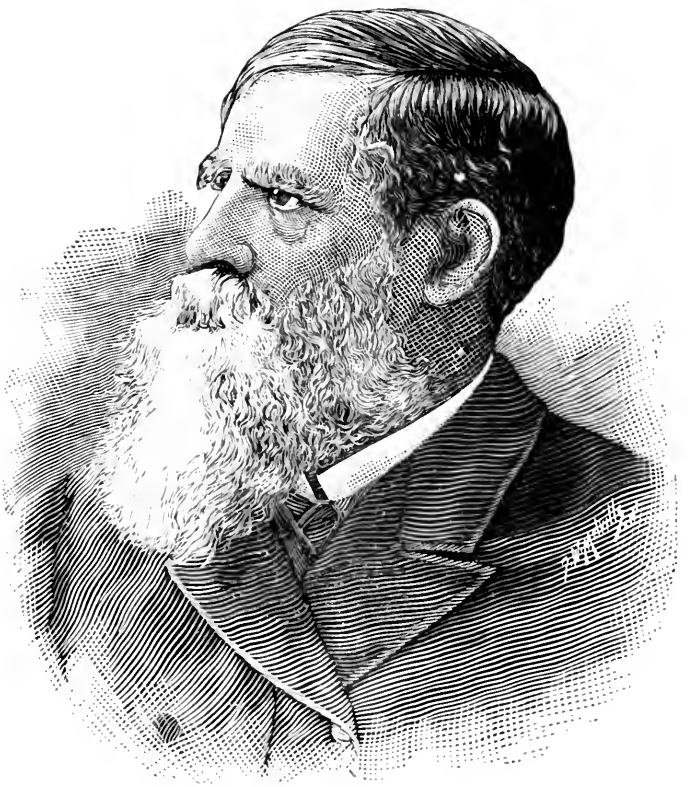


HON. EDWIN WILLITS.

EIGHTEENTH ANNUAL REPORT

OF THE

SECRETARY

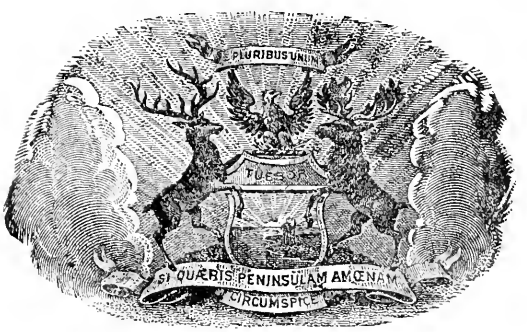
OF THE

STATE HORTICULTURAL SOCIETY

OF

MICHIGAN.

1888.



BY AUTHORITY.

LANSING:
DARIUS D. THORP, STATE PRINTER AND BINDER.
1889.

REPORT OF THE SECRETARY

OF THE

MICHIGAN STATE HORTICULTURAL SOCIETY.

ALLEGAN, MICHIGAN,
December 31, 1888.

To Hon. Cyrus G. Luce, *Governor of the State of Michigan:*

I have the honor to submit herewith, in compliance with legal requirement, the accompanying report of 1888, with supplementary papers.

Respectfully yours,

EDWY C. REID,

Secretary of the Michigan State Horticultural Society.

TABLE OF CONTENTS.

INTRODUCTORY NOTE.

Perhaps the unusually late date of publication of this volume calls for a word of explanation from its compiler. I have only to say that while assumption of duty in the middle of the yearly term, when affairs of the society were in unpromising condition, and unfamiliarity with the labor undertaken, had much to do with this delay, still more is due to excess of work in private business. I trust that the Report's contents will prove to be of sufficient interest and value to partly compensate for the delay.

A new feature of the Report will be found in the transactions of the West Michigan Fruit Growers' Society, embracing minutes of meetings held during several recent years, now presented because untoward conditions prevented publication when they were current. They will be found to contain much valuable matter, especially for those engaged in fruit growing along the Michigan lake shore.

Another portion of the work, while not entirely new, is much enlarged in comparison with former volumes—the portraits and sketches of men prominent in Michigan horticulture in one way or another. There are scores more of those whose achievements or labors justify preservation of a record thereof in these volumes, together with a reproduction, by engraving of their features, that future generations of pomologists may know how the pioneers looked, as well as what they did.

For the excellent plates accompanying Prof. Smith's report on yellows, the society is indebted to Hon. Edwin Willits of Washington, assistant secretary of agriculture, who very gladly placed them at my service.

Although the system of "auxiliary" membership and "branch" societies has been abrogated, reports of a number of district or local societies have been included. Most of those represented have contributed, voluntarily, more or less to the support of the state society, and are willing and valuable aids to our work.

I can not close this note without acknowledgement of the aid given me, by information and counsel, by many officials and members of the society; and specially helpful has been ex-Secretary Garfield, who has not permitted his enforced retirement (by ill health) to diminish in the least his interest in the society or his willingness to serve it to the fullest extent his strength will permit. Nor has President Lyon been a whit less cordial and prompt in aid whenever called upon.

SECRETARY.

OFFICERS

OF THE

STATE HORTICULTURAL SOCIETY FOR 1889.

PRESIDENT—T. T. LYON, South Haven.
VICE-PRESIDENT—W. K. GIBSON, Jackson.
SECRETARY—EDWY C. REID, Allegan.
TREASURER—S. M. PEARSALL, Grand Rapids.
LIBRARIAN—THOMAS H. FORSTER, Lansing.

EXECUTIVE BOARD.

W. K. GIBSON, Jackson, 1 year.
H. W. DAVIS, Lapeer, 1 year.
E. H. SCOTT, Ann Arbor, 2 years.
W. A. BROWN, Benton Harbor, 2 years.
CHARLES W. GARFIELD, Grand Rapids, 3 years.
CHARLES A. SESSIONS, Mears, 3 years.

STANDING COMMITTEES.

ON FRUIT CATALOUGE—T. T. LYON, South Haven, Chairman; GEORGE C. McCLATCHIE, Ludington, for Northern Lake Shore; W. A. BROWN, Benton Harbor, for Southern Lake Shore; EVART H. SCOTT, Ann Arbor, for Central Michigan; H. W. DAVIS, Lapeer, for Eastern Michigan; D. G. EDMISTON, Adrian, for Southern Michigan.

ON NEW FRUITS—T. T. LYON, Chairman; C. A. SESSIONS, Mears; GEO. C. McCLATCHIE, Ludington; C. ENGLE, Paw Paw.

ON FINANCE—E. H. SCOTT, C. A. SESSIONS, H. W. DAVIS.

ON ENTOMOLOGY—ALBERT J. COOK, Chairman.

ON VEGETABLE PHYSIOLOGY—L. R. TAFT, Chairman.

ON LANDSCAPE GARDENING—JAMES SATTERLEE, Chairman.

ON VEGETABLE GARDEN—W. W. TRACY, Chairman.

CONSTITUTION

OF THE

MICHIGAN STATE HORTICULTURAL SOCIETY.

ARTICLE I.—NAME, TERRITORY, AND OBJECTS.

The name of the society shall be the Michigan State Horticultural Society; and its territory shall be the State of Michigan. Its objects shall be the development of an adequate appreciation of the peculiar adaptation of the soils and climate of the State to the pursuit of horticulture in all its branches; and the collection and dissemination of information bearing upon the theory and practice of the same, as well as upon the arts and sciences directly or indirectly associated therewith, or calculated to elevate or improve the practice thereof.

ARTICLE II.—OFFICERS AND MODE OF ELECTION.

The officers of the society shall be a president, a secretary, and a treasurer, together with an executive board of six members, aside from the president, secretary, and treasurer, who shall be *ex officio* members of the said board. Said board shall designate one of its members as vice-president. The officers shall be elected by ballot.

ARTICLE III.—A QUORUM.

Four members of the Executive Board shall constitute a quorum for the transaction of business at any meeting of said board: *Provided*, That each of the members thereof shall have been notified, in the usual manner, of the time, place, and object of such meeting.

ARTICLE IV.—ANNUAL MEETING AND ELECTION OF OFFICERS.

The annual meeting of the society, for the election of the officers specified in Article II., shall occur on the first Wednesday of December in each year, and the officers then elected shall enter upon the discharge of their duties as such, on the first day of January next ensuing; but in case of a failure to elect at that time, such election may be held at a subsequent time at an adjourned meeting, or at a meeting of the society called for that purpose, in the usual manner.

ARTICLE V.—TERMS OF OFFICE.

The officers specified in Article II. shall hold their offices until the thirty-first day of December of the year for which they were elected, and thereafter until their successors shall have been elected, and shall have signified to the Secretary their acceptance: *Provided,* That the terms of office of the six members of the Executive Board shall be so arranged that but two regular vacancies shall occur in each year.

ARTICLE VI.—ANNUAL AND LIFE MEMBERS.

Any person may become a member of the society for one year by paying to the Treasurer the sum of one dollar; and the yearly term of all annual memberships shall expire on the thirty-first day of December of the year for which they were taken, but be regarded as continuous, except as may be provided by the by-laws. Any person may become a life-member by the payment at any one time of the sum of ten dollars into the treasury of the society.

ARTICLE VII.—AMOUNT OR LIMIT OF PROPERTY.

The society may hold real and personal estate to an amount not exceeding twenty thousand dollars.

ARTICLE VIII.—BY-LAWS.

By-laws for the government of the society shall be framed, and when needful, amended by the Executive Board; but changes thereof may be at any time proposed by the society in general meeting.

ARTICLE IX.—AMENDMENTS.

This constitution may be amended at any regular meeting of the society by a vote, by ballot, of two-thirds of all the members present and voting: *Provided,* That notice of such proposed amendment, specifying its purport, shall have been given at the last previous regular meeting.

BY LAWS OF THE MICHIGAN STATE HORTICULTURAL SOCIETY.

I.—THE PRESIDENT.

1st. The President shall be the executive officer of the society, and of the Exeutive Board; and it shall be his duty to see that the rules and regulations of the society, and of the Executive Board, are duly enforced and obeyed.

2d. He may, in his discretion, and in the lack of needful rules during the recesses of the society and of the board, prescribe rules for the management of the interests or business of the society, such rules to continue in force till the next session of the Executive Board, and until by its action they shall have become no longer necessary.

3d. He shall act in conjunction with the Secretary in the preparation of programmes, or orders of business for the sessions of the society; and in the devising of plans and processes for the maintenance of its interests.

4th. He shall have the best interests of the society at heart, and shall lead in forwarding any and all enterprises calculated to add to its permanency, or to increase its usefulness, and establish it more firmly in the public confidence.

II.—VICE PRESIDENT.

The Vice President shall perform the duties of the President in case of the absence or inability of that officer; and may be called upon by the President to assume the duties of the chair at any meeting of the society or Executive Board.

III.—THE SECRETARY.

1st. The Secretary shall be the recording, coresponding, and accounting officer of the society, and he shall also be, jointly with the business committee, its financial and auditing officer.

2d. He shall incur no expenditure of a large or doubtful character, except with the sanction of the Executive Board, or of the business committee.

3d. He shall submit all bills or claims against the society to the business committee for approval, and endorsement to that effect, before drawing his order upon the Treasurer for the payment of the same.

4th. He shall attend all meetings of the society, and of the Executive Board, and shall keep a faithful record of their proceedings.

5th. He shall sign all certificates of membership, and all diplomas and certificates of merit awarded by the society.

6th. He shall have charge of the society's books and papers, excepting only such as by the advice or direction of the Executive Board shall be placed in charge of the Librarian, and he shall be responsible to the board for the safe keeping of the property placed in his charge.

7th. He shall be the custodian of the seal of the society, and shall have authority to affix the same to documents when needful.

and expected to choose a sub-committee for his district, of which he shall be chairman.

3d. It shall be the duty of each sub-committee to collect and report, each year, to the general chairman, such facts respecting fruit culture in the district as shall promise to be of value in the revision of the catalogue.

4th. There shall be a Standing Committee on New Fruits, to consist of a chairman, with as many associates as such chairman shall find it desirable to appoint.

5th. Such other standing committees may from time to time, be appointed by the Executive Board as, in its discretion, it shall deem desirable or necessary.

6th. All standing committees are expected to report at the annual meeting in December any information of value to the society or its members that may have come to their knowledge during the year, as well as any scientific theories, deductions or facts that, in their opinion, may be useful in advancing the objects for which the society is laboring.

IX.—LIFE MEMBERSHIP FUND.

1st. All moneys coming into the treasury of the society in payment for life memberships shall constitute a perpetual fund, to be known as the life membership fund.

2d. The principal of this fund shall be invested by the Treasurer under the advice and direction of the Executive Board.

3d. All interest accruing upon any portion of said fund shall constitute and become part of the fund of the society devoted to the payment of its ordinary expenses.

X.—MEETINGS OF THE SOCIETY.

1st. The society shall hold its first regular meeting for the year during the month of January or February for the inauguration of the officers chosen at the annual meeting held the previous December, as provided in article IV. of the Constitution, and also to arrange its plans of operations for the year.

2d. Its second regular meeting shall be held in the month of June at such date as shall best accommodate an exhibit of the early summer fruits.

3d Its third regular meeting shall be at its annual exhibit of autumn and winter fruits, in the month of September or October.

4th. Its fourth regular meeting shall occur in connection with its annual election of officers, on the first Wednesday of December, as provided in Article IV. of the Constitution.

5th. The times and places for the occurrence of these regular meetings (excepting only the *time* of the annual meeting) shall be determined by the Executive Board.

6th. Other meetings may be called by the Secretary, under the advice or direction of the members of the Executive Board, at times and places by them deemed expedient.

7th. In case of the calling of a special committee for the election of officers of the society, in consequence of any failure to elect at the annual meeting, as provided in section IV. of the Constitution, all persons entitled as members to vote at such annual meeting shall be considered as retaining such membership for such purpose until such election and until such officers so elected shall have been inducted into office.

2d. It shall have power to displace any officer of the society for neglect of duty or abuse of position, and to fill all vacancies by appointment, to continue till the next annual election.

3d. The board shall hold four regular sessions during the year, to occur at the times and places for the regular meetings of the society.

4th. Other meetings may be called by the Secretary, under the advice or direction of the President, or of a majority of its members, at such times and places as may be deemed most convenient; but in all such cases each member must be notified of the time, place, and object of such meeting.

5th. It shall be the duty of the board to carefully guard the general interests of the society, to watch over its finances, and to provide for its necessities as they shall arise.

6th. All important measures shall be submitted to this board, but they may by the board be re-submitted to the society with recommendations.

7th. The board shall at the annual meeting submit through the secretary, in connection with the reports of officers, such farther report upon the condition, interests, and prospects of the society as it shall judge necessary or expedient.

8th. Two members of the Executive Board are to be elected each year, to hold the office for three years, but if any such member shall absent himself from two or more consecutive meetings of the society, and of the board, without reason satisfactory to the board, the said board, may, in its discretion, consider the office vacant, and proceed to fill such vacancy by appointment, to continue to the next annual election.

VII.—THE BUSINESS COMMITTEE.

1st. It shall be the duty of the Executive Board, annually, upon entering upon the duties of the new year, to appoint, from their own number, three members, who shall constitute a Business Committee for the year.

2d. All accounts or claims against the society, when presented to the Secretary for payment, shall, before payment, receive the sanction and endorsement of the Business Committee.

3d. Such claims shall be submitted to this committee and approved in duplicate; one copy to remain with the Secretary as his warrant for the payment of the same, and the other to be transmitted by him to the President, along with his order upon the Treasurer, as his warrant for countersigning the same.

4th. It shall be the duty of the Business Committee, upon application of the Secretary, during the recess of the Executive Board, to advise with him as to the expediency of making any contemplated but questionable expenditure for which occasion may arise during such recess.

VIII.—STANDING COMMITTEES.

1st. There shall be a Standing Committee on Revision of the Catalogue, to be composed of one member from each of the five districts into which the State is, for this purpose, divided, with one member chosen from the State at large, who shall be the chairman of the committee.

2d. Each member of said committee (except the chairman) is empowered

8th. He shall seek, by all suitable means, to secure the fullest announcement of the meetings of the society in this state, as well as in adjacent States, when such shall be found desirable.

9th. He shall, as far as practicable, cause the transactions of the society, together with such valuable or interesting papers as shall be read at its sessions, to be properly published, and thus placed within reach of the State.

10th. It shall also be his duty, yearly, to prepare for publication the annual report of the society, together with such other matter as he shall deem proper—he being aided in the selection of such matter by an advisory committee of the Executive Board.

IV.—THE TREASURER.

1st. All the funds of the society shall be paid into the hands of the Treasurer.

2d. He shall disburse the moneys of the society that shall come into his hands only upon the order of the Secretary, countersigned by the President.

3d. He shall keep the moneys received by the society for life memberships as a distinct fund, and shall invest the same under the advice and direction of the Executive Board, applying only the interest accruing thereon to the purposes of the general fund.

4th. Immediately upon assuming his office, and before entering upon its duties, he shall execute to the society an official bond with sufficient sureties, conditioned for the safe keeping and disbursement of the moneys of the society, and for the proper discharge of the further duties of his office, in such sum as shall be specified by the Executive Board. Such bond shall receive the approval of the President, and shall be deposited with the Secretary.

5th. He shall, at the close of each year, report to the Executive Board the amount of money that shall have come into his hands during the year, the sources from which it has been derived, and the disposition made of the same.

V.—THE LIBRARIAN.

1st. The librarian shall have the custody of the library of the society. He shall be appointed by the Executive Board, and may be displaced at its pleasure.

2d. He shall act jointly with the Secretary in the care and arrangement of the same, and in the reception, custody and disposal of the volumes of transactions annually supplied to the Society by the State.

3d. He shall have the custody of the rooms assigned to the society at the State capitol, together with such books and other property as the society or the board shall direct to be deposited therein.

4th. He shall report annually, at the close of the year, to the Executive Board the amount and condition of the property in his hands.

VI.—THE EXECUTIVE BOARD.

1st. The Executive Board shall enact all rules and regulations for the management of the affairs of the society, determine the salaries of its officers, and assume the control and management of its exhibitions.

XI.—RULES FOR DISCUSSIONS, ETC.

1st. The deliberations and discussions of the society shall be conducted in accordance with ordinary parliamentary usages.

XII.—AUXILIARY SOCIETIES.

