and shrubs, which are very desirable on account of the peculiarities of their growth, foliage and flowers, which appear in profusion in May and June. The European Mountain-Ash (*Pyrus aucuparia*) in its many beautiful varieties is a fine, hardy tree, with a dense and regular head, and is covered from July till winter with great clusters of bright scarlet berries. The Celestial tree (*Ailanthus glandulosa*) is lofty, and of rapid growth, has elegant pinnate foliage, and is hardy.

For shading our homes, or hiding from view, an unsightly object, we have a large class of fine ornamental trees, among which Maple, Ash, Elm, the different sorts of nuts and even the willows can be used to advantage. I would advise the planting of shade trees a little to the side of the front, or alongside the drive-way, as a free opening and view of the premises is very desirable.

Evergreens, shrubs and trees can be placed to good advantage here and there, around the house, to take away the monotony of the view; particularly will Evergreens do this in winter time, and their forms are always pleasing to the eye. The European Larch, Norway Spruce, Austrian and Scotch Pine, or some of our Arbor Vitæs (*Tujah*) are well suited for this purpose.

We have at our command many beautiful flowering shrubs, to see which covered with flowers gladdens anybody's countenance. There are the Lilacs or *Syringas*, the

Viburnums or Snowballs, the *Spiræas*, the Mock Orange or *Philadelphus*, the Barberry, Dogwood (*Cornus*), the *Weigelia*, and, for all, the thankful *Hydrangea paniculata*, and many others, which can be appropriately used either in groups or along fences.

A creeping vine, running up the sides of a house, is a very pleasing object. Try to secure a few roots of the Virginian Creeper, and see how quickly it will repay the little labor you bestow on it. The Woodbine or Honeysuckle (*Lonicera*), and the Trumpet Creeper (*Tecoma radicans*), will answer the same purpose.

To complete the cheerfulness of the place you want a nice display of flowers on your lawns. How to realize this without losing much time in spring, I shall try to explain in a few words: Many of our choicest flowers are perennials, that is, the top dies off in winter but in spring they shoot up again from the root. Planted in fall on the place where you want them, they flower at their time without any more trouble except the weeding. A judiciously selected collection, gives a variety of flowers during every month in the season.

First in spring and first in beauty are the Tulips, Crocuses, Hyacinthes and Narcissuses. To see them in their gorgeous colors is a treat not to be forgotten. A small assortment for a beginning is within the reach of nearly every one, and afterwards you are able to raise your own bulbs as they increase freely. Set them four inches in the ground, just before the frost sets in, and during the winter months give them a covering of four to six inches of manure, which must be raked off as soon as mild weather in spring sets in.

Next in flowering order are the Columbines (*Aquelega*), or the Bleeding Hearts (*Dicentra*); both very unique and attractive in their colors and forms. The double flowering Rocket (*Hesperis matronalis*), with its spikes of clear white fragrant flowers, is well deserving our attention. The Crowfoots, with their golden flowers; the Pæonies, so very showy and so easily cultivated; the Lychnis and Pink tribe shed their lustre mostly in May and June, just as well as the different kinds of Iris and Evening Primroses (*Œnothera*). The

Millefoil (*Achillea*), Centaureas and the different kinds of Larkspur (*Delphinium*), as well as the Stonecrops (*Sedum*) and the Bellflowers (*Campanula*), bloom in July and August. For fall flowers we have the Monkshood (*Aconitum*), the Day Lilies (*Funkias*); the Phloxes, with their rich colors; the Asters, the Golden Rods (*Solidago*), and many others which are of very easy culture, hardy and herbaceous; and which, when planted in fall, take care of themselves during the season.

If we add to these some of our hardy lilies, which require for years hardly any care whatever, and some of the ornamental grasses as Erianthus, resembling the celebrated Pampas Grass, but hardier, and the Ribbon Grass (*Phalaris*), with its striped foliage, we have the means to plant with them either whole beds or Rabatts leading up to the entrance door.

There are many of us though, who have sufficient leisure to prepare a hot-bed, or at least to construct a cold frame. With this one can raise choice annuals and most kinds of bedding plants, and have them well started about the middle or last of May, when they are to be planted out.

Heat and moisture are necessary for the germination of seeds as well as the raising of plants, but these conditions cannot be had and regulated so early outside in spring as in a hot-bed or a cold frame. To make the former it is necessary to put from two to three feet of fresh horse manure in a bed and cover it with five or six inches of soil, after you have built your frame with a little inclination over it to support the glass (sashes). The manure will ferment and warm the soil, the glass will protect it from cold air, and so earth and air can be kept at such a temperature as is favorable for growing. A frame constructed and put on good soil, without manure at the bottom, yet covered with sashes, is called a cold frame.