1st. The society shall in all reasonable and proper ways encourage the formation of local horticultural or pomological societies auxiliary to this society in all such counties or other municipalities of this State as shall afford a reasonable prospect that they will be able, effectively, to maintain the same.

2d. It shall be the policy of this society in supervising the organization of such local auxiliaries to secure an identity of constitutional provisions throughout, and in so doing to insure harmony among them; but at the same time it will not discourage the including by them of special or local objects in cases in which such shall be found desirable, so long as the introduction of the requisite provisions therefor into the constitution and by-laws of the auxiliary society shall not be deemed likely to interfere with the harmonious workings of the whole.

3d. Any person may become a full member of an auxiliary society, for one year, by paying into its treasury the sum of one dollar; and a compliance with the provisions of clause fifth of these by-laws shall constitute him also a member of this society, for the same term.

4th. The wife, and the resident, single or unmarried daughters of any full member, may also become members of such auxiliary society upon the payment of fifty cents each: *Provided*, That in such case such entire family shall become entitled to a single copy, only, of the current volume of the transactions of this society.

5th. On receipt of the names of such members, with the required fees, the Secretary shall immediately transmit their names and postoffice addresses, together with half the membership fee of each, to the Secretary of this society, who shall record the same and pay the money into the treasury for the benefit of the general fund.

6th. It shall be the duty of the Secretary, on receipt of such remittance, with list of members, to supply such auxiliary society with a certificate of membership in this society for one year, together with a copy of the current volume of transactions for each full member so remitted for.

7th. The proceedings of such auxiliary societies shall, at the close of the year, be forwarded, in succinct form, to the Secretary of this society, to be by him incorporated into the annual volume of transactions, accompanied by a list of its members for the year.

8th. The auxiliary societies shall, as far as practicable, be made the medium for the distribution of the annual volumes of the transactions of the society; the nuclei for its meetings, and the means of creating interest therein, as well as the means of collecting such facts or other information or material as shall, from time to time, become needful or desirable in the conducting of its various operations.

XIII.—AMENDMENTS, ADDITIONS, SUSPENSIONS.

1st. Amendments or additions to these by-laws may be made by a majority vote of the Executive Board, at any meeting; but if objections shall be made the same shall "lie upon the table" till the next regular meeting of the board.

2d. These by-laws, or any one or more of them, may be suspended for the time, by order of a majority of all the members of the society present and voting.

3d. A proposition, in the general meeting of the society, for an amendment or addition to these by-laws shall be referred to the Executive Board for consideration and decision; but the society may submit therewith its advice or request.

4th. All amendments of the constitution and by-laws of auxiliary societies shall, before they shall take effect, be submitted to the Executive Board of this society, by whom their approval or rejection shall be considered upon the principal provided in section XII., clause 2d, and the determination of said Executive Board shall be final and binding upon the auxiliary society.

RECORD OF A JOINT MEETING

OF THE

MICHIGAN STATE HORTICULTURAL SOCIETY

AND THE

WESTERN MICHIGAN FRUIT GROWERS' ASSOCIATION,

HELD AT BENTON HARBOR, JUNE 13, 14 and 15, 1888.

Accepting invitations from the Berrien county Horticultural Society, the two organizations of fruit growers above named began joint sessions in Benton Harbor the evening of Wednesday, June 12. In many respects this joint meeting was both pleasant and profitable; and while the attendance was satisfactory in numbers, so far as non-residents were concerned, it was not so in respect to the fruit growers of Berrien county, who number hundreds (perhaps thousands) but were represented by not more than a score.

The sessions were held in Grange hall, and at the first one, Wednesday evening, President Walter Phillips of the West Michigan society presided.

Col. L. M. Ward made a brief and practical address of welcome, in cordial terms, in behalf of both the horticultural society and citizens in general, speaking in compliment of both the visiting societies. He said there were still living here some of the pioneers of fruit growing, and there are many who took part when peach growing flourished in Berrien county and the peach grower did likewise; and made facetious allusions to the expression they wore of supreme self-sufficiency. But the scourge of yellows came and was followed by organization of a pomological society whose members began searching for light—and are still so engaged. Yet some continue to proceed on theories rather than practice—have too much of the eagle and too little of the owl in the business; but these will surely come around and be as anxious to learn as were others. In small fruits we must learn what to plant so as to avoid gluts, secure variety of product, and consequent good prices. While this is highly important, each one should make a specialty of what he can do best. We have learned that fruit growing is a most complicated business, and that much loss occurs by setting kinds that prove to be unprofitable. That we may learn of these things from your experience, we again express not only a glad welcome but hearty thanks.

Mr. Joseph Lannin of South Haven spoke in behalf of the West Michigan society, regarding it a high compliment to be invited to Benton Harbor, the center of horticulture in Michigan for half a century. We have met Benton Harbor people here and elsewhere, and have always got from them such practical information as we hope now again to receive. While Berrien county did indeed lose her peaches, she is no less famous now for her small fruits. He had heard that were the small fruits raised about Benton Harbor all dumped in a line they would pave a highway from here to Chicago. He had been astonished, riding out from town, to find the whole country covered with fruit trees and plants, and rejoiced to know there was demand for the whole vast quantity. He was moved, in contemplation of our varied and fruitful soils, mild climate, and other blessings, to use the poetry of holy writ: "Our lines have fallen in pleasant places and Thou hast given us a goodly heritage."

President Lyon of the State society said one of the most important benefits of horticulture was its revelation of the adaptability of a country to agriculture. If a land were shown to be friendly to the refinements of horticulture it was proved valuable for agriculture. For this reason, what we have done has been of more value to agriculture than the work of an agricultural society could possibly be. Our exhibits are made in a self-sacrificing spirit and not for advertising purposes, as are many agricultural exhibitions. When he came here fifty years ago it was not known if fruit growing were possible; yet the New Yorkers tried, from their native love of fruits, and the result is that Michigan is proved to have horticultural possibilities equaled by no other state. We have come here to learn of you who were first to begin commercial fruit growing. We may impart but we know we shall receive.

President Phillips spoke in an impassioned manner, saying he would not be true to the emotions of his heart if he did not speak his feelings. He felt inspired by sight of the fruit, the flowers ("alphabet of the angels"), the ladies, and this assemblage of fruit growers, to say that we truly should feel a pride, as we meet, to know our work is raising the people to a higher and more Christian civilization. He eloquently exhorted each to do his part and all to aid faithfully in the progress of the pomologist's exalted calling.

THE SEASON'S PROMISE.

Reports of crop conditions were made by gentlemen present from points on the shore as far as Ottawa county, and east and southeast across the State. These uniformly agreed that apples and peaches were unusually full; pears, good but not so full as last year; plums and quinces, loaded; raspberries, very full; blackberries, a half crop; strawberries, short, except new fields, on account of last season's drouth; grapes, abundant, though in low places a little hurt by frost.

USE OF ARSENICAL SPRAY.

There was much discussion of spraying with arsenites, all agreeing it is effectual as to the codlin moth and many other sorts of insect; but disagreeing as to how it effects the curculio (whether killing the mature insect or only the larvæ), though actual experiments seem to prove that the spray does stop the mischief and provide good crops.

It was the sense of the meeting that it is better to use a weak solution and spray oftener.

One grower would use only soft water, as hard water, he believed, injured some foliage.

E. H. Scott said he and a helper had sprayed 1,700 apple and pear trees the day before, and that with apparatus in proper order it is easy to spray that number in one day.

Two members had found curculio in the fall feasting on ripe peaches.

Some apples have so close a clayx that the poison can not enter. Hence spraying such while in bloom is of no effect, nor just after the bloom falls. It must be done later. Spraying the bloom is likely to prevent fertilization; and it may be done with good results any time before the fruits turn down.

NOT HARMFUL TO BEES.

The question of damage to bees having been raised, J. G. Gould, of Paw Paw, said no harm would come to them from the poison, for his honey sac is not the bee's stomach and the poison probably does not reach the nectar in the blossom. Harm might possibly come to young bees from poison in the pollen on which they are fed, if trees are sprayed when in bloom.

CARBOLIC ACID IN LIME FOR CURCULIO.

J. N. Stearns detailed his plan of driving off curculio, which he said he had found highly successful, although President Lyon had objected to it on moral grounds, as being no better than driving pigs from your own crops into those of your neighbor. Mr. Stearns' method does not destroy curculio but drives them off most effectually. Begin in time—as soon as the bloom falls. Put one bushel of stone lime into a box and throw upon it one pint of crude carbolic acid (costs 75 cents per gallon) and then just enough water to slake the lime to a powder. Let it stand 48 hours, that there may be no lime lumps left. Mount the box of powder upon a wagon, drive along the rows, and throw on the powder with a shingle paddle. Do it when the leaves are moist with dew or rain, and put it on until the tree appears thoroughly dusted. Renew as often as washed off by rain, until the curculio season is past. It is probably the odor of the acid that is offensive to the curculio, although it is well known that any dust is repulsive to them and the insect tribe in general. Use of this almost wholly prevents ravages on cherry, peach, and plum trees, as has been proved by repeated experiment.

OFFICIAL CHANGES.

At a meeting of the executive board of the State society, Wednesday night, the resignation of Chas. W. Garfield, as secretary, was accepted and Edwy C. Reid, of Allegan, was chosen to the place. Mr. Garfield's retirement was made necessary by failure of health and is deeply regretted by every pomologist of the state.

W. A. Brown, of Benton Harbor, was chosen member of the executive board, to fill the vacancy caused by Mr. Reid's promotion.

Thursday—Morning Session.

Joint committees were announced by President Lyon as follows:
Resolutions—A. C. Glidden, J. N. Stearns, L. D. Watkins.
Fruit and Flowers—Wm. Corner, Alex. Hamilton, A. Morrill.

W. A. Brown, of Benton Harbor, read the subjoined paper upon

COMMERCIAL FRUIT GROWING IN WESTERN MICHIGAN.

In a "Catalogue of Fruit Growers and Shippers," compiled by L. J. Merchant in 1872, many interesting facts regarding the early development of fruit growing in the St. Joseph region are preserved. In 1834 a Mr. Brodiss, living up the St. Joseph river, near Niles, supplied the commercial town of St. Joseph with peaches, which were run down the river in a canoe. As the country around Lake Michigan became settled, comparisons of the temperature were manifested by the survival of the semi-tropical fruits on the western shore, and the influence of the lake in the reduction of the temperature in winter, and the retarding of vegetable growth in spring, was proven by Professor Winchell and others; and about 1855 the fruit belt of western Michigan was clearly outlined. Previous to this time several pioneer peach growers had foreseen the important future of the business, and peach orchards of the improved varieties had been planted by B. C. Hoyt, Hon. H. C. Morton, George Parmelee, L. L. Johnson, Captain Curtiss Boughton, and a few others. During this period Chicago began to develop and St. Joe peaches found a ready market. Captain Boughton was the first in the trade, buying and packing in barrels and dry goods boxes. He shipped in his little vessel, selling in Chicago at a large advance. In 1850 he shipped about 1,000 three-peck baskets, very few of which were of improved varieties. The first barrel of good peaches came from an accidental seedling tree grown on the Conger (afterward Stern Brunson) place, now Benton Harbor. They were sold by the captain at auction, in Chicago, and brought $8. The captain planted budded trees at St. Joseph in 1849. Mr. George Parmelee planted his first orchard in 1848, which was subsequently enlarged until it covered 90 acres, when it was sold for $43,000. In 1860 a number of intelligent persons had been attracted to this region and large orchards of peaches and apples began to be planted, and the first berries for market purposes were planted the same year. The growth of the business soon assumed commercial proportions, until, in 1869, 9,314 acres of the various fruits were reported in bearing, in the region tributary to St. Joseph and Benton Harbor.

RISE AND PROGRESS OF PEACH GROWING.

A report made in the St. Joseph Traveler, in 1865, gave the number of peach trees in bearing as 201,603. In 1869 the Hon. John Whittlesey reported the number increased to 335,530. A canvass of six townships made by L. J. Merchant, in 1872, gave the total peach plant as 594,467 acres. The alarming increase of yellows subsequently reduced the number of peach trees rapidly, until in 1878 the beautiful peach orchards of Berrien county were almost entirely obliterated. The virulence of the disease and the magnitude of the loss paralyzed our fruit growers, who refrained from planting

more peach trees until the remains of the old stock was entirely destroyed. The theory that upon the removal of all diseased trees, peaches could again be successfully grown, has been verified, our young orchards having produced fine fruit during the past two years, and very large plantings have been made with full confidence in the successful culture of peaches in the future.

The temporary decadence of peach growing has not detracted materially from the commercial interests of fruit growing in Berrien county. In 1872 the shipments of small fruits had assumed large proportions, which have been greatly increased and diversified by the production of a great variety of horticultural products, until, in 1887, the aggregate value of fruit and vegetable products shipped from St. Joseph and Benton Harbor was estimated at $900,000.

The climatic conditions in VanBuren and Allegan counties, for successful fruitgrowing, are not excelled in the fruit belt of western Michigan. Peach-growing having commenced at South Haven at a later period than in the St. Joseph region, and yellows having destroyed a large part of the orchards in Berrien county before serious damage was inflicted at points further north, our northern neighbors were enabled to ward off the threatened invasion, and wherever the provisions of the yellows laws have been strictly enforced, peaches have continued to be successfully grown.

Within the last decade Allegan has assumed the place of the banner peach-growing county in Michigan. A canvass made by Senator C. J. Monroe of South Haven, last year, shows the total acreage of fruit in the three counties of Berrien, VanBuren, and Allegan, as being: Apples, 38,000 acres in bearing; and peaches, 12,000 acres; in commercial gardening 7,000 acres. The acreage in grapes and small fruits could not be correctly estimated. Mr. Monroe estimated the total home cash value, including packages, at $1,901,960. Six townships in Allegan county produced about the same quantity of peaches as was grown in an equal number of townships [in Berrien county] in 1872.

CONDITIONS FURTHER DOWN THE LAKE SHORE.

Ottawa and Muskegon counties, not having the high, fertile table lands along the lake and river, have generally proved unfavorable for peach culture, extensive orchards having been repeatedly killed by severe winters. Grapes and small fruits are successfully grown, however, at many places, Grand Haven and Muskegon now growing extensively for export.

Oceana county, being on a promontory extending toward the central part of Lake Michigan, with good soil and the necessary elevation, is proving one of the best fruit counties in the belt. A recent summary of the fruit crop in 1887 gives shipments of 63,015 barrels of apples, 21,275 bushels of peaches, and 5,884 bushels of plums. The counties north of Oceana, and bordering on Grand Traverse bay, are growing a variety of fruits, which are celebrated for color, texture, and long keeping qualities.

The highest lands in Kent and other counties in western Michigan are proving to be well adapted to peach growing, and while supplying the local demand, Grand Rapids and other inland towns are shipping large quantities of peaches.

GROWTH OF THE WESTERN MARKET.

During the past thirty years vast improvements have been made in the west, and the adaptability and material interests of different locations have been proven and developed. Railways have opened to settlement a vast agricultural country; cities of metropolitan magnitude have been built, and commerce sustained by contributions levied upon agriculture, while the surplus products of the soil have found a greater or less remunerative market among the great army of non-producing workmen engaged in other pursuits.

When the first Michigan fruits were sent over the lake, the little village of Chicago numbered about 200,000. Now Chicago claims 800,000 inhabitants and will soon make the figure a round million. Chicago, the "Garden City," has absorbed its cabbage fields and swamps and now demands the choicest offerings of horticultural and pomological products from every country and clime to supply the daily demand. The instinct of the human family to partake of the first and best fruits, has been manifested by every country and people, from the good old days of Adam and Eve, down to the present generation of prairie pioneers. Coming from regions in the east, the fruits indigenous to the home of their fathers have been planted in the new home only to blight and die if exposed to the bleak winds and low temperature of the open country throughout the northwest. All of the tree fruits planted by the early settlers throughout the timbered regions of the middle states flourished and produced fruit in abundance until the removal of the forest opened a passage for the fierce winds from the polar regions of the far northwest. The influence of the great lakes in the protection of certain areas of country is becoming more clearly defined by the curved lines of the deadly blizzards which, coming from the northwest, are repelled by lake Michigan, but returning from the southwest, invade the southern central part of our peninsula, thence onward over lakes Erie and Ontario, which again afford protection to the favored regions in northern Ohio and western New York.

THE DEVELOPMENT A NATURAL ONE.

Commercial fruit growing in western Michigan is but the natural result of the climatic conditions of our location and the lake influences, which have so far protected this "infant industry" and must always exist independent of governmental subsidies or the leveling propensities of our people, which prompts them to cut down, drag out, and destroy the last remnants of our noble forests.

LACK OF EFFICIENCY IN MARKETING.

In connection with commercial fruit growing the questions of remunerative markets, transportation and distribution are worthy of more consideration than the limits of this paper will allow. Different systems are being adopted at large fruit growing centers for the distribution of perishable fruits. The fruits of California are placed in all of the eastern markets by a combination of growers, whereby their own agents procure the lowest train rates in cars built especially for the fruit trade. The whole country east of the Rocky mountains is districted, and a full supply of California fruit is constantly offered for sale in every eastern city where a local supply of better fruit does not prevent competition.

Southern perishable fruits find a ready market throughout the north, before our fruits mature, while the inter-state and other coöperative distributing agencies are supplying cities outside of Chicago with car loads of fruit direct from the growers.

The "Chautauqua Grape Growers Union" grade and pool the crop and ship to every town where a car of grapes can be distributed, procuring extremely low freight rates and the cheapest commissions. Although but five per cent is charged for selling perishable fruits in the great eastern cities, the old system of consignment by growers is being almost entirely superceded in the celebrated fruit growing districts on the Delaware and Maryland peninsula. A system of fruit exchanges has been established at all of the large shipping points, where the fruit is sold at auction to dealers from the large cities. The fruit exchange is supplemented by the "bureau of information and distribution," which has already made arrangements to ship train loads of peaches to Chicago, and car-loads to other large cities in the northwest.

HOW SALES ARE MADE IN DELAWARE AND MARYLAND.

In illustration of the Delaware and Maryland system, I will quote here an editorial from *The Farm and Home* of Wilmington, Delaware, published May 31, 1888:

As time elapses, the prospect for a full crop of peaches increases rather than diminishes, and only an unparalleled "June drop" can prevent an enormous yield. With this prospect before them the growers should lose no time in making all possible arrangements to market the crop at a profit. The object to be accomplished is to secure the wide and rapid distribution of the fruit. There are twenty millions of people within reach of the peach orchards of Delaware and Mayland, to say nothing of the much larger number that may be reached by canned and evaporated fruit. There is, therefore, no need of having this crop waste in the orchard nor be shipped at a loss to the growers if all these twenty millions of people can be reached every day in the week. The fruit exchange is taking active measures to secure buyers from all markets, and will, in a large measure, be successful. The bureau of information and distribution, which has been so carefully and thoroughly planned by Mr. Polk, will come in to distribute that which is not bought on the Peninsula. To encourage commission merchants to come here, those who buy for their own houses and pay cash will be given the first choice of their own market, and hence can practically control shipments to that market. Mr. Polk has a long list of towns lying along the main arteries of travel and in the interior of most of the eastern states, which can be reached by direct shipments. Heretofore these towns have been supplied from Philadelphia and New York. The fruit has been consigned to those cities and reshipped the following day by express, but by direct shipments, both time and expense will be saved, and this saving will be sufficient to enable the smaller towns to have a constant supply at very moderate prices. By thus extending the market, gluts will be avoided and equable but not exorbitant prices will be maintained. Fruit growers should therefore no longer delay, but should at once become members of the bureau and stockholders in the exchange. They should organize for the protection of their own industry and not be content to remain longer at the mercy of the men engaged in other pursuits, all of whom have strong organizations for mutual advantage and protection.

OUR FAILINGS POINTED OUT.

Thus it appears that localities hundreds and thousands of miles from the great commercial centers of the northwest, are successfully competing with the fruit growers of western Michigan. Yet we find many chronic grumblers who depreciate the business and cry, "more fruit will be grown than can be profitably sold!" With our great advantages of suitable climate, soils, and central location, we should be able to compete with fruits shipped from the Atlantic and Pacific coasts. We grow the best peaches, pears, and apples, and the only method whereby distant competition can be met is by growing more fruit and the adoption of a system of marketing and distribution whereby every man, woman, and child living in the vast region contiguous to us, and where the fine fruits of western Michigan can not be successfully grown, may have a constant supply at moderate prices. The time has come when the come mercial interests of western Michigan demand a more direct and comprehensiv- system for marketing our fruits.

The immense and increasing demand for the supply of the city of Chicago will continue to require the aid of the established dealers, but that the Chicago commission system has proved costly, inefficient, and unreliable for the distribution of perishable fruits to outside markets, has been fully proved. But the fruits of Michigan are attracting dealers who buy directly from our growers to supply the many towns outside of Chicago, where our fruits are finding good markets. Heretofore very few inducements have been offered fruit buyers at our large shipping points. The individual consignments of fruits to Chicago houses has been so long in vogue, and the presistent soliciting by the numerous representatives of the commission system having been so long endured and paid by our fruit growers, it is hard to leave the old beaten track and adopt newer and cheaper methods of marketing a large portion of our fruits. If the cost of soliciting consignments is paid by the commission houses, would it not be cheaper for them if their agents bought the fruits in our orchards and on our docks? Before fruits can be sold on their merits it will be found necessary to grade and stamp the relative quality upon each package, but before buyers can be attracted a system of exchanges must be established by combinations of growers at the largest fruit shipping points.

A REMEDY PROPOSED.

The Michigan fruit exchange has endeavored to inaugurate some reforms in the grading and marketing of fruits in the vicinity of Benton Harbor, but having been unfortunate in adopting some impracticable measures, has failed to receive the unanimous support of our fruit growers. The fruit exchange still lives, however, and with the objects now in view should receive the support of all progressive fruit growers at this and other points of large production in western Michigan.

The pioneer fruit growers have made apparent the great possibilities of commercial fruit growing in Michigan, in the future, and the intelligent efforts now being made toward better systems of cultivation and the wider dissemination of our fruits, must eventually attract more of the lovers of the most ennobling of all occupations, to the fruit garden of the northwest, and enable us to supply and control, during our season, the markets of the vast region naturally tributary to western Michigan.

Following this paper, discussion began on

HANDLING OF PERISHABLE FRUITS.

Joseph Lannin, of South Haven: If there was ever a year it is this, when fruit growers should take action for mutual assistance and protection, because of the great prospective amount of their product. The immense quantity of fruit grown in and imported to this country shows that we are a fruit-eating people, the only question being how to quickly and cheaply carry it from producer to consumer. The exchange system is still in its infancy, both as to transportation and system of sales. I have thought that each man could make his own market, but my mind has changed and I now think combination is necessary. As it is at present, the merchant, carrier, and package-maker all get their pay first and we take what is left, if anything. It behooves us to do all we can honestly to make our share as large as possible.

J. N. Stearns, of Kalamazoo, indorsed these views in all respects, although he had made a special effort to provide his own market and had to some extent succeeded. Doing so makes more work but he had had 100 per cent better prices by doing it.

THE "EXCHANGE" PLAN OF MARKETING.

W. A. Brown, of Benton Harbor: Success of the exchange system here depends on co-operation of other localities. Our exchange has but 35 members out of the hundreds of growers here, making by no means the unanimity wished for. Mr. Whitehead is our agent in Chicago, and it is a question if we will be able to pay him $65 per month. We do not ship many peaches, though we expect to do so ere long. Berries are now fetching $3 to $3.50 per crate in Chicago. While these rates hold none will go beyond Chicago, but this will not be so, later, and we can well afford to pay one man $65 per month if the Chicago commission men can pay 100 men to ride over this country and tell us what to do.

A. J. Knisely: We hope to arrange to have one cent per package kept out by the merchants and returned to the exchange and expect this to be sufficient for all expenses, any surplus to be distributed or deficiency to be assessed. By means of the exchange our fruit receives superior care, both in transportation and sale and it seems a disgrace that we have not acted sooner and more effectively in this way. But we have a peculiar class of growers here. They scoff now at spraying, as they scoffed also at laying down blackberry bushes for winter, but they take up these things after others have delved them out and they get both theory and proof in the papers.

C. W. Whitehead, of Benton Harbor: I was appointed a committee to see the officers of the C. & W. M. road, and was successful in getting a hearing from them and an offer to let the fruit growers run their fruit train at the same rate now paid by the American express company. But the growers have failed to act upon this opportunity. Our plan of taking care of fruit at the terminals is the true one. Much injury is done to fruit by expressmen in Chicago, which may be prevented by watchfulness of an agent. A saving can be made on cartage—it may be got for a half cent, whereas now from one to two cents are paid. The commission men do not own teams but contract with draymen. By making these contracts ourselves we can effect a saving, and by other such cuts can gain, in the total, thousands of dollars. Last year I sent car lots to Minneapolis and St. Paul, 600 miles, for only

one-half cent more per package than others paid for carriage from here to Chicago, 60 miles, and got four hours' quicker time than other shippers.

W. J. Jones, of Oronoko: How does Mr. Whitehead secure better care? If I go over to Chicago and speak to boatmen or expressmen about the handling of fruit, they talk back. No individual can secure extra care for certain packages as against others shipped with them, though we can get benefits from watching the sales. We sell grapes for two cents per pound which the consumer pays ten cents for. Fruit is sold on its merits, but we only get what is left after charges are paid. No man can control packages in transit. If he tries to he will be told to mind his own business.

W. A. Brown: If we combine and send a man over, he will be recognized by expressman, cartman and merchant. We can say: "Handle that fruit right or we shall have another man handle it."

A. J. Knisely: We have agreed that it is perfectly right and legitimate to have two stencils, one for best goods and one for inferior, but both marked X, meaning exchange. We get better transportation, cartage, etc., and dealers and carriers soon learn that X goods must be well handled or they will lose exchange trade. We do not put the exchange brand on poor fruit. We need a man over there to see where Mr. Jones' lost eight cents go. Mr. Whitehead can do these things for all of us as well as each could do them for himself. Ten thousand cases will command respect when ten would have no attention.

Mr. Whitehead: When I first asked parties for space on boat or car, it was refused. I said: "You give space to the express companies?" "Yes." "Well, the Benton Harbor fruit exchange have the same rights as express companies." "You can have space, sir." All we have to do is to ask for these things. Our goods are off the boat as soon as express goods are, and in time for the early northwest trains. All this was long ago demonstrated by the Illinois growers, and the wonder is that our people are so slow to see the advantages. We have brains enough to run our own business, and these carriers and merchants are in fact our servants or agents, and we have only to insist on this. We can make them drive slowly and keep the packages right side up. Cartage may be had for half a cent per case, and we can get a less charge from merchants because we send daily large shipments. We can by the exchange plan get our fruit sold for five cents. Much depends on size of shipments and regularity.

J. C. Gould, of Paw Paw: I believe the exchange plan is practicable. I have been refused information as to where my fruit went; but, in one case, finding out, learned that my returns were just half what the fruit sold for.

Wm. Corner, of Ganges: I cannot see how this can be made to work unless we get a general combination, for otherwise the commission men will head us off.

A. Hamilton, of Ganges: If commission men can do better than a fruit exchange, why do they not do so? If organizations show best results, all will join.

Walter Phillips: Yes, but we must organize to make the test.

J. N. Stearns, of Kalamazoo: Have you tried the New Jersey plan of sales on track?

Mr. Whitehead: No, but knowledge that we have an exchange here brought many buyers who took large quantities of apples.

S. G. Antisdale, of Benton Harbor: The best of our apples sold right here,

in car lots, directly through the agitation of this fruit exchange. One day there were ten buyers of car lots and on other days from three to five.

A. C. Glidden of Paw Paw: The plan of the Delaware exchange (sales by auction on the track) does well where there is much fruit of one kind, as apples here or peaches in Delaware and New Jersey. The sales are made direct and there is no chance for stealing. The fruit is inspected, branded No. 1, etc., and so goes on the market. Last year people came to Lawton and bought grapes in car lots. I think this plan will be the end of all this agitation.

Mr. Antisdale: Every package might be sold here if growers would accept a fair price; but nearly every one thinks he can do better in Chicago, though very often they fail to do so. For the present state of affairs the fruit grower is as much to blame as the commission man, for he wants it all and more too.

COMPARATIVE HONESTY OF FRUIT GROWERS AND "COMMISSION MEN."

A. Morrill, of Benton Harbor: We sent one year by the fruit exchange, but the whole effort was spoiled by some dishonest packers. There was no actual inspection, while all the fruit should pass before one competent inspector. It is a too common practice to stuff berry boxes—put poor or worthless or sandy fruit under that which is sound and good. The members of a fruit exchange should pass inspection, too, as well as the fruit. They should be found honest, and if one turns dishonest he should be expelled. I think it is not possible to watch all the draymen; but we can get space on the boat and dock and should hire our own teams—we can get them for half the present cost. If you are dealing with a commission merchant, make it his interest to do well by you, by good honest packing, and don't quarrel with him. If you beat him down to six or eight per cent he will get ten just the same, in some way. Some commission men are thieves, but the average of them—I say this with regret, but it is a fact—are better than the average of fruit growers. Parker Earle exercises the utmost thoroughness and honesty in the packing of his fruit and he gets two or three times what others receive. I always guarantee the even quality of my packages, having packers to rehandle it after it comes from the field. I have dealt with two merchants for eight years, and last season I got $3.50 per case for all my raspberries except 25 cases. If all would do this there would be no need of a fruit exchange; yet I believe that it is necessary to handle the bulk of the crop by the exchange plan. The exchange should issue circulars to all dealers within 300 miles, inviting them to come here and purchase. Special express rates could no doubt be obtained.

Mr. Hamilton: I must protest against the applause given the statement that the average of fruit growers are dishonest. It is not so! I am ashamed of you!

Nevertheless, several members insisted that Mr. Morrill was right, and cases were cited wherein men had put bad berries and sandy ones at the bottoms of boxes, filling up with good fruit; or topped off poor ones of one sort with good ones of another. The practice of letting pickers take cases to the field was condemned. They will cheat, and if you put your name on the cases you will regret it. Experienced packers should be employed or the grower should do the packing himself. The sins of pickers were instanced. They have been known to put in leaves and litter, in one case a dead frog(!) and

even to turn some boxes up with no berries at all or only some in the bottom. Mr. Morrill said he had often bought peaches in Chicago and always found more or less deception. West Michigan fruit has the worst reputation of any on South Water street. This is grievous but it is true.

FAULTS OF NURSERY STOCK.

Mr. A. Hamilton of Ganges read the following paper on "Reasons why nursery stock does not always prove true to name."

I am asked to give you the reasons why nursery trees do not always prove true to name. I might do so with a very short paper, by simply saying that it is because nursery trees are not always correctly named; but I desire to say just a little more.

As a rule, no nurseryman, honest or dishonest, intending to continue in the business, will sell to the grower trees that he knows are not true to name. As a matter of business he could better afford to make you a present of ten trees correctly labeled than sell you even a single tree that would not prove true to name; and yet you know there are hundreds, yes, thousands of trees coming into bearing each year that are not what they were named, and the question now to be answered is, how does this occur?

It sometimes occurs through the mistakes or carelessness of honest nurserymen who, by mistake, are shown and cut their original buds or grafts from the wrong tree, or depend upon some one else to furnish them. It frequently occurs through dishonest nurserymen selling to dealers, who may be ever so honest, trees that he is not sure of, and on that account does not sell to the growers himself. But it most frequently occurs through our giving our orders for varieties that are scarce, to the gentlemanly appearing and captivating tree peddler, who always seems to have a great abundance of just what we need, and cannot find elsewhere.

I could refer you to hundreds of growers in western Allegan county, who, each year, after the popular varieties are exhausted at the nurseries, give their orders and pay big prices to these fellows, expecting to get kinds that the nurseries cannot supply; and instead, when their trees come into bearing, only get experience.

Following this, Mr. G. H. LaFleur told how easily honest nurserymen may make mistakes. Employés may mix the buds, when at work with peaches, and sometimes this does occur; label stakes may be knocked down and the men put them up wrong. But such are not the worst errors. Seedling buds may get among the better sorts, by misinformation from growers, or by other means. There are dishonest nurserymen, of course, but tree-growers are, as a class, as honest as other men. If your home nurseryman is honest and trying to do as he should, patronize him; but require him to make good his mistakes, so as to keep him careful.

Wm. Corner, of Ganges: Nurserymen are often out of desired sorts. Can not western Michigan grow enough trees for home use? I would prefer to wait two years rather than buy of the tree peddler.

H. Dale Adams, of Galesburg: Up to the time of digging, there is no possible excuse for error, unless as to some new kind the nurseryman is unfamiliar with.

A. Hamilton, of Ganges: It is impossible to distinguish between Early and Late Crawford in the nursery row. I was once deceived by scions obtained

for Amsden but proved to be something like Mixon. Again, I was given Rareripe for Early Crawford, and Barnard for Louise, by growers who are ordinarily careful. Such things will occur to any nurseyman; and while he is responsible, it does not follow that he is dishonest.

THE WICKED "SUBSTITUTION" CLAUSE.

A. Morrill, of Benton Harbor: We should unite against the substitution clause in all contracts and orders. As an illustration of how some dealers and growers operate, he said he once bought of Lovett of New Jersey a quantity of blackberry plants. They were sold as Early Harvest but proved to be Bronze Early, a worthless sort. He had three acres of them and sold some, but the whole proved a total loss. He wrote Lovett, who answered that he "bought them of a western party supposed to be reliable." Such transactions, said Mr. Morrill, are not legitimate. A nurseryman should know, especially in cases of high-priced sorts.

President Lyon (referring to claim of H. D. Adams and Joseph Lannin that it is easy to detect the difference between the Crawfords): There is not an apple, pear, or peach which can always be detected from some other. Variations are made by different soils and circumstances and the season; even a change of soil in the same nursery will often effect decided differences in appearance of the same variety.

Thursday Afternoon Session.

The afternoon was spent, Mr. S. G. Antisdale presiding, in revision of a portion of the State society's fruit catalogue. Strawberries, raspberries and grapes were passed upon, Mr. Lyon saying he desired to make this review as thorough as possible, as probably it was the last time he would have to do with the work.

Changes were made chiefly because, in the varieties dropped, they are no longer cultivated in the state or have proved to be quite worthless in this region, however desirable they may be elsewhere. Some additions were made; but the details are needless here, as the revised list is given in this volume and the changes may easily be noted by comparison with the former list.

Thursday Evening Session.

The Thursday evening session was opened with prayer by the Rev. Dr. Eastman, a quartet of gentlemen following with a stirring song, "The Bugle Horn."

Mrs. N. H. Bangs of Paw Paw read a paper on Home Adornments.

Hon. Thomas Mars, master of the Michigan State grange, was called upon for remarks upon this topic, and in response made several highly sensible observations.

W. A. Smith of Benton Harbor read a paper on the

HISTORY OF SMALL FRUIT CULTURE IN BERRIEN COUNTY.

The culture of small fruits in Berrien county bears a close and striking similarity to the development of the same industry in many other localities

of our country. When some of us were boys, about everybody depended upon the spontaneous productions of nature for their supply of these household luxuries. When the days grew long and the nights short, we would range the field and meadows over, in search of the few small scarlet strawberries, found here and there among the tall grass and weeds; later, the old tumble-down, moss-grown, worm fence rows, were followed for miles in search of the small seedy black raspberry, the seeds for which the birds had doubtless carried there years before, and planted in those by-places for their own gratification and subsequent supply, and later still, the burnt districts among the timber belts and many old worn-out and abandoned fields, furnished us a rich harvest of good ripe blackberries and dewberries. In addition to these, the wild red raspberry, then as now, furnished a good supply, in many sections of the country, while the mountains, the hills, and the marshes yielded, as they still do, our entire supply of that fine little fruit know as the huckleberry. It is a matter of some importance for some enterprising fruit grower to tame this bush, and make it yield a larger, better, and more abundant supply of fruit than it does in a state of nature and also nearer home. The time required in gathering most of these wild fruits is much greater than that necessary for cultivating them around our respective homesteads. And when we take into consideration the superiority in quality, size, and yield to those cultivated, over the wild types, except perhaps the huckleberry, we need not wonder that the wild types are being neglected and discarded. In the case of the cranberry, the same remarks hold true. The people of any neighborhood are somewhat like a flock of sheep—when the leader goes over the fence, the whole flock follow, except some poor cripples who dare not venture.