A hot-bed may be used for plants and seeds pretty early in the season, say the middle or end of March. To plant in a cold frame it is advisable to wait till the middle of April. In the former you can root slips which you have taken from the old plants in your rooms, for instance, Geraniums,

Fuchsias, Heliotrope, Lantanas, Hydrangeas, and many other bedding plants, and have them fit for planting out by the end of May. Verbenas and some other seeds of slow growth may also be sown in the warm soil of a hot-bed, but most of the fine annuals ought not to be sown earlier than the 10th to the middle of April, and a cold frame will do very well for them in general. Sow the seeds evenly in rows, not too thickly. A partial shade when the sun is hot and the weather dry, is necessary, just as well as airing the bed at that time, to keep it from getting too warm within.

The following is a selection of those annuals which are deserving of our attention and which I can best recommend: The ten-week or annual stocks have the requisites of perfect flowering plants, in regard to habit, foliage, flowers and fragrance. Sown in a cold frame they have to be transplanted when quite small, just out of the seedleaf. When set out they should be about a foot apart. The Portulacca delights in a warm sun and sandy soil, and makes a brilliant bed on the lawn. It bears transplanting very well. The only possible objection to it is that its flowers are fully open only in sunshine. Petunias will make a very showy bed, giving flowers from early summer till after frost. Sown in a cold frame they will produce flowers in June. Balsams or Lady Slippers are wonderfully adapted to our climate. They require a good, rich soil to produce flowers of the greatest excellence, and can be sown in a cold frame. The Asters are favorite flowers; they like a deep, rich soil, transplant very easily, and do well when sown in a cold frame.

The varieties of Dianthus, known as Chinese Pinks, are among the most brilliant of garden flowers. The Phlox Drummondii displays a brilliant mass of colors. A good bed of Phlox is a dazzling sight. There are the Zinnias, Marigolds, Clarkias, Browallias, Gaillardias, Lobelias, Torrenias, Mirabiles or Four O'clock's, Tropaeolum or Sturtions, and many others which we can very properly make use of and raise by seeds in a cold frame.

For the information of those to whom the construction of regular cold frames or hot-beds is not feasible, I wish to give a few hints to aid in raising a supply of flowers even in

a room. Although it is not so easily done, yet a lover of flowers likes to bestow on them a little care and attention, if he can only realize the desired result. Get a few oblong, shallow boxes of a depth inside, of about two inches, bore some auger holes in the bottom for drainage, and fill the boxes with a loose sandy garden soil. Press it down lightly with a flat piece of board so that the rim of the boxes projects a little, then sow your seeds thinly and sift with a fine sieve, some soil over it, according to the thickness of the seed itself. The proper rule is not to cover a seed higher than three times its thickness. Press, with the little board, your sifted soil gently and evenly, and sprinkle it lightly with water. Very fine seeds need only to be pressed in the soil lightly and sprinkled over. Care should be taken that the seeds do not float and warm water should be used for this purpose.

In order to keep an even moisture it is advisable to cover your boxes with panes of glass till the seeds germinate, and to keep them shaded with paper. Remove the shading as soon as the seed leaves appear, and the glass, when the plantlets are a little farther advanced, but not at once; get them used slowly to the air, by tilting up the glass several days before its final removal. If the weather becomes warm, open your windows or take the boxes outside during the day. In this way you get suitable plants for bedding about the middle of May, provided you have done your sowing in good season — by the end of March or the commencement of April.

Now, ladies and gentlemen, having got thus far, I think I will leave the matter in your hands. It was thought advisable not to enter into what is called finer gardening, but rather, the simpler parts of the pleasures that can be derived from this pleasant pursuit. If from what I have said any of the farmers' wives and daughters are enabled to surround their dwellings with the beauties of nature that gladden the eye, and need not lighten the pocket to any appreciable extent, I shall consider myself well rewarded, and I trust that my hearers will this spring — the time is near by — put into practice at least a portion of the recommendations here so poorly made.

SMALL FRUIT NOTES.

By I. N. STONE, Ft. Atkinson, Wis.

If we look back fifteen years and consider the quantity of berries that were grown in Wisconsin at that time, we will find it small as compared with the present supply. Then one bushel per day was considered an ample supply for a village of two or three thousand inhabitants; now five bushels would be a small allowance, even at the same price.

A person starting in small fruit culture in Wisconsin fifteen years ago received the sympathy of his neighbors and friends; and if he was rash enough to put out an acre of strawberries and one or two of raspberries he was considered on the direct road to the poorhouse.

Experience has proved that small fruit growing was at that time as well as at the present, largely experimental. After growing a good crop of fine fruit we reviewed the causes which seem to us to have been effectual in producing it and think we know just how to duplicate it; but even though we follow the same plan of cultivation we may have a total failure from some cause that did not exist in growing the *fine crop*. About nine years ago I had two acres of strawberries that were given the best of care during the growing season, and in the fall they were strong. They were well covered with mulch at the proper time; a part of the winter they were covered with a foot of snow; and then a rain reduced the snow to slush, and a sudden freeze froze the slush solid over the vines, killing nearly all of the fruit buds, while the roots and foliage escaped uninjured.