I might take up your time in giving the names of some of our pioneer fruit growers, in this section of the state, some of whom have laid down the shovel and the hoe, and long ere this gone to their final resting place. An outline of their work, and their success, has already been given to the public, through the effort, and so far as I know the gratuitious labors, of the painstaking and lifelong horticultural student, President T. T. Lyon, in the last report of the State society, and who is with us to-day.

Owing to the peculiar geographical location of Berrien county we have perhaps made greater progress in this line of industry than many other sections of this state. In the early rise and progress of fruit culture, especially the small and tender varieties, it was necessary to have speedy and convenient transportation to market. Our water-ways were then the only means of reaching markets any considerable distance from the grower. The harbors and shipping points of the lake supplied the only available outlets; and the fruit centers nestled around these localities. Small fruits in those early times sold high; the demand was greater than the supply, and the value of real estate about these fruit centers rose correspondingly high. Many launched their boats, as they supposed, on the tide of great prosperity only to sink in the vortex of financial bankruptcy.

I have known strawberries, of very poor quality, to sell for $12 per bushel, blackberries by the case for 50 cents per quart, and whole crops of blackberries for $8 per bushel, net. But this was in war times when we had a high tariff and everybody had stamps. Since then, many ups and downs have occurred in this business, like all others.

Railroads have stretched their long iron arms out into almost every part of

the land, gathering up and distributing the products of one zone to another, as though everybody was next door neighbor to everybody else. This equalizes production, and brings not only the necessaries, but also the luxuries from all lands to the door of every well-to-do household. Small fruits are no longer a luxury, unless it is with some of our rural population who can not find the time to give them care and culture. About everywhere they have become a household necessity, and not only in their season, but throughout the year, are found upon the sideboards of our wage laboring people as well as the rich; even the poor are not deprived of their use.

SMALL FRUIT CULTURE NOT HIGHLY PROFITABLE.

The culture of small fruit is no longer a bonanza. Like all articles of commerce, their value is regulated by quality, supply, and demand. The question is no longer how can we grow them, so much as where can we find a market for what we do grow. This occurs, at least, when there is a general full crop in the various fruit growing sections. Some years the margin of profits was so low that we could better afford to abandon our crops than gather and ship them. In the early time of this industry here, our transportation was higher than now, but we were not blessed with the give-away package. We made our own packages, and had them returned, thus saving a large expense to the shipper. But the commission men, who were taking their 10 per cent toll, besides the stealings incident to the business, complained of their great hardships, and by various means the entire system of shipping was changed. I bought my first quart-box material from Mr. Wilcox and made the packages at home. This was the first attempt at quart-box manufacture in this section, as far as I know. This was some 16 or 18 years ago. The material was cut by hand, with the help, I think, of one man. The amount of timber consumed by that establishment was comparatively limited. Now, the country round about is being stripped of its little remaining saw and box timber, to supply the numerous establishments engaged in making these give-away fruit packages. Sooner or later, we will have no timber protection for our tender fruits, and the business will eat itself out, like the Kilkenny cats. Our manufacturers have struck a new key; they are now reaching south, where timber is plenty and cheap, cutting it and shipping it north in the flat, to be made up ready for use. When fruit is plenty and low, and these expenses all coming out of the business, as they necessarily must, the margin of profit to the grower runs low. To find a ready sale at good figures, our goods must have qualities to recommend itself to the buyer.

Only those who will grow good fruit, pack and ship with care, guarantee the quality of their goods, and use a good business management generally, can effect satisfactory results.

EXTENT OF THE BUSINESS—SOME PIONEERS.

From the most meagre beginning, in less than twenty years the culture of small fruits in this locality assumed a most important commercial attitude, the shipments reaching as high as 14,000 half bushel cases in a single day.

Among the pioneer fruit growers in this part of the country, allow me to mention the names of David Brown, who, I am told, shipped the first straw-

berries from this harbor to Chicago, in the year 1861, and a year or two later he shipped the first blackberries (Lawton) to the same market; and he is still engaged in the same business. Among others may be named Samuel Jackson and A. C. Fish, who have long since crossed the dark river.

SOME OBSTACLES.

In pursuing commercial fruit growing, the question ever occurs: What shall we grow? This is far more difficult for the veteran than the beginner to answer. Our soil does not respond to our demands as it did 20 or 25 years ago, when we had a virgin soil and plenty of timber for winter and summer protection. Varieties, too, seem to run out and have to be replaced by others, more vigorous, more hardy, and better adapted to the wants of the day. Many varieties that years ago proved entirely satisfactory and were profitable to grow, have since been discarded, some for one reason, some for another. None has stood the test better than the Wilson strawberry; and there are yet those who consider it, for all purposes, the best berry to grow. But other varieties are fast taking its place, and unless the difficulties (liability to leaf rust, etc.) are overcome, it will sooner or later be entirely discarded as a commercial berry. For home use it will stay yet a good while. The Crescent is fast coming into general cultivation; being a good berry and exceedingly prolific will make it a favorite for years to come. There are many new varieties being introduced every year, with the most seductive names, the Sucker State for instance, Jumbo, Big Bob, and others with names perhaps equally felicitous. Perhaps one in the score or so of these new comers may prove a valuable acquisition.

Among raspberries the same rule holds true. The old Doolittle and Clark have gone; the Turner is going, or will go as soon as a substitute for it is found worthy in all respects to take the place of the good old Turner. Perhaps the Marlboro may, but so far it has proved a slow grower. The Cuthbert is today, in this country, the leading red raspberry, and well it deserves the reputation it has.

Among black caps, the Gregg, for late, has no peer. The Tyler, for early, gives equally good satisfaction.

Among blackberries we are more at sea. Our best varieties are somewhat tender, and must have winter protection to secure a crop one year with another. This department of horticulture is being eliminated to several ironclads, such as the Snyder, the Western Triumph, and Taylor's Prolific, that need no winter protection in favorable localities. The Lawton, Kittatinny, Wilson, and Early Harvest, especially the two latter, must be well protected in the winter to insure a crop. When thus protected they yield bountiful crops, and for home use I consider the Early Harvest the best of all blackberries. These are the leading varieties of these fruits, now in general cultivation in this county. Many new varieties are being tested, and sooner or later we may effect some good results from some of these trials.

Friday Morning's Session

was under the chairmanship of the late Hon. H. C. Sherwood of Watervliet.

First in order was a paper by Secretary Geo. H. LaFleur of the Western Michigan society, on

PREACHING AND PRACTICE.

Men have been engaged for many years in fruit growing and have talked and written a great amount, and it would seem that they should be well posted in that line of business; and yet the masses are hardly out of the rudiments. This is not because they have lacked the opportunity to learn, but in most cases it is a want of application of the knowledge they have gained.

Many men seem interested in the teachings and the statements made by intelligent and practical fruit growers. But they forget to put into practice what they learn and cling to the old ways of their fathers and continue to travel in the old ruts.

Most of the first orchards which were planted in Michigan contained too many summer and fall apples and the few winter sorts were not altogether the best sorts for market. A few fruit growers hit the right thing and only planted a few of the best winter varieties. But it took many years to bring into practice by the masses what they know. Even now some men have not learned what varieties constitute a good orchard.

Since the organization of so many horticultural and pomological societies, fruit growers have given much more serious thought to the questions connected with fruit growing. The educational effect upon the people is in the direction of progress. Some of the most successful fruit growers have been willing to give others the benefit of their knowledge, and yet the majority of farmers do not appreciate, or do not fully comprehend or understand, many of the facts so often demonstrated to them; or they do not put into practice what they really know.

The man who attends public meetings and talks what he does not practice can have but little influence over others, as we look upon such men as mere theorists, and most fruit men have learned to place but little faith in theory until it has been practically demonstrated. While on the other hand the man who comes with practical ideas gathered from experience in the orchard, garden, or vineyard, and can give ocular demonstration of his teaching, how eagerly we listen and learn of him!

THEY HEAR BUT DO NOT REMEMBER.

All observing fruit growers have learned that climate, soil, and elevation have much to do with success in fruit growing. High ground, with good natural water and air drainage, is much better adapted to the peach than low, level ground. After all that has been written and said upon all these points, it would seem that most men should be well posted upon these things; and yet we frequently find men planting the very kind of fruit which will be sure to fail, when, if they had heeded what had been told them, they could have made a success instead of failure by planting the right kind of fruit. These

same men have had opportunity to observe these things and been told by others some facts in relation to the adaptability of fruits of different kinds to their soil, yet they failed to profit by what they had learned.

THE CONDITIONS WE HEAR OF AND THOSE WE SEE.

Much has been said on different occasions in relation to the farmer's garden, and many valuable suggestions offered. When we listen to these statements it seems an easy matter to have a good garden, with plenty of vegetables and berries on the table. I have no doubt that a thousand resolves have been made that we would go home and commence from that day to have and enjoy the luxuries so graphically pictured to us. These resolves are no doubt made in sincerity, and we picture to ourselves something in the garden similar to the one displayed on paper. But alas! the cares and hurry of farm life, with financial and perhaps political matters, crowd out these good resolves and we fail to put into practice the beautiful lessons taught us in relation to horticulture. Where we imagined a rose bush or other ornamental plants and flowers, we find that we have too often dock, thistles and weeds. Where on paper we had seen the choicest of vegetables, crisp and fresh from the garden, we too often find a scanty supply for an excuse for such things, and even these are the product of the care and labor of the wife and children, who stay at home and work in the garden at odd times when the men are away attending some farmers' institute or pomological meeting, listening to the fine sayings of some other fellow whose garden is a duplicate of their own. I speak from experience.

Many papers have been read, followed by discussions, in relation to the proper method of cultivation and pruning the apple orchard. The system taught is all right, but the neglected appearance of so many apple orchards show how ill these lessons are heeded. If we have failed to teach men the practical part of fruit growing through the exercise of our mouths, or by drawing pen pictures on paper, perhaps we could impress upon them our ideas and induce them to practice what we preach, if we should give them ocular demonstration of our theories in our own orchards.

Commission men and buyers of our fruit tell us that much fruit comes to them direct from the grower, put up in so slovenly a manner as to render it unsalable. They tell us that more money would be sent us in return for this same fruit if the "snide" part of it had been kept at home. The inferior portion destroys, in large measure, the value of what is good. Papers have been read, letters have been written, appealing to fruit growers to pack their fruit honestly and properly. Every man who says anything upon the subject of packing fruit advocates honest packing. Every farmer or fruit grower will tell you that honest packing is the proper way to secure good prices. All agree that it is the true and best policy. Are all these lessons heeded and reduced to practice when we come to the business part of fruit growing? We have passed resolutions in favor of full, honest packages of every kind, and also in favor of good, honest packing. Instruction has been given, time after time, how to do these things, yet manufacturers tell us that a real, full-size, honest package finds little or no sale. If we must use scant packages they ought to be filled with good fruit, such as we would desire to buy if we were the consumer at the other end of the route. If we have failings on our part

as growers let us talk up that side. It is better to state honest facts, rather than flatter each other with whitewashed statements.

J. Lannin: Perhaps the men who do these things may be charitably considered as not fully instructed; they are largely the men who do not attend the horticultural meetings nor read. We are apt to speak of all horticultural knowledge as of recent discovery; yet we learn from Homer's Odyssey that 1700 years before Christ they had black, white, and red grapes and thoroughly understood their propagation and culture, though probably they had little scientific knowledge of plant growth. But in other respects there has been a great advance in knowledge, and the fruit grower who does not avail himself of it is not wise and must often suffer for his ignorance.

W. A. Brown thought more of the intelligent fruit growers should contribute in the way of papers to these meetings. He thought the growers should patronize the newspapers that devote space to these subjects.

The committee on fruit exchange reported that they had nothing to offer; that it was useless to advance in western Michigan until they had more general support at home.

REPORT OF THE COMMITTEE ON RESOLUTIONS.

The committee on resolutions submitted the following, which was unanimously adopted:

Individual thought links itself with its fellow. Individual interest seeks a common good. Like employments become banded for mutual protection. So up and down this shore come the fruit growers of western Michigan to consider questions common to the welfare of all. While these unions are natural and necessary, a large measure of responsibility rests on a few individuals who perform arduous duties and assume large responsibilities. To such persons the commendation of "well done" is the only recompense which a well pleased public can bestow. The good people of Benton Harbor have earned a wide reputation for a generous hospitality in the past, which is still creditably sustained. The fruit growers surrounding and contiguous to this harbor have large hearts and a wide hospitality. The Grange has an ample hall, fittingly arranged, which is surrendered to this society. The bugle notes of the local glee club are resonant with agreeable harmony. The writers and speakers have pleased the attentive listeners. To all these, and such others as have in any manner contributed to the interest of this occasion, the West Michigan Fruit Growers' Society offers its many thanks; and its members hereby pledge themselves to reciprocate in like measure whenever the opportunity shall occur. The present meeting confirms the conviction, already very well settled in the minds of this society, that the responsible duties assigned its officers are well performed; and we hereby express our hearty thanks for their unceasing attention and frequent forbearance. Signed by the committee.

A. C. GLIDDEN,
J. N. STEARNS.

E. C. Reid offered the subjoined resolution, which on motion of W. A. Brown was adopted without dissent:

Resolved, That the Michigan State Horticultural Society and West Michigan Fruit Growers' Association in joint meeting assembled, extend to ex-Secretary Garfield their sincere sympathy in his physical affliction, hoping that

he may soon be fully restored, deeming his health and possible future labors of the highest importance and value to the horticultural interests of the state; and that we hereby express our appreciation of his services in the past.

REPORT ON FRUITS AND FLOWERS.

Nothwithstanding the meeting opened two or three days too early for June roses and strawberries, your committee beg to report a creditable exhibit of strawberries, consisting of two boxes each of the Crescent and Glendale varieties, by S. Mars of Stevensville. W. M. Smith of Stevensville contributed fine ripe specimens of Champion and Sucker State, also several boxes containing stools of several varieties.

R. Brunson and others of Benton Harbor showed boxes containing plants of several new varieties of strawberry, which were not sufficiently matured to judge of their characteristics.

W. A. Brown placed a plate of Cooper's Market apples grown by M. Dansforth of St. Joseph, which were perfect, and verified the claim for this variety as being the best long keeper.

Wm. B. Andruss of Allegan placed upon the tables a magnificent exhibit of twenty-one varieties of winter apples, all of his own growing. They were these: King, Wells, Northern Spy, Hubbardston, Rubicon, Smith's Cider, Stark, Ben Davis, Cooper's Market, Jonathan, Baldwin, Detroit Red, English Streak, Ostend Greening, Danvers Sweet, Melon, Baltimore, Yellow Newtown Pippin, Rawle's Janet, Yellow Belflower, Munson's Sweet.

Mrs. J. Burridge, of the committee on decoration, placed a beautiful pyramid of flowers on the tables, early in the session, which was supplemented subsequently with many floral contributions, among which a most exquisite wreath of flowers by Mrs. W. M. Smith of Stevensville attracted much attention.

W. A. BROWN,
WM. CORNER,
Committee.

After a vote of thanks to the presidents and secretaries of the two societies, the joint meeting adjourned *sine die*.

EIGHTEENTH ANNUAL MEETING.

HELD IN GRAND RAPIDS, DEC. 3, 4, AND 5, 1888.

PRACTICAL PAPERS ON IMPORTANT SUBJECTS, BRIEFS OF THE DISCUSSIONS—REPORTS, QUESTIONS, ETC.

The eighteenth annual meeting of the Michigan State Horticultural Society was held in Grand Rapids, December 3, 4 and 5, 1888, there having been no summer or autumn meeting, the joint meeting, at Benton Harbor, in June, with the West Michigan Fruit Growers' Association, answering to the former, while no fall meeting was held because of several adverse conditions, chief among these being the enforced retirement of Secretary Chas. W. Garfield, on account of failure in health, and the ensuing and unavoidable confusion of the society's affairs. For this meeting the appended programme was provided.

SCHEME OF TOPICS.

MONDAY EVENING.

8:00 O'CLOCK. ANNUAL MESSAGE OF THE PRESIDENT.

PROFITABLENESS OF HORTICULTURE, Including the culture of fruits as usually conducted, compared with what is known as "intensive horticulture."

In what does the difference consist?

What is the result of the latter, so far as its influence upon the size, quality, and other characteristics of the products are concerned?

Appointment of committees.

TUESDAY FORENOON.

9:00 O'CLOCK. COMMERCIAL FRUIT CULTURE.

How best and most profitably to meet and supply the requirements of the market.

Educating the market—how far is it practicable consistently with the highest profit?

Choosing and reaching markets.

Commission sales vs. associated marketing.

Freight vs. express transportation.

How can we secure the prompt and careful handling of perishable fruits?

Our present system of crop reports—Is it adequate to the needs of fruit culture? If not, what further is needful?

11:00 O'CLOCK. SPRAYING WITH ARSENITES.

Results of practical tests the past season, on the codling moth.
How and to what extent is the curculio affected?
Other beneficial results.

TUESDAY AFTERNOON.

1:00 O'CLOCK. PEDIGREE IN PLANTS AND FRUITS.

In what does it consist, and to what extent and under what circumstances may its beneficial influences be relied on?

THE SEASON OF 1888—Results and lessons.

FORESTRY.

Management of artificial plantations.
Wind breaks.
Needed legislation.
Uses of very young timber.
Wasteful methods of lumbermen.

PRUNUS AMERICANA—The indigenous plum of Michigan and the north generally.

Its variability, in the wild state, indicates the practicability of its improvement under a course of treatment tending to that end.
Improvement by selection: Its results, so far, in the more western states.
Failure of Prunus Chicasa to fruit freely at the north.
Comparative exemption of native sorts from premature loss of foliage, rotting of the fruit, and the attacks of curculio.
Their extreme hardiness and productiveness.

TUESDAY EVENING.

8:00 O'CLOCK. Lecture by Prof. W. J. Beal of Michigan Agricultural College, on The Horticultural Possibilities of Northern Michigan, with references to this year's results at the experiment station.
WILD RICE (*Zizania aquatica*).—Its susceptibility to improvement under artificial treatment.
The overflowed lands along many of our lakes and rivers: The practicability of their economical and profitable improvement and cultivation under this as a crop.

WEDNESDAY MORNING.

9:00 O'CLOCK. Reports of officers.
Reports of committees.
Election of officers.
Miscellaneous business.

The attendance was excellent, except in a local way, several other associations being in session in the city at the same time; but, especially during the second day, no fault could reasonably be found on this score.

President Lyon called to order and read, as follows, his annual message:

PRESIDENT'S ANNUAL MESSAGE.

To the Michigan State Horticultural Society in annual meeting assembled:

The present seems an appropriate time for the review of the past, especially of the doings of the past year, and for the devising of plans for the future, while several events occurring since our last annual assemblage render this more then usually proper, if not in fact necessary.

RELATIONS WITH THE STATE AGRICULTURAL SOCIETY.

In January last, at the annual session of the State Agricultural Society, in Detroit, Mr. E. H. Scott was in attendance as a delegate from our executive board, for the purpose of making the requisite reports on behalf of the society, and effecting a renewal of the annual arrangement under which it has, for many years past, conducted the horticultural department of the state fair.

On his arrival he was informed that the executive committe had already considered the matter, and adopted resolutions, in the nature of an ultimatum, proposing to allow to the Horticultural Society the personal expenses of two, or perhaps three, persons to take charge of the horticultural exhibit, but making no allowance whatever for the much larger, and equally unavoidable, expenses which must necessarily accrue in the bringing together and conducting of the exhibition.

Further than this, it had been resolved that a superintendent, in general charge of the exhibit, should be appointed by the Agricultural Society, instead of, as heretofore, entrusting the management to the Horticultural board.

Mr. Scott not feeling warranted in deciding the matter then and there, asked to be allowed to refer it to the Horticultural board, at its meeting to be held in February, for final determination.

On receiving his report, as proposed, the executive board determined not to accept the proposition, regarding it as, if not intended to express lack of confidence, at least indicating a purpose to evade a further continuance of arrangements of this character. This conclusion was arrived at with much regret, under the apprehension that the change in the management of this department must, very probably, mean the lowering of the standard of horticulture in our state.

This, to our apprehension, unfortunate action of the State Agricultural Society, seems to render necessary a very general change in the society's mode of operating, and calls for a more or less general and well considered revision of its plans. Committees were therefore appointed for such purpose and the board adjourned.

The society should, doubtless, avoid placing itself, in any unnecessary sense, in antagonism to the State Agricultural Society, or in fact to any other society. Results have long since demonstrated the economy as well as the effectiveness of the combination so long in vogue, and the society's position should ever be such as would render it easy to accept advances from any eligible source, looking to the effecting or renewing of similar arrangements.

The high position of Michigan, pomologically, is doubtless attributable to the existence of such arrangements for many years past, aided by the thoroughly effective regulations of this society for securing creditable and correctly named exhibits.

SECRETARY GARFIELD'S RESIGNATION.

Early in the following season, this difficulty became vastly more serious, consequent upon the failure of Secretary Garfield's health, and the consequent necessity for his resignation of the position he has so long and so effectively filled; and that, too, under circumstances rendering its acceptance by the board imperative.

His resignation was not tendered until the state of his health had become such that it was necessary at once to relieve him of the cares and responsibilities of the position. This had the effect, for the time, to throw these cares and responsibilities upon the president.

THE JOINT MEETING AT BENTON HARBOR.

Prior to Mr. Garfield's resignation, he had received proposals from the Berrien County Horticultural Society to hold its June meeting at Benton Harbor, jointly with that of the West Michigan Fruit Growers' Association, whose meeting had already been appointed at that place. This invitation, with the accompanying correspondence and a statement of what had been done in the matter, was received from Secretary Garfield along with his resignation. After correspondence with members of our executive board and others, I wrote to the Benton Harbor Society, accepting the invitation, conditioned upon the approval of the proper authorities of the West Michigan Society which was to be secured by the authorities of the Berrien Society. I am assured that such approval was promptly requested; and yet the request was only responded to at so late a date as to leave an exceedingly limited period within which to issue and distribute a notice of such meeting; while the needful arrangements for conducting the joint and several sessions were unavoidably left to be adjusted at the time of meeting. In fact, the assent of President Phillips was received at so late a date that proposals for a separate meeting, at a different point, had been agreed upon by the members of our board, and, but for the opportune receipt of such assent, the notices for the proposed separate meeting were to have been given to the press by the next mail.

The arrangements between the two societies were readily and satisfactorily effected; and yet, to those who attended the sessions, it hardly need be stated that the circumstances were but ill calculated to encourage the frequent repetitions of similar combined meetings.

OFFICIAL CHANGES.

At a session of our executive board held during the continuance of the Benton Harbor meeting, the resignation of Secretary Garfield was accepted, and Edwy C. Reid of Allegan was appointed to fill the vacancy. Mr. Reid, in consequence, resigned his position as member of the executive board, and the vacancy thus created was filled by the appointment of W. A. Brown of Benton Harbor.

AS TO THE FUTURE.

During the earlier years the charm of novelty, coupled with a natural and commendable enthusiasm, served to maintain a strong and permanent interest in our meetings; but during the later and maturer years, the charm of novelty seems to have worn off, and the maintenance of the old-time interest and enthusiasm seems to be becoming increasingly difficult, the apparent facts being that the overlying ideas and principles which at the first attracted earnest attention and discussion have been "worked out," and we are in contact with the much broader underlying stratum, which, while equally indis-

pensable to horticulture, as a science, and even as an industrial pursuit, fail in some degree to interest those who work mainly at the surface.

Among these underlying subjects, we may specify pomology, both domestic and commercial, forestry, floriculture, vegetable culture, landscape gardening, and in a leading sense botany, with several others, in a greater or less degree kindred to or inter-associated with them.

With the purpose to bring together those who may feel interested in any one or more of these subjects, by means of an arrangement through which each may be able to attend the discussions of the subject or subjects most in accord with his tastes, while at the same time economy of expense may be secured, as far as possible, by associating the whole, it was proposed at last winter's board meeting to segregate the society into sections, assigning to each a group of kindred subjects, with power to hold distinct sessions during the year, while the whole shall be assembled annually, for the election of its general officers, and for general business and discussions. The idea has, so far, only been outlined; but the subject is broad and important, and may well demand the careful and earnest consideration of the society.

STATISTICS AND EXPERIMENT STATIONS.

The horticultural reputation of the state would, beyond question, be greatly advanced by a more complete report and digest of its pomological products, and of the values of its investments of this and kindred kinds. To be fully effective and satisfactory, it seems important that the statistics annually collected by our state authorities should separately specify: The quantity of each class of fruits actually marketed; the estimated quantity of the same not marketed but consumed at home; the amount of land devoted to each class of fruits; the amount of land occupied by vegetable gardens, commercial or domestic; the value of such lands aside from the improvements; the value of the same in their improved condition; the age of each separate plantation of fruit trees.

This subject has been heretofore presented for your consideration, and the matter was last year referred to a standing committee on legislation, which committee may properly be called on to report during this meeting.

Since my last annual address, what has been designated as the "Hatch law" has been given effect, and the authorities of our Agricultural College have been constituted the managers of a state experiment station, under its provisions. It may reasonably be anticipated that with the special and recognized horticultural standing of this state, horticulture, and especially pomology, will be made a prominent feature of its system of experimentation.

There is, however, a very serious, if not in fact insurmountable, obstacle in the way of successful pomological experimentation at the college, namely, the location of the institution in the low and frosty valley of the Cedar river, where only the more hardy fruits can be successfully grown. We are not informed as to the plans of the responsible managers, with reference to this difficulty, but it would seem requisite, in consideration of the very important commercial fruit interests on the lake shore, as well as in other regions thus practically shut out from the benefits of experimentation at the college, that a plan be devised, by a system of outside experimentation or otherwise, to confer upon so important an interest a reasonable share of such benefits.

In consideration of the last mentioned items, I may be allowed to suggest

that this subject be referred to a special committee, or otherwise that both this and the last preceding subject be referred to the committee on legislation.

IS NOVELTY NEEDED?

It may be well to devise measures for infusing something of novelty into our summer and early fall meetings, as a means of attracting wider attention. It is now the custom of many of our most efficient local societies to call such of their meetings as occur during the fruiting season at points where fruit plantations may be visited, holding their sessions in the open air, accompanied by dining arrangements in the nature of a picnic, over which the ladies are expected to preside, thus affording an occasion, not to say a necessity, for their attendance; while at the same time portions at least of the programme are so arranged as to call for their active participation.

It has ever been our feeling that the interest and attendance of ladies at our meetings is eminently desirable. Women constitute an inseparable element in human society, and no organization for general improvement can reasonably hope for a full measure of success except by their co-operation.

DISREGARD OF THE PRINCIPLES OF FORESTRY.

The more northern portions of our state, in both peninsulas, are being penetrated by railroads, and are as rapidly filling up with a permanent agricultural population. With this process arises an urgent need that these hewers-out of new farms become, at the earliest practicable moment, imbued with a proper knowledge of the actual bearings of forests upon meteorology and other climatic matters, together with a knowledge of such facts or principles as shall enable them to discreetly and wisely locate the positions of field and forest, as well as to determine their profitable proportions in the light of the ultimate needs of both the farm and the farmer.

While mastering these highly essential particulars, the yet incipient farmer will equally need to master the ideas and practices out of which are to grow the farm, garden, and orchard; and in consideration of the eminent importance of intelligent action in several directions, and moreover in view of the yet imperfectly understood influences of an untried and severer climate upon the success of varieties, we venture again to invite attention to this as yet uncultivated area in the broad domain of Michigan horticulture.

Upon motion of Mr. W. N. Cook, the message was accepted and referred to a committee for report upon its several suggestions.

The committee comprised Messrs. C. J. Monroe, W. N. Cook, and J. A. Pearce.

INTENSIVE HORTICULTURE.

Beginning consideration of the topic, "Intensive Horticulture," Prof. L. R. Taft, successor of Prof. L. H. Bailey in the chair of horticulture at Michigan Agricultural College, read the subjoined paper:

We may liken horticulture to a broad field, at one side of which the various flowers, fruits, and vegetables are growing in almost their wild condition, with slight care or training. As we pass along we notice that more attention has been given to the selection of soil and varieties, to training, pruning, culti-

vating, and these evidences of care increase until, at the further side, we find that every method known to benefit or render the development of the crops more perfect has been employed. On the one hand we find the varying degree of care given by the mass of horticulturists, and on the other the highest types of what are known as intensive methods.

IN WHAT IT CONSISTS.

The difference between horticulture as commonly conducted, and "intensive horticulture," is measured by the amount and character of attention paid in each case. It is a small area well tilled, compared with a larger tract over which the same amount of care has been spread.

The character of the crop, the cost of land and labor, and the nature of the market, will be important factors in determining the extent to which these methods can be employed with profit. Among the conditions which should in all cases be sought after, and without which the best success can hardly be expected with any crop, are a suitable climate, a soil well drained and of such a physical and chemical composition as it requires for its best development. Moreover, the proper preparation of the soil, the supplying of plant food in sufficient quantities, and cultivation given at the right time, and of a nature adapted to the crop, will meet with its reward and success can not be hoped for with any crop if these essentials are neglected.

NOT AN EXACT SCIENCE.

Owing to the outside circumstances which bear upon our operations, the time will never come when any general rule can be adopted for use under all conditions. In the very beginning we are confronted by a diversity of opinion as to the comparative virtues of spring and fall, deep and shallow, and flat or lap, plowing. The character of the soil, the nature of the climate and of the crop, have so much to do in determining these points, that a method which is adapted to one section will prove utterly unfitted to another. Subsoiling, too, has its advocates and its opponents, equally firm in their belief. All agree that on shallow soils, underlaid with compact strata, which are designed for deep rooted crops, subsoiling will generally prove beneficial and profitable. It is claimed by its advocates that it opens new feeding areas to the roots of the plants; that it breaks up the soil, admitting the air and favoring disintegration and the formation of plant food, and that it increases the water-holding, or reservoir, capacity of the soil.

RESULTS OF SUBSOILING.

In plats subsoiled to the depth of fifteen inches, contrasted with adjacent unsubsoiled plats, Prof. Sanborn (Missouri State Board of Agriculture report, 1885, p. 375) obtained the following results:

	Water Per cent.	Yield of Corn Bushels.
Subsoiled, 1883	10.1	70.1
Unsubsoiled, 1883	8.33	49.3
Subsoiled, 1884	11.16	52.1
Unsubsoiled, 1884	9 16	62.8
Subsoiled, 1885	14.2	93.5
Unsubsoiled, 1885	10.4	97.8

In order to understand these results it must be explained that the summer of 1883 was a dry one, and the two per cent of water conserved by subsoiling was of great advantage to the crop. On the other hand, the seasons of 1884 and 1885 were unusually wet, and subsoiling, by increasing the water-holding power of the soil, proved injurious to the crop. The subsoiled land, to a depth of fifteen inches, contained 100,000 pounds of water in 1884, and 190,000 pounds per acre in 1885, more than the unsubsoiled.

Experiments with wheat and potatoes gave similar results. The effect was especially noticeable in the case of the potatoes, the yield being, in 1885, as 108 to 335, against the practice. The season was so wet as to cause the potatoes on the subsoiled portion to rot badly.

These results are corroborated by experiments carried on in all parts of the country.

Thus the nature of the season has much to do in determining the results, and for ordinary crops it has been found that, as the result of experiments conducted for a series of years, subsoiling made no appreciable gain in the crops, and hence was unprofitable. Prof. Shelton of Kansas reported, as the average of a four-years trial, 55 bushels of corn from the subsoiled to 55.25 bushels from the unsubsoiled.

Whatever method of plowing is found best, and whether subsoiling is practiced or not, the thorough pulverization of the soil, in fitting it for the crop, will not only lessen the labor of cultivation, but will render the catch of seed more even, thus saving in seed and in the labor of the consequent thinning, and will also often increase the yield obtained.

CLEAN CULTIVATION.

No one can improve the advice given years ago, to kill weeds before they are up, and this advice should be followed whether intensive or extensive methods are used. Cultivate early and often, and never allow weeds to form seeds and drop them on the land. The value of tillage is derived not alone from preventing the growth of weeds, but in a more marked degree it is useful in admitting the air and retaining the water which dissolve and convey food to the plants.

The method employed, whether with horse or the wheel, hand, or scuffle hoes, is, of course, determined by the character of the crop and the value of land and labor. In the growing of vegetables a majority of market gardeners use close culture for their early vegetables, while those for fall and winter marketing are planted at such distances as will permit their being worked with the horse. In some localities, where land and manure are cheap and labor high, such crops as even radishes, parsley, and lettuce are worked with the two horse walking cultivator.

The same holds true in the raising of strawberries, but the method employed is modified by the character of the market. With an educated public, willing to pay an extra price for increase in the size and quality of the fruit, and especially if there be competition, close cultivation, in hills, under the most favorable circumstances, will not fail to be more profitable than the matted row or the "no row at all" methods.

DEEP OR SHALLOW CULTIVATION.

The question of deep or shallow cultivation will perhaps never be settled to suit all minds, but all experiments thus far conducted indicate that stirring the soil tends to admit the air and to deprive the stirred portion of moisture. But on the other hand the soil, being loosened, capillary action is checked and the surface soil, acting as a mulch, retains the water in the subjacent layers, for the use of the plants. In wet seasons, and especially in the spring, deep tillage removes the surplus water from the surface soil. In dry seasons and in the summer it destroys the surface roots, thus depriving the plants of their water supply and exposing an unnecessarily large amount of the soil to the drying influences of the air. From these results a rule has been derived which, like all others, has its exceptions: cultivate deep in the spring, and in wet seasons when there is no danger from breaking the roots, but by all means use surface tillage in dry seasons.

Proper cultivation promotes a healthy growth and increases the size of the plants, thus giving them strength to mature fruits larger both in size and number.

Harm is often done by late cultivation; as, when the plants have made their growth for the year and have commenced to mature their fruit or ripen their buds, the stirring of the soil will often cause a new growth of the plant, which will lessen the amount of fruit in the one case and produce a new growth, liable to to winterkill, in the other.

FERTILIZATION AND FERTILIZERS.

No one can expect to obtain good crops unless he provides food for them. The source of the supply makes little difference if it is furnished in proper kind and quantity. Experiments in stock feeding have demonstrated that animals can be molded at will in both form and structure, and, except that they are more exposed to climatic influences, our plants can with equal certainty be subjected to our will.

With a knowledge of the wants of plants and of the sources of plant food, we can bring the feeding of plants down to a rational system.

A few years ago much was said of the advantages of soil analysis, but it is now considered of importance as a general indication of the soil constituents.

Stable manure is the main dependence of the horticulturists of the country, and as such it should be husbanded and applied to the extent that the increase in return will warrant.

While the time has not yet come for the general use of commercial fertilizers by the ordinary farmer, the fruit grower and gardener will even now find their rational use a profitable investment.

The commercial fertilizers are in a soluble form and furnish food to the young plants, in the spring, thus giving them a vigorous start before they can obtain a full supply of food from the soil. For forcing early vegetables, nitrogenous fertilizers will prove a paying investment.

The fruit grower desires a fertilizer which will produce a strong, healthy plant and an abundance of fruit. Stable manure, especially if it be undecomposed, when applied in large quantities is likely to cause a rank growth of the plant at the expense of the fruit. On the other hand, such mineral fertilizers as ashes and ground bones tend to correct this and improve both

the size and quality. Few persons are aware of the beneficial effects of potash on the quality of the fruit. By the application of potash at the rate of 80 pounds per acre, with other special fertilizers, the amount of sugar in grapes has been increased more than fifty per cent and the same holds true with nearly all fruits.

While wood ashes are valuable as a source of potash, the best results with fruits have been secured by the use of potash salts in the form of muriate. The value of this salt to the fruit grower can hardly be overrated. It is a specific against fungous diseases, and in addition furnishes potash, which is lacking in most soils, to the plants.

Potash has its place in the structure of the plant, and is necessary for the formation of chlorophyl. the green coloring matter of the leaves, without which no growth can take place. The yellow color of the leaves of plants growing in poor or exhausted soil is generally owing to the absence of potash; and if it be applied, the green color will be resumed. The ultimate effect of fertilizers is to increase the size, quantity, and quality of product. While all may not appreciate the latter, everyone will value the increase in quantity, and in case of active competition or glut the increase in size will lead to the sale of the large, perfect fruit at a fancy price, while small and inferior packages of the same variety will be a total loss.