There was another bed which was allowed to grow up to weeds after fruiting; the snow drifted on to this bed deep enough to prevent ice forming on the plants which came through in good condition fruiting much better than those that had received so much care. The crop was nearly ruined by the snow where the most care had been given, and preserved by it where none had been bestowed. Two years later this case was reversed; a heavy snow fell before the ground froze and nearly all the strawberry plants were

smothered except those located where the wind blew a part of the snow from the beds.

We are still dependent on natural causes for our best crops of berries; even if we select the best varieties and give the best of culture, we may have a failure. In our efforts to control the forces of nature we sometimes increase their damaging influences. Experience has taught me that if strawberry beds are covered before the ground is frozen, they should be covered with light a mulch. Straw is better for winter protection than marsh hay unless the hay is coarse; fine hay is better for summer mulch than straw or coarse hay; chaff is better than either straw or hay for summer or winter protection. I have had strawberry buds injured by ice and other winter causes, when the beds were covered with straw. Where the covering was mostly chaff they would come out in fine condition.

My experience and observation in strawberry culture during the past fifteen years is that there has been greater loss in this latitude from the buds being injured by our winters than from any other cause. This is especially true of the Wilson on account of its buds forming so near the surface. I have known four-fifths of the buds of the Wilson to be winter-killed while Crescents, planted on each side of the Wilson, would, with the same care come out uninjured; but the roots and foliage of both were not injured in the least. The difference was caused by the fruit buds of the Wilson being nearer the surface than those of the Crescent and the ice, forming close about the crown of the plants, killed the fruit buds within its reach.

I know of no remedy to prevent ice from being formed close to the crown of the plant except to use chaff or hay cut fine for mulching. Enough of this can be used without smothering the plants, to prevent the ice from forming solid enough about the crown to injure the fruit bud, unless the bed should be flooded. If a bed should be flooded and freeze over, it would not be injured unless it freeze solid, or the water remain over the vines a week or more. If the water can be drained from under the ice before it freezes solid, it will save the plants.

Mulch should be left undisturbed in the spring until warm weather has come to stay; then it should be stirred or removed from the crown of the plants, if there is enough over them to check their growth. If early berries are desired from part of the bed, take off all the mulch and leave it off until a few days before they begin to ripen, when it should be carefully placed under the fruit stems, covering all vacant places between the plants.

Five years ago it was thought that red raspberries could not be successfully grown in Wisconsin, but now with such varieties as the Turner, Brandywine, and Cuthbert, our markets are being well supplied with home grown berries. These varieties have given better returns since their introduction than the black raspberries, where they have received proper care. The Turner or Cuthbert are the best varieties for home use, and the Brandywine for shipping. By having the Turner and Brandywine the red raspberry season will commence before the strawberry season is through, and will continue until the blackberry season.

Success with the red raspberry depends largely on proper pruning and thinning out the canes. If fruit is desired, all suckers and canes not wanted to fruit should be cut out early in the growing season. The black raspberry season can be lengthened so as to be the same as the red raspberry season, by having the following varieties: Souhegan, Doolittle, Mammoth-Cluster and Gregg.

Black raspberry canes are not generally headed back soon enough to obtain the best results. The Doolittle will not grow much higher after it has been headed back; while the M. Cluster and Gregg headed back at the same time, will increase their height about one-third. This proves that it is necessary to head some varieties lower than others. The same holds true in regard to blackberries. It has been claimed by many that blackberries could not be profitably grown for the market in Wisconsin, on account of the abundance that grow wild in the northern part of our state, and on account of our severe winters. I had a good demand and paying prices for the 8,000 quarts I raised last season, and I am confident that there never were as many sent into our state from

the south and from Michigan before. The northern crop of wild ones was very large also. Even with the large crop last year, the demand seemed to exceed the supply.

My experience in growing blackberries during the past eight years convinces me that I can grow them with as much certainty as any other fruit that I grow; and no kind of berries fills a wider gap in the small fruit season than blackberries; coming before raspberries are gone and holding out until grapes are ripe.

If we compare small fruit growing in Wisconsin fifteen years ago with the present, we can see that we have truly made great advancement. Then five or six weeks was the limit for the berry season; now, with the new and tested varieties of strawberries, red and black raspberries and blackberries, we may extend the berry season over a period of three months. My records show that last season I regularly furnished berries by the case, for market, from the nineteenth of June to the twenty-sixth of September. This could not have been accomplished with the varieties we cultivated here fifteen years ago; but by selecting the best of the new varieties which have come to the front during this time, and by keeping the old tried and true in their proper places, we have been able to accomplish it, and may reasonably expect to continue, with now and then a failure of some one kind in the succession, which will be the exception, and not the general rule.

The customary vote was taken, making those who had read papers on invitation honorary annual members of the Society.

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