Potatoes, when highly fertilized with stable manure, are coarse and watery, while the same yield of the very best quality can be secured by the use of the sulphate of potash and ground bone.

In an experiment with sugar beets, Dr. Goessmann found the per cent of sugar, when stable manure was used, to be 7.8, and when sulphate of potash was used as a fertilizer the same variety showed 12.78 per cent, a result almost exactly obtained from the grape by the use of muriate.

Not only do plants that are properly nourished produce more and better fruit, but they are less injured by insects and diseases. Trees supplied with an abundance of food, and which are making a good growth, are less liable to the attacks of borers than those that are suffering for want of it, and if attacked will outgrow the injury, while the weak ones generally succumb.

Plants of all kinds, that are neglected and in a feeble condition, may be seriously injured by any one of their pests, while the healthy plants in the same neighborhood will not be appreciably injured.

The mildew and rot of the grape, and all fungous diseases, are often prevented or their ravages greatly lessened, if the plants are properly fed. The advice given years ago, to provide food enough for both plant and parasite, still holds good, and if followed will greatly lessen the injury from insects and fungi. The successful horticulturists, however, will not neglect the use of insecticides and fungicides.

We have thus briefly mentioned some of the steps that must be taken if success would be secured. The extent to which intensive methods can be used will depend on circumstances; but if brain directs brawn in carrying out the work, we can feel assured that the proper methods will be employed, and that the result will be a pecuniary success.

WHAT FOLLOWED.

Ensuing discussion of Prof. Taft's paper took a wide range.

Thomas Wilde of Herrington, Ottawa county: I have seen plant feeding

overdone—have seen quality of the product injured by it, where a moderate supply would have produced desired results in both quality and quantity; but perhaps the wrong kind of food was given. Possibly the right sort of food would relieve apples of the fungus known as scab. To do the same I have used a solution of corrosive sublimate, sprayed on, and it has been efficacious to some extent. I used one part of sublimate to 10,000 parts of water and found that a little too strong. It was applied in spring, just after the blossoming. The same solution also kills the codlin moth and curculio and seems to prevent rot of plums. I have tried commercial fertilizer for onions, with fair success, raising them upon ground that would not otherwise have raised them. The kind used was garden city phosphate and one ton was used on four acres of the onions—worked into the soil before planting. The soil was upland and I got forty cents per bushel for the onions when swamp onions brought but fifteen cents. I used the same fertilizer on strawberries, on a small scale, but it seemed to produce an excess of foliage.

A. G. Gulley of South Haven: My experience is against subsoiling for onions. As to intensive horticulture, there are but few places where it can be profitably practiced. In most localities land is cheaper than labor and it is therefore best to use more of it. Where land is high, practice of intensive horticulture becomes desirable.

Prof. Taft: I have tried nearly all the phosphates and have grown wary of them; but it is always safe to use ashes or the potash which they supply —the sulphate of potash for vegetables, the muriate for fruit.

Thos. Wilde (replying to a question): I give onions shallow or deep cultivation according to season. This year I used the Perry scarifier and deeper cultivation than usual I had a later crop but a better yield in consequence.

President Lyon: I would ask Prof. Taft what fertilizers he would use in intensive horticulture on light soils.

Prof. Taft: Soluble fertilizers would be largely lost because they would go down. Ground bone is excellent in such cases and its influence is felt at once. The salts of potash would be largely lost. Such soils would require, for fruit, 500 pounds of muriate of potash per acre, while ordinarily 150 to 200 pounds would be sufficient.

C. F. Wheeler of Hubbardston: I once planted forty grape-vines on light soil unfertilized. I piled ashes from the house about them and in the course of years these became very thick. They now bear good crops, though none at all at first; but while the bunches are of fair size they do not equal the fruit on systematically pruned vines.

W. H. Parmelee of Hilliards, Allegan county: The past few summers I have engaged in onion culture, using barnyard manure, and I can not afford to spread it thinly. Where my cultivation was most intensive the results were the best. My onions were on a dry piece of muck. I used some ashes and they told decidedly, though they were spread lighly on the surface, before the seed came up; but on that part of the field I got carrots at the rate of 1,738 bushels per acre. My Red Wethersfield onions yielded 600 bushels per acre, Southport White about the same, Danvers somewhat less.

J. A. Pearce of Grand Rapids: I have noticed a marked difference, from the use of ashes, in the size, quality, and color of fruit. One of my acquaintances, having applied ashes heavily to his peach orchard, the soil being a good clay loam, this year gave it a good dressing of muck, and he had the finest peaches that entered the Grand Rapids market this season. Beyond

doubt, intensive methods are best where they can be carried out. We should all give more and better cultivation to our lands.

Pres. Lyon cited a grower whose dwarf Duchess pears flowered freely and set but little fruit—a common experience with that sort. He cut them back severely (equivalant to disbudding), manured heavily, and worked it in; and although the trees stood four feet apart, they bore more fruit than would have completely covered the ground. The market gardeners near New York city manure excessively and spade the earth four feet deep; and say that on ground worth $1,000 per acre they must do it to make anything. Intensive horticulture has been highly successful on strawberries. (Replying to a question by Mr. W. N. Cook): The Duchess pear needs heavy or strong soil, and this is so as to nearly all others, though there are some which do well on the lighter lands. But even these you should manure heavily, adding clay if possible.

SOME COMMITTEES.

President Lyon announced the following committees:
Fruits and Flowers—Messrs. L. R. Taft, A. G. Gulley, Thomas Wilde.
Resolutions—Messrs. W. J. Beal, J. F. Taylor, S. R. Fuller.

Tuesday Morning Session.

The second session of the series began with an increased attendance and continued with growing interest, being opened by the following paper by W. A. Brown of Benton Harbor, on

COMMERCIAL FRUIT CULTURE.

The work done by the pioneer members of the Michigan State Horticultural Society in the interests of practical fruit growing have resulted in great commercial interests which now require the co-operation of fruit growers for the purpose of economical distribution, transportation, and marketing. Societies have discussed all questions connected with location, methods, diseases, and varieties of fruits. The student who desires information regarding fruit growing upon the Michigan peninsula can find full knowledge regarding all subjects relating to this great interest in the numerous volumes of the reports of this society.

But commercial fruit growing, in those parts of our state most exempt from the rigorous climate of this latitude, has developed more rapidly and assumed greater proportions than dreamed of by the most sanguine fruit grower of twenty years ago. While horticultural societies have accomplished much for our fruit growing interests, they are not organized for business; but since the large production of fruits demand new methods of marketing, and a more comprehensive system of distribution, the consideration of these subjects is of paramount importance.

THE OLD SYSTEM OF SALES UNSATISFACTORY.

The old system of selling to grocers, by growers for a local market, or individual consignments to commission houses at distant markets, proved gener-

ally satisfactory so long as the local demand equaled the supply. Since the early era of commercial fruit growing, when the St. Joseph region afforded an inadequate supply to the growing city of Chicago, the fruit growing area has been vastly extended. California, the gulf states, and many inland points, are now sending a large part of their surplus fruits to Chicago. Commencing with high rates on perishable fruits, transportation companies have reduced rates and bettered facilities from distant points, until cost of water transportation from the east shore of lake Michigan nearly equal thousands of miles of rail carriage. It is evident that great fruit growing centers do not consider the fact that their fruits must be sold in Chicago in direct competition with large quantities of fruit which are received daily from all parts of the world which can reach Chicago. The inevitable sequence of such large and "unexpected" accumulations of perishable fruits, is a glut in the market and unremunerative prices.

A few such lessons are not without effect. Only the best is shipped, large quantities go to waste, new points of distribution are sought, and many resign the business in favor of other localities or other growers who are intelligent in their modes of growing and marketing fruits.

In view of the inevitable competition and occasional gluts in the markets, the advisability of planting fruits for future markets may be questioned. I would say, continue to plant those varieties which have been found best adapted to our climate, soil and markets, but only in such localities as have been proved to be favorable to fruit production.

WHAT FRUITS TO PLANT.

Of the different fruits the apple is of greatest importance. It has proved prolific and certain in a large part of the Michigan peninsula, while it has signally failed over a vast extent of country in the northwestern and middle states. Notwithstanding the present backward season and immature crop, the past twenty years have proved the peach adapted to the high lands near the lake, northward to and including Oceana county. Plant and replant the peach. Pears have also proved a paying crop. Plums are of first importance in the northern lake shore country, while choice varieties of the cherry are better adapted to the southern counties, which is also true of the grape. Various conditions have obtained during the past few years which will cause the extensive planting of small fruits for distant markets to be of doubtful utility. The extreme south brings the first strawberries to all of our markets, which are followed by large shipments from further north which "lap on" to Berrien county berries, thus extending the season until raspberries are in the market. The small towns are being supplied with home grown berries, and many places which formerly bought Berrien county berries are now shipping a surplus to Chicago.

LACK OF APPRECIATION OF GOOD FRUITS.

We can not educate the large markets. Size, beauty, and long-keeping qualities will continue to be preferred in the markets when fruits are received from distant points and change hands several times before reaching the consumer. Comparatively few in the large cities are educated to discriminate in purchasing by the names of fruits. New, showy varieties sometimes com-

mand large prices, however, and a few will suit their tastes, in preference to appearance, in fruit. The grower for a local market comes in contact with his customers who soon learn to discriminate in their selections of fruit. Many of them are amateur growers, who study with interest the cultivation of fruit, and observe the introduction and development of new and choice varieties in the fields of the professional grower.

FINDING MARKETS AND REACHING THEM.

The question of "choosing and reaching markets" is of vital import to large fruit growing communities. The consideration of these subjects includes transportation and methods of marketing, and has resulted in combination of fruit growers in the Pacific and Atlantic states and at various points in the south. Combinations of fruit growers made many years ago in southern Illinois, whereby fruit shipments to Chicago are made by the "Granger" fruit trains, have proved satisfactory to shippers and to the Illinois Central railway company. Cars are furnished by the railway company, at an agreed price per car, and sufficient cars are placed at principal shipping points to make up a daily fruit train. The growers employ their own agents to load cars and make bills of lading; also agents in Chicago to unload cars and collect freight bills from consigners, a pro rata charge being made to shippers for cost of cars and other expenses. The Illinois Central railway has given fair rates and every possible facility to the fruit interests of the south. With the extension of its system, shipping facilities have been given to fruit organizations in Tennessee, Mississippi, and Louisana. Among these the "Inter-state Shipping Association" has gone aside from the main track by sending carloads of fruit to points outside of Chicago.

The magnitude of the fruit business, and the long distance from markets, compelled an early organization of the fruit growers of California. Various modes of co-operation were proposed and tried, which finally culminated in the formation of the "California Fruit Growers' Union," which has proved the most successful of any fruit organization extant. The union gives the sole control of the business to their agents, who are getting reduced rates from the great trans-continental railway lines for full trains of fruit. Sales are made at auction, immediately on arrival at terminal points, of which Chicago has received much the largest share; but during the past season shipments have been successfully made to the large eastern cities.

The arrival of California fruit in good condition is only possible through their system of gathering before maturity, shipping in refrigerator cars, and their nice mode of packing only the best grades of fruit.

Chautauqua county, N. Y., celebrated for the large quantity of grapes grown, appears to be successful in obtaining cheap freights and distant markets through the "Chautauqua Grape Growers Union."

The Delaware Fruit Exchange has been in successful operation two years. The distinctive character of the organization consists in selling fruit from growers' wagons at auction. The fruit is sold at large shipping points, and being graded attracts numerous buyers from the eastern cities. The exchange has recently been supplemented by the Baltimore Fruit Exchange, and the "Bureau of Transportation and Distribution." These agencies have been efficient in aiding in the disposal of the large crop of peaches grown in Delaware and Maryland, the past season, no glut having occurred in the eastern markets, and much better prices being received by growers than anticipated.

WHAT WE HAVE AND WHAT WE LACK IN MICHIGAN.

The commercial systems for the marketing of Michigan fruits are too well known to require a review before an audience of Michigan fruit growers. But it may be well to compare our methods with other fruit localities which seek a common market. Lake transportation is supposed to give western Michigan a great advantage in the Chicago market. So far as the transportation of small fruits from the lake ports nearest to Chicago is concerned, this will always be true; but not one-half of the tree fruits shipped from Michigan to Chicago are consumed in that city. They are reshipped in little lots and in car lots over the many roads which diverge from Chicago to small places and large towns, where they are consumed.

The modern world moves on wheels. Large mercantile transactions are by the car-load. Minneapolis and St. Paul consume and distribute more fruit than Chicago did twenty years ago. A hundred small towns in the west will each buy a car-load of good Michigan peaches if they can get them in good condition and at a fair price, and twenty thousand prairie farmers, who never expect to grow apples, will buy annually from one to ten barrels each, and railways will carry fruit home to their best customers at cheap rates.

I can not at this writing outline new and better methods for the transportation and sale of Michigan fruits. Lake transportation and the intervention of the commission system will always be necessary in the large lake cities; but fruits consumed at points beyond Chicago should not pay tribute to that city, nor be subject to the delay and rough handling incident to transfer from boats to cars. Some lessons may be learned in co-operation from the results obtained by other organizations herein alluded to, and these subjects more carefully considered at conventions of fruit growers in the future, when practical suggestions may be made and preliminary action taken having in view the reconstruction of the Michigan Fruit Exchange upon a broad and permanent basis.

TESTIMONY OF THE SHIPPERS.

An animated and interesting discussion ensued upon the reading of this paper. Prof. Beal asked if there were any growers present who had shipped fruit beyond Chicago to cities or small towns.

D. W. Hinman of Fennville: I have sent peaches to Minneapolis, with good results.

J. F. Taylor of Douglas: I know of no one sufficiently acquainted with results to intelligently express an opinion. It is difficult for one sending large quantities to adhere either to Chicago or beyond. The shipper by lake may often be harmed by boats being too late for trains west, thus causing a whole day's delay. In such cases the fruit might better have been left in Chicago and sold there. Transfer in Chicago creates a charge which the shipper can ill afford when margins are close, and express charges on small lots consume profits. Buyers in the small towns are fastidious, "returns" are uncertain, and there is considerable loss of packages, so the end of such shipments is likely to be unsatisfactory. When a grower can send to a few reliable, prompt, interior dealers it is an advantage, but otherwise it is better to send to Chicago and receive payment in reasonable time. I have sent to Indianapolis and a few other such places, but the results were unsatisfactory, owing to loss of packages and payment. Again, it is useless to send the

smaller sizes of peaches to local and distant markets, for only the best will sell readily therein or return profitable prices. Our difficulty with shipment of car lots west from Milwaukee has been bad connection of boats with trains. This season we kept a man there to serve our interests and the result was better than ever before. We are encouraged by it to think that in the future we will be able to supply the northwest direct. Packages are deceptive, new forms not always proving popular. The great volume of the peach crop the past two years has made the return to the producer as low as he can bear with any profit; yet, to the consumer, prices were as high as ever. Unless this can be remedied, decrease of production will follow, owners of the less reliable lands occupying them with other crops.

A. G. Gulley: I sent my raspberries to Chicago, but found afterward that I could have obtained better prices inland. Growers about South Haven say they have better returns from berries sent beyond Chicago, or to the smaller towns in other directions, though not in car lots. This year a new feature of trade was the coming of buyers from the south and east who took peaches off in wagon loads for retail, taking them even 75 to 100 miles away.

C. J. Monroe of South Haven: This began three years ago. Some of these purchasers buy to peddle, others come with orders in advance. I sold one-third of my peach crop to such men, and a neighbor sold them $400 worth in two days. It is one of the most satisfactory features of the business at present, and if it increases will greatly relieve the central markets. My brother and myself each has a peach orchard; each has to hire all the labor required, and we can therefore compare results very closely. My brother scatters his crops, but I send to Chicago. He gets better prices on the whole, but his profits were cut by gluts in some of those smaller towns, so that in the end, for two seasons, there is scarcely any difference between us. If my brother had counted in his time spent in correspondence, he would be below me in net returns. Yet, if a man can give shipments his personal attention, I think he can do better by scattering them. The most successful grower I know of, in this respect, is J. N. Stearns of Kalamazoo, whose orchards are near South Haven. He secures his markets carefully, in advance, and so gets highly satisfactory returns. But for the great mass of growers, Chicago and the commission system are indispensable. If we could assess ourselves and keep a man in Chicago to look after our interests, we could gain much. It would also be a great advantage if large shipping points would send to Chicago bulletins of shipments, so that the dealers could know in advance what was coming.

A COMMISSION MERCHANTS' VIEWS.

G. W. Barnett (of Barnett Bros., Chicago): No doubt many present are familiar with my views on the points made by Mr. Brown's paper, through my letters to the Allegan Gazette, so I must be to that extent repetitious. Mr. Brown has spoken in generalities. The California union has not been altogether successful, and changes of its plan are to be made soon; the Maryland exchange does not operate to the west, and the results of the work of the others is not publicly known. But as there have been new ones formed lately, it would seem that those first established have not been altogether satisfactory. There are not twenty places west of Chicago where car-loads of fruit can be successfully handled. Fifteen years ago the receivers of green fruits were largely dependent on one man, but not liking that dependence my firm

established for ourselves direct business relations with the dealers west of us, and in those towns such shippers as Mr. Taylor may often be in competition with us, to the injury of both in respect to prices. I would like to hear, sometime, at a meeting like this, an expression of opinion on the topic, "What should we expect from the commission merchant?" Mr. Barnett expressed himself as gratified with the reception accorded him here, contrasting it with one he received at a meeting of southern fruit and vegetable growers, which had much of that warmth which springs from misinformation, and continued: No honest man in the commission business will advise a shipper to send his products to Chicago, or to his firm, if he has reason to believe that the shipper can do better elsewhere; and no man fit to continue in the business will do it. Find if you can do well with part of your crop elsewhere than in Chicago, and if you can send ten baskets there per day, do so, and to that extent relieve the central market. Mr. Barnett spoke at some length about the bad condition in which fruit is often received, and told how he once offered, to an association of growers, to pay the expenses of a man in Chicago, if he would honestly report to him the state in which their fruit reached the market. He spoke further, favorably to each grower "working up" a market for himself, and said he would like to have in Chicago such an agent as Mr. Taylor referred to, who would not only look after the shippers' interests, but would be able to tell how much fruit was coming. He did not believe it would ever be practicable to supply the northwest without the aid of Chicago and the commission men.

W. N. Cook of Grand Rapids: In the apple business it is very unsafe to depend on names, as Chicago insists on "Wine" for Twenty-Ounce and "Steele's Red" for Red Canada. One advantage would come from planting fewer varieties, and supplying better sorts will educate the market, or, rather, complete their acquaintance and use.

J. A. Pearce: Cold storage could be used to advantage to keep back part of the crop and thereby relieve the market of glut. The commission men have no facilities for storing large quantities, so if each grower would keep back his share it would be a great relief.

IMPROVING THE PUBLIC TASTE FOR FRUIT.

President Lyon: It must be known to most of those present that I most thoroughly believe in the possibility of educating the market. I well recall the time when both pieplant and the tomato were not used; but the public were educated to a liking for both. So, too, as to the Concord grape, though never esteemed by connoisseurs as of high quality; and so, too, as to the Delaware grape, for, despite its small berries and bunches, the people learned its value. In the same way the Rhode Island Greening apple's quality has won a high place for it, notwithstanding its uninviting color. There are other apples of equally superior quality, but they have not been pushed in the market to public attention. Commission men, of course, ask for the sorts their customers demand. The Schaffer raspberry has fought its way to preference very much against its appearance. If we send fruit to market in such condition as it should be, if it has merit it will win its way.

C. W. Garfield: I am not so optimistic as Mr. Lyon; but we can all note the disadvantage we labor under in the fruit market. We see the stores and stands crowded with southern fruit, more and more each year, for consump-

tion has increased rapidly. But the Ben Davis or Baldwin apple is all we have to offer against the banana, the orange, or the lemon—no Red Canada, no American Beauty, scarcely a Jonathan, though any of these would soon command a ready and an increasing sale. This forces southern fruit where our own and better should be used. In planting trees we should look beyond what orchards do now, to what they will do when better sorts become more known.

W. N. Cook: Fruit growers are largely at fault in supplying such apples, yet we seldom see on Chicago fruit stands anything but Ben Davis. The public has no chance to get better.

Evart H. Scott of Ann Arbor: It may be impossible to educate the Chicago market—it looks that way; but the eastern markets are well educated in the quality of fruit. My Ben Davis apples are not wanted till all others are gone. I send my poorest varieties of fruit to Chicago—much as Clairgeau pears. The Bartlett pear sells better there than the Sheldon.

A. G. Gulley: It is easier to educate small towns than Chicago, where three-fourths of all the peaches sell as Crawford, when in fact only one-tenth are such.

A NON-EDUCATOR.

E. Graham of Grand Rapids: It is easy to talk about educating the market, but to do so costs money and time. The standard fruits are demanded; and as the dollar is what is wanted by all growers, I am going to get it and as soon as possible. Color has much to do with sale of apples, both here and in England, nothing selling better than the Baldwin, in the latter market, at this time of year. The King brings the highest price there, but who can afford to grow it in Michigan? I can raise two barrels of Baldwin to one of King. Education of local markets is possible, however, and I would not advise cutting down of the better sorts, for the public *may* become educated.

BUT THE WORLD DOES MOVE.

Thomas Wilde remarked, "Education is proceeding," and told of a trip he made last fall with some buyers who preferred Belflower, Spy, Red Canada, and other sorts, to Ben Davis, saying of the latter, when he had to take some in order to get the others, "Well, take them in, they'll do for cooking." The Red Canada, he further remarked, is small when unpruned or uncultivated, but where otherwise treated is of good size and is sought for eagerly. Besides, the Spy and Red Canada hang on well to the trees in winds that shake the Baldwins all off.

Plates of Shiawassee, incomparable in color, and Grimes' Golden, were here brought forward in contrast with Baldwin and Ben Davis.

C. J. Monroe urged the need of greater care in handling, and the desirability of having fruit growers' agents in Chicago to see to unloading; and asked Mr. Barnett if most of the drayage in Chicago is not done by contract.

Mr. Barnett: So far as I know it is only so done by those managing the "granger system," alluded to by Mr. Brown. No harm comes from tossing or throwing the packages if they are properly caught. The harm comes from dropping them, and the dropper is held responsible. To fruit shipped on boats there is not a single jar from the time it is put aboard till it reaches

the merchant's door. This is a pretty strong assertion, but it is strictly true. It is put upon the docks as carefully as eggs.

C. J. Monroe: Yet no fruit grower goes to Chicago in the season but sees fruit handled in a way to make him nervous. I have seen it piled upon express wagons in great loads, the packages in all sorts of improper positions, on the sides, the ends, upside down, and very roughly handled. The employés of boats are careful. One or two tossings will do no harm, but three or four are damaging, as examination will show.

E. H. Scott: I have known great injury to result to berry boxes from piling them in a slanting position.

J. F. Taylor: That is just the trouble. They should all be piled level. I have seen fruit stacked bottom upward as often as any other way. Such treatment is specially fatal to berries. But very little rough handling gives them a bad appearance. Hauling and stacking do more harm than handling.

Mr. H. H. Hayes of Talmadge, Ottawa county, was asked what package he uses for his Niagara grapes, and answered that it is the Climax, a kind having a board bottom and close veneer top secured by six fastenings. They cost three and a half cents each.

Pres't Lyon: Such are used for peaches, at South Haven, to some extent.

Mr. Cook asked Mr. Barnett what packages he recommended for peaches.

Mr. Barnett: For really choice fruit, the fifth basket; for medium (and there were but few such this year), the bushel basket is best; and for poor fruit, the bushel by all means, it is so much more easily dumped!

R. M. Kellogg of Ionia: I put up my fruit in such a way as to tempt the consumer by its appearance. But this is for ready use. It takes 24 hours to reach a great city [Mr. Barnett: Say Milwaukee!] and 48 hours to get to the northwest, and condition at time of packing must be calculated accordingly. There should be three grades of ripeness—for home use, for the immediate market, and for the distant market. The same must be considered in connection with apples; and the despised Rome Beauty, Ben Davis and Baldwin will turn up next February when the better sorts are gone.

SPRAYING WITH ARSENITES.

Taking up the subject of spraying with arsenites, the secretary read the following, from Mr. N. J. Strong, of Fairfield:

I have one orchard of 130 trees, set about sixteen years ago, and it has borne several years, but the apples have been nearly worthless until this year, when I packed fifty-six barrels of first-class fruit and seven of seconds, besides a wagon load of windfalls. And this is how it happened: About five days after the blossoms had fallen I mixed six to seven ounces of London purple with fifty-three gallons of water, and with a good force-pump and spraying nozzle went over the trees once, and could go only one side of the row on account of a very high wind; but I threw spray over the trees as much as possible. If in three weeks I had gone over the orchard again, I have no doubt a still larger per cent of fruit would have been first-class.

My old orchard of 159 trees, set nearly fifty years ago, was not sprayed, and eighty per cent of its fruit was wormy. All of my neighbors with whom I have talked say they culled out over half in packing. They did not spray.

The same day I sprayed my plum trees and a few peaches, but the mixture was too strong for the latter, as it injured the foliage, but not so with the

apples and plums. As to its effect on the curculio, I am of the opinion it does no good unless applied very often, and then the insect will get in his work between times. It is barely possible a few eggs deposited about the time of spraying may be destroyed, but I think it not safe to depend upon this treatment altogether if one wants a good crop of plums, for there is no place for poison to lodge, as in the calyx of the apple.

I raised a good crop of plums, but jarred the trees once and some days twice. have no doubt that spraying pear trees will result beneficially.

OTHER EXPERIENCE.

Eugene Davis: I used one-third of a pound of Paris green to one barrel of water, and this injured the foliage sometimes when not stirred actively. I carried the barrel in a wagon and the work was not as well done as it might have been, but the result was good, much better than I believed apples ever could be again. They were nearly free of the codlin moth's work except some on under limbs. A few trees unsprayed yielded as many wormy apples as usual. The expense was for one day's work and four pounds of Paris green. Four or five barrels of apples paid for this, while the gain from spraying was thirty or forty barrels. I would not on any account abandon the practice. I applied the poison three or four days after the bloom fell, and a shower occurred soon after.

W. H. Parmelee: I have practiced spraying with good success for three years. I first used a small hand-pump and a pound of London purple to a barrel of water. The second year I reduced the poison and it was still effective. This year I used a pound to 120 gallons, and shall add thirty gallons more next season. I apply when the trees are dry from the dew and when no rain is impending. My trees are twenty-five years old and large, probably requiring two pailfuls to each tree. I drove through "quartering" and so sprayed each tree from four directions. Two men can easily go over five acres in a day.

Prof. Taft: I have put on a second hose, at the opposite side of the pump, and turned it back into the barrel, so making every stroke of the pump serve to keep the mixture stirred I have found the Field and Gould pumps to be of equal merit. One pound of Paris green in 200 gallons of water proved sufficient this year. The best time for application is one week after the bloom falls. Be careful to have the barrel wholly closed, to exclude dirt which easily clogs the pump or nozzle. In California gas-pipe is attached to the pumps so as to get above the trees. Spraying is efficient against the curculio, if applied once a week for three or four weeks. White arsenic is pure, and for spraying only one-fourth as much is necessary as of Paris green or London purple, and its cost is but a fraction of that of the other substances. Lye should be used with it, to make a solution. There is no danger from the spray to the operator.

E. H. Scott: With a power pump, two men can go over 1,700 trees per day. I put on rubber gloves and coat, for safety and dryness.

Prof. Taft: The curculio are killed, by spray, either the mature insect when cutting the fruit to deposit the egg, or the larva when hatched, the poison having settled into its hiding place in the wound.

Thos. Wilde: I have used white arsenic for spraying, and regard it, in solution, as safer than the other forms in suspension. When the solution

reaches the ground it goes in and nothing is left behind. My solution has 10,000 pounds of water to one of arsenic, when ready for the trees; and a pint of it might be drank by a human being and no harm ensue. To make my solution I take five gallons of water, one pound of concentrated lye, and a quarter pound of white arsenic, having the water warm so as to dissolve the lye more quickly, and I take one gallon of this to one barrel of water to use for spraying.

Tuesday Afternoon Session.

The session of Tuesday afternoon began with the reading, by the secretary, of the following letter from Mr. B. Hathaway, who had been invited to furnish a paper on

PEDIGREE IN PLANTS AND FRUITS.

LITTLE PRAIRE RONDE, December 3, 1888.

I have had no opportunity to give due study to the subject you proposed to me to write a paper upon, and it is but little I could offer or suggest upon so recondite a theme, at the best.

That pedigree will do for us in the line of fruits and plants what it has done and is doing in the animal kingdom, seems reasonable and in accordance with all analogies. But we must first have the improved family, before pedigree can become beneficially operative; and the first problem, as it seems to me, for Michigan horticulturists to solve, especially as it relates to the apple, is the producing of a new race.

This is not accomplished through pedigree, but must be sought through hybridizing, crossing and selection. That we have the elements of a new race, or new family, of the apple, one that will more fully meet the requirements of the climatic condition of our state than anything we now have, I have no doubt.

We want an apple that shall be in tree as hardy as the Duchess of Oldenburg, or any of the Russian varieties; that in fruit shall possess all the flavor of the Northern Spy, the keeping quality of a well grown Baldwin or Red Canada, as these apples are when grown in the central or northern part of the state.

That a judicious cross of one or more of our most valuable varieties, upon the best of the Russian sorts, will result in a new family out of which, by painstaking selection and the help of pedigree in further propagation, we shall finally obtain the apple we want, I have the utmost confidence.

Like every other good thing, however, it is not to be gotten in any easy manner or by hasty method. If the desired apple is produced and tested and ready to disseminate in 20 years, it will be well worth the long-time labor and painstaking in its production.

Then there are the crab hybrids, so called, of Minnesota, many of them genuine crab hybrids, no doubt, out of which, by crossing upon such of our common sorts as the Spy, Baldwin, Red Canada, Hubbardston, etc., will be produced a new family with great and distinctive merits of its own.

Out of this, when the family character is once established, by careful

selection, and observance of pedigree in the selection of seed for further experiment, we may reasonably hope for an apple that, for our state, will fill all the requirements of hardiness, productiveness and quality.

The pressing need of horticulture in Michigan, though not as pressing as in the states further west, is for new, hardy, valuable indigenous varieties of fruit, of the apple especially, as this is the great staple.

While the labor of producing and testing the new and needed fruits would seem to belong to a well equipped and organized experimental station, the work can be and should be supplemented, if not inaugurated, by the enterprising horticulturists of Michigan.

B. HATHAWAY.

MR. HATHAWAY'S STRAWBERRIES.

Prest. Lyon: The fact is that Mr. Hathaway, who is living almost entirely beyond the influence of Lake Michigan, has himself given much study to this question of originating hardy and improved varieties, and especially as to the strawberry. He took a certain strain of the native stock (the Virginia Scarlet) and persistently worked at it, securing one thousand or more seedlings, and from these selected his Pistillate Scarlet. He has many seedlings from this, all of them bearing a strong family resemblance, and they are as vigorous and fruitful plants as I ever saw. Such a course with other fruits is what he recommends. Peter M. Gideon of Minnesota did the same with the crab apple and got many seedlings desirable for that region, all bearing the distinctive crab appearance. The efforts of Prof. Budd of the Iowa Agricultural College with Russian pears and apples are upon the same line in some degree. All these experiments, in their results, go to show the practicability of generating families of fruits as well as of animals.

CARELESS USE OF TERMS.

Prof. Beal: Such experiments, if carelessly conducted, will be disappointing, but if pursued with care and intelligence in selection and crossing, the result is sure to be good. There is much carelessness in use of scientific terms among breeders, both of animals and plants. In science a term means one thing, exactly that and nothing else. Hybrids are crosses between species, and the term "families" should be "races," for families of plants cannot be hybridized. Work of this kind is very fascinating. The hybrids may be fertile and may not. If they are we may use, in further crossing, the pollen of either parent, or may take it from some other good specimen of the same kind, and by continuous work in this way finally get that which will come "true to seed." Mr. Beal rehearsed the history of the Drummond phlox, which was originally a Texas wild flower, cross-fertilization and selection having produced the variation of color and size. The same process may undoubtedly be carried out with the apple and a race established with such fixed character as to come true from seed.

AS TO PISTILLATE HYBRIDS.

Mr. Lyon was asked if it was true, as said by some, that recourse constantly to pistillate sorts, in hybridizing, tends to establish a pistillate hybrid. He

replied that the whole rose family (which is the great fruit family) has a marked tendency to production of sterile flowers, and this is specially true of the strawberry. The pistillate strawberries bear large leaves and fruit, all the strength of the plant going into these instead of to the production of stamens and pollen. Yet we try to avoid this, because the final results are not likely to be as good as with perfect-flowered sorts.

Thos. Wilde: I have one of Mr. Gideon's hybrids which he sent me with a request that I would cross it with some of our best winter apples, and I will do so as soon as it blooms. I find it best to make crosses within the same strain, as taking something else tends to reversion into worthlessness.

EXPERIMENTS IN CROSSING CORN, TOMATOES, BEANS AND CARROTS.

Will W. Tracy: I want to give some experiences which bear upon the subject, and will endeavor to be as brief as possible. First, in corn: In 1881, by starting it in pots we secured silk on three or four plants of Cuzco corn. This is a very late maturing species from Brazil which grows much taller than ours, with much more brittle leaves which are split into threads by our winds. The ear is short, nearly as thick as long, and the grain is much larger and proportionately broader, being in size and shape much like the common chestnut and perfectly smooth on the outside. The grain is made almost entirely of starch which is very white and flour like. The tassels had all been cut from the Cuzco as fast as they appeared, and the only pollen I had to use was some of Black Mexican. I used this freely and frequently, and as a result obtained two quite good ears, many of the grains being black and wrinkled like sweet corn, others being white but wrinkled, still others being white and smooth like the variety. In 1882 the white wrinkled grains were planted where there was little chance of mixture. The tassels were carefully removed as they appeared, and in due season the silk was fertilized with Early Minnesota pollen. The result was quite a lot of ears, some showing all sweet grains, some nearly all of the Cuczo type; but I think none of them black, although some of them showed considerable red. The best ear was selected and the sweet grains planted in 1883 and the silk again fertilized with Early Minnesota. This season there was considerable black corn, there being much more color than in 1882. The best two ears were selected and planted and left to fertilize themselves. There was much less color shown this season than any year previous. In 1885 the best were planted and no color appeared. In 1887 the best ears were planted and no color showed. In 1888 the best two were planted, and this season a good many grains were as black as the Mexican and some ears are as much marked with red or black as is the ordinary red blazed. I could not find that there was any red or black within a mile. Where did this color come from if it was not "in the blood?"

Again, in tomatoes: The Optimus, a red tomato, resulted from crossing a purple and a red variety, and as it first came to us would have five per cent of plants producing purple fruit. We selected the best plant and, preserving it through the winter, propagated the next spring about 100 plants from cuttings of these plants. Two always bore purple fruit. One of these cutting plants was kept through the second winter and again plants propagated by cuttings, and these had one plant which bore purple fruit. Where did this tendency, so clearly shown, come from, if not "in the blood?"

In 1886 we had a stock of Carentan carrot which contained some very fine

sorts, although the bulk of the stock was poor and there were some sorts which were plainly crossed with some brighter colored sort. We selected three of the best sorts and set them out in 1887. There were no other carrots seeded within two miles. The seed was sown in 1887 and the product varied greatly, many of the sorts being light colored and the whole looking like the stock from which the selection was made much more than like the selection from which they were grown. Was not this a case of bad blood?

In 1884 we selected a plant of black wax beans, planted the seed in pots early in 1885, and then transplanted into the open ground, so that they came into bloom earlier than any other plants in town. The plants all gave fine wax pods, and the seed was saved and planted in 1886, and produced quite a number of *green-podded* plants. Was not this due to blood?

I might give such instances by the score, and they occur so frequently in my experience that I am as thoroughly convinced that fixity of type, resulting from a long ancestry of uniform character, is just as possible in plants as in animals, but that it is only by careful attention to the same principles of breeding that are observed in animals that we can hope to reach the best result.

Prof. Beal reminded that the progeny of crossing will partake chiefly of the character of the more vigorous and thoroughbred parent.

Thos. Wilde related the result of sowing seed of a strain of green lettuce. Three-fourths of the product were yellow, and from this he concludes that at some time there was a yellow strain used in its production.

Prof. Beal and Mr. Tracy agreed that what are called "sports" are only the re-appearance of a strain which was present in the original breeding.

FOR COMMISSIONER OF AGRICULTURE.

Mr. E. H. Scott made some remarks concerning appointment of a new Commissioner of Agriculture by President-elect Harrison, and read a letter from Senator Thos. W. Palmer, who had been mentioned in connection with that office, saying he would not accept it if offered. Mr. Scott moved that this society request the president-elect to nominate, in due time as he shall see fit, Mr. J. S. Woodard of Lockport, N. Y., for Commissioner of Agriculture, our president-elect to so memorialize Mr. Harrison. Messrs. Beal, Garfield, and others spoke in favor of the motion and it was carried unanimously.

THE M'INTOSH APPLE.

The secretary read a letter from Mr. S. D. Willard of Geneva, N. Y., expressing regret for his necessary absence, his regard for all the members, and closing thus, with respect to a desirable sort of apple: "Tell your men who want a choice early winter apple to try McIntosh Red. I know nothing equal to it for productiveness and quality here. It had its origin in Canada and is a trifle like Fameuse. We sold our fruit of it for $2.50 per barrel."

SOME SUGGESTIONS FROM ADRIAN.

Mr. D. G. Edmiston of Adrian sent the following letter concerning several of the topics of the programme:

ADRIAN, Mich., Dec. 3, 1888.

The crop of small fruits in this vicinity was a light one, but quality was good and prices ruled high—just about double those of the year before. The cause of the light crop was the severe drought of the previous season. Those who had kept their berry fields in a good state of cultivation during the dry weather of last year had a fair crop with high prices, while those who had neglected cultivation had no fruit as their reward.

A good average crop of the standard varieties of grape was realized by those who had kept their vineyards in a good state of cultivation. The weather of the summer did not seem to be such as to cause the spread of mildew and rot, hence but little damage was done to either fruit or vine.

The crop of pears was a fair average and the quality was better than usual.

The apples were perhaps two-thirds of a full crop. The quality of the fruit was good where the orchards had been sprayed with the arsenites; while the fruit not treated so was very wormy and inferior.

We may learn from the season's experience that cultivation should not be neglected during dry weather, and that spraying fruit trees with the arsenites, for the destruction of the codlin moth, is a success. The only serious difficulty in the way seems to be in getting the practice made universal, so as to prevent our neighbors from raising moths to destroy our fruit late in the season or the next year. The following remedy is suggested: Let the fruit growers of each neighborhood arrange with one or more individuals who shall get the necessary outfit and spray all the fruit trees in the neighborhood, for a reasonable compensation, just as the man who owns a threshing machine now goes from farm to farm and threshes the grain. It is believed that few persons would refuse to pay a reasonable price for having this work done, while not one in ten will get the necessary outfit and spray his trees at the proper time.

Of the effects of the arsenites on the curculio I am not so sure, experiments not all proving successful, as has been the case with the codlin moth.

Yours, respectfully,

D. G. EDMISTON.

SPRAYING PLUMS FOR CURCULIO.

A questioner wishing to know how the arsenites operate in destruction of curculio, on plums, Prest. Lyon said he thought some of the poison lodged in the wound and killed the larvæ.

Thomas Wilde said spray of corrosive sublimate, such as he had already described, will do the same and also arrest or prevent mildew; but which it kills, the larvæ or the mature insect, or both, is yet a question.

SOME FORESTRY TALK.

Opening, with a short address, consideration of the topic, "Forestry," C. W. Garfield said he was more discouraged at the outlook as to forests than he was a few years ago. He had thought the forests might be preserved by promulgation of certain well known facts; but it is clear that only the money which comes from the cutting of lumber is now thought of, no care being taken as to the future. He related an anecdote, a conversation Prof. Beal and himself had with a man in northern Michigan who was about to cut the

pine from 40 acres he had bought for $200, and by that means make a profit of $500; but he had no care or even thought of what should become of the land afterward. There are so many such that it seems useless and hopeless to do anything. Only one thing remains for us to do, and that is to continue to discuss the effects of cutting. No farmer in southern Michigan can afford to be without a woods tract, and this as a matter of practical sense, not of sentiment. Mr. Garfield said he had planted recently 1,200 little trees and has cultivated them. The black locust grew most rapidly, the hardy catalapa next (half as high as the preceding), and the others less, on down to the evergreens. He means to extend the plat, and solely for protection and benefit to his farm. Ten years ago he planted 1,000 such trees just west of his house. The Austrian pines are now 25 feet high, although at first only a few inches. All others have done as well for their kind and now make a perfect windbreak for his house, which before was bleak. He cited the case of a western man who had made profit from growing the black locust; and answered a question by saying there is no trouble from the borer to a large plantation of these trees, no more than there is from the cabbage worm to a large field of cabbages. Several cases were cited, and severe criticism spoken, of the men possessed of a fever for cutting trees, one of these being that of a man who wantonly cut a beautiful windbreak of elms and soon lost 500 bushels of apples, blown off, as a consequence.

HINTS ON PLANTING TREES.

Prof. W. J. Beal: This mania for timber is much like the boys' disposition for stealing apples, a matter of heredity, something inherent to the Anglo-Saxon race, which has spent its whole course in subduing wooded countries. There is no help for northern Michigan until all the timber is cut off and burned off and the lumbermen gone elsewhere.

Continuing on the management of artificial plantations, Mr. Beal said: "Some trees will not grow in the shade, and if planted by themselves the tops will be very thin, allowing the light to reach the soil, which encourages the growth of grass and weeds. These will check the growth of trees. Trees of this sort are black walnut, white ash and the European larch. Some trees will endure a medium amount of shade, as our oaks and the sugar maple; some will grow very well in the shade, as the beach and most pines, spruces, and cedars. With larches, ashes and walnuts should be planted two to one of some shade-loving trees, mixed in checkerboard style. Plant trees about four feet apart and cultivate, the longer the better for the trees. Trim occasionally, so that the tops of adjacent trees barely touch each other. While young, see that no bad crotches are allowed to form. A young maple, oak, or elm is much like an apple tree, it will grow very slowly in the grass, especially if the soil be a poor one For windbreaks, white pine holds out long and well. Scotch pine grows fast but becomes straggling; and butternut grows fast at first but slowly later." Mr. Beal also noted the many uses to which very young timber is put in the mechanical arts, showing that a profitable demand for it is likely to be made upon its grower.

G. S. Linderman called attention to the rapid growth of the honey locust.

E. Graham could see but little hope for advancement of forestry in this generation, for no one will now do much except for the present dollar, but eventually its precepts and practice must become well established.

Prest. Lyon: The hardy catalpa is wholly so at South Haven; but while Prof. Bailey says it has been winter-killed at the Agricultural College, I have seen it in Minnesota doing well.

Prof. Beal: Many things go to determine the question of hardiness of this tree, and one of them is whether the seed was from the north or south. Some catalpas in Lansing are perfectly hardy, and I have seen such in Ann Arbor.

So, too, I have seen ripe persimmons in a garden in Bath, this State. The condition of hardiness is a variable one.

PROPOSED CHANGES IN LAWS.

Mr. Garfield said he had become converted to one of Mr. Lyon's views upon this question, that of exemption from taxes of plantations kept for forest purposes. When this matter touches the pockets it will advance quickly. He quoted the recommendations of the state forestry commission: that the law be repealed which provides for collection of forestry statistics by the supervisors, because the cost thereof is large and the return unsatisfactory—the commission to secure such statistics by other means; that a law be passed prohibiting the setting of fires for clearing land, from April 1 to November 1, each year, except by written permission of the supervisor and notice to owners or occupants of adjoining lands—boards of supervisors having power to suspend the law by majority vote; that cheap lands, in one or more locations, be acquired by the state and set apart as a preserve.

On motion, these recommendations were endorsed by the society, together with a plan of exemption of forest tracts from taxation.

Mr. Linderman thought much of the northern region of the lower peninsula might well be exempted, or held as a park as the Adirondacks are now in New York.

C. J. Monroe: It would be best not to include this in our recommendations, judging by what has been said of forestry, in the state legislature, many of that body looking upon the whole subject as purely sentimental.

Prof. Beal: It was not included in the commission's recommendations because of its many complicating conditions.

OUR NATIVE PLUMS.

The secretary read the following paper by Prof. J. L. Budd, of the Iowa Agricultural College, on the above subject:

Mr. President and Members:

Your secretary requests me to give some notes on our native plums, as found west of Lake Michigan, and their possible improvement by selection and crossing. That it is a subject worthy of careful consideration, even in Michigan, can not be doubted. While we have no native species of the apple, pear or cherry that promises to give us valuable varieties for cultivation in the near future, I think we can say that we have the best indigenous plums of the temperate zones.

Nearly every neighborhood has its varieties, having a deserved local reputation, and a few varieties, to which the attention of our horticultural societies have been directed for years, are grown quite extensively in the nurseries and have been planted in commercial orchards over large areas of the prairie

states. Among these the De Soto, Wolf, and Wyant stand well at the head of the *Prunus Americana* family. That they are better for any use or are better because of perfect fruit, than a dozen others in the state, I am not prepared to say, but they are better known to growers and they have taken well in the western markets when put up in as neat packages as the plums from the south and the Pacific coast. It has been said truthfully of these varieties that they have been fruited in certain localities for a quarter of a century without the total loss of a single crop, and my experience has been that they have borne full crops each year during the past six years when failure at the west has been the rule with the orchard fruits on account of extremes of winter cold and summer heat. While it is true that our best native plums of the Americana and Chickasaw races are more or less punctured by the "Little Turk," the larvæ are developed in only a small per cent of the specimens, and the crescent mark on hundreds of the perfect specimens are scarcely distinguishable when they are ready for picking. It has been said that such varieties as the De Soto, Wolf, Wyant, Hawkeye, Maquoketa, and Pottawatomie are so loaded with water during the early stages of growth that the conditions are not favorable for the larvæ. Be this as it may, we are able to gather full crops of perfect fruit from some of our native sorts, which we never could do, without treatment, from the Lombard or European sorts we were able to grow prior to our recent test winters.

As to the size and quality of some of the best of these native sorts Mr. T. T. Lyon can testify as grown the driest season ever known in the west. In quality they can hardly be compared to the European plums, as they differ wholly in texture and flavor.

I was assured by an expert judge of fruits on South Water street, Chicago, that he preferred well-grown and ripened De Soto plums to the best specimens of the plums and prunes of the Pacific coast, for the reason that they had a sprightliness and positiveness of flavor which was lacking in the firmer fleshed European and Asiatic plums. That many buyers share this opinion is evidenced by the fact that the pretty Wild Goose varieties from the south are taken in small packages far more rapidly than the larger, firmer fleshed and sweeter sorts of European origin. Even for culinary use the fruit dealers of Chicago will assure the inquirer that our native plums are gaining ground. They are also gaining favor with the growers for market on account of their perfection of foliage, hardy fruit buds, and relative exemption from rot and injury from curculio.

The Miner, Blackman, and other Chickasaw varieties first tried on the prairies, blossomed profusely without getting a crop of fruit. This was caused apparently by the premature ripening of the pollen before the stigmas were ready to receive it, as when mingled with Americana sorts they fruited fairly well, and microscopic observation showed the Chickasaw pollen perfect. Later, we have found varieties that appear in leaf, bud, and wood to be pure Chickasaw, that bear annual crops, but not as fruitful as our best Americanas. Of those the Maquoketa, Forest Rose, and Pottawatomie, for the present, head the list. These are later in season than the Wild Goose and will prove more valuable for home use or market north of the forty-first parallel.

Thus far in our history our cultivated varieties have come from indigenous variations found in the thickets of the west or south, or from their seedlings. But in the near future we may hope to secure improved sorts by methods

of crossing and hybridizing. Our college experiments indicate that the southern varieties of the Chickasaw cross readily with the Americana, and the pollen of the best European sorts takes equally well.

Our seedlings from DeSoto pits fertilized by pollen of the Wild Goose, show varied combinations of the two species, and seedlings of DeSoto fertilized by pollen of a large European variety sent by mail from Oregon show in leaf, bud, and wood, they are true hybrids. The seedlings of the latter cross were purposely left without protection in seed bed, where on rich soil they had made a growth of three feet, and they came through the severe winter sound to the terminal bud. This seems to indicate that the pre-potent mother stocks will transmit hardiness to the seedlings without regard to the pollen used. If this proves true we can use the pollen of the best plums and prunes of the Pacific coast, as we have had better success in using pollen of the plum and cherry which had been several days in the mail sacks, than with that freshly gathered.

If by crossing we could increase the size and firmness of flesh of our best native sorts, and yet retain a part of the positiveness of flavor of the latter, we could without regret bid good bye to the European sorts which have proven really at home in but few localities of our great domain.

J. L. BUDD,
Iowa Agricultural College.

Mr. Lyon did not quite like Mr. Budd's conclusion regarding the Pottawatomie, for his tree of this variety yields him nothing.

Prof. Beal: The trouble is, the pollen is poor.

Mr. Lyon: The Chickasaws, while loaded south, wholly fail here, except that I saw a few fruits upon them last season.

W. J. Cook: What is the cause of plums shedding their leaves?

Prof. Beal: Septoria or "shot-hole fungus" which bores the leaf, and finally causes it to drop. It is not likely to continue, as some change will take place which will eradicate it.

Mr. Lyon: It has been with us thirty years, so it is to be hoped the change will come pretty soon.

Tuesday Evening Session.

This session was chiefly occupied with a lecture by Prof. W. J. Beal, of the Michigan Agricultural College, the full text of which is here presented under the title of

THE HORTICULTURAL POSSIBILITIES OF NORTHERN MICHIGAN.

As you doubtless all know, each state and territory in the United States which had in operation an agricultural college, began receiving from the national government $15,000 per year, on February last.

In our State, part of this money is used in paying one-third of the salaries of six professors of the college, viz: those of chemistry, zoölogy, botany, agriculture, veterinary, and horticulture. The president of the college is the director, but draws no salary for his services in this capacity. After taking out $1,000 for experiments in dairying, and $2,000 for experiments on the northern sands of Michigan, the remainder is placed somewhere nearly even

in the hands of the six departments above named. The expenditure of the $2,000 per year in the north, with the advice of the director of the station, was to be made by Dr. Kedzie and myself.

LOCALITY OF THE JACK-PINE LANDS.

So far as we have gone the stations of the north have dealt only with jack-pine lands, and only with these for one short summer. Besides, no experiments in fruits have yet been attempted. So you will see that at this time I must content myself in giving mere opinions in regard to the horticultural possibilities of the north, aside from hints picked up from some early settlers, from reading, and from observations made on frequent visits covering a large extent of territory.

These jack-pine plains are in irregular spots in Iosco, Osceola, Crawford, Kalkaska, Newaygo, and other counties. At Grayling, in Crawford county, the Michigan Central railroad company gave us a deed of eighty acres of new land near the village. We have also rented eight acres more of older land. Dr. Kedzie is testing by the acre at this place numerous grasses and forage plants, using to some extent as fertilizers, plaster, marl and salt. The soil is pure sand containing but little vegetable matter, and most of that is not in a very finely pulverized condition. Occasionally there is some gravel. Such a soil is "leechy," and crops soon suffer after rain ceases. Much of the land is quite subject to spring frosts. The seasons are very short, the winters severe, though in most instances a continued layer of snow from late autumn till spring helps preserve the small trees and shrubbery from harm.

NATURE AND EXTENT OF EXPERIMENTS.

I shall now glean many items from my forthcoming report of the experiment station, now in the hands of the State printer.

In my part of the experimenting on the northern sands of Michigan I started with the attempt to answer two questions:

1. To find one or more grasses or other forage plants that shall be better adapted to the soil and climate than any heretofore in general use in such places.

2. To test many kinds of forest trees to learn which are best fitted to plant for timber on the sandy plains.

An effort to answer either one of these two leading questions very naturally suggests several other questions, such as the proper modes of seeding, planting, and cultivation, whether one kind only of either grass or tree should be allowed to occupy the ground at the same time, whether several grasses or other forage plants shall be sown together, and whether several kinds of trees shall be set together.

Again, for grass or tree, will it be most profitable in the end to thoroughly prepare the ground before planting, to make a slight and cheap preparation, or simply sow and plant in open places, without cutting any tree or shrub or plowing or harrowing the land?

The grass plats are each one rod square, and occupy about two acres of the "old" land which was rented. Most of the species of forage plants which I desired to try have not been tested to any extent in this country. Many of them have not found their way into cultivation, at least only sparingly in

isolated places. Seeds of these are not in the markets of the world, and can only be secured by going after them or through the efforts of botanists in remote countries.

The finer seeds were generally sown broadcast and raked in; the larger ones were sown or planted in rows or in "hills" and have been hoed. There were about one hundred species thus planted or sown, including one Niagara grape-vine, which was an unsolicited gift. The vine was planted as the grasses, in this sand, without the use of any fertilizer. It lived and put forth two or three canes, the longest of which was about 18 inches. We shall probably, at this rate, not be able to show many fine clusters at the next annual meeting of the society.

The last examination of the plats was made on June 16, too early to make it worth while to notice in this place the degree of success of each plant. By autumn of 1888, and spring following, I shall have ready seeds of many other species from various sources.

The trees planted were about 6,600 in number and belonged to seventy-six species and varieties. They ranged from four inches to two feet in hight, most of them being about one foot high. A few poplars and willows were in the form of cuttings. Thirty-five species from Iowa Agricultural College were represented by a few trees each, and were raised from stock which had been imported from central Russia. They were planted in close rows on the "old" land which was rented.

The other trees were bought of W. W. Johnson of Snowflake, Antrim county, and shipped direct to Grayling. One acre of newly broken and well prepared land was planted to representatives of each of the kinds obtained of Mr. Johnson. These were planted in rows four feet apart each way and were well mixed, so that evergreens and other shade-loving trees alternated with those which would not thrive in much shade. These trees last noticed, I intend to keep cultivating for some years to come. Near them was a piece of unbroken new ground containing a few scattering jack-pines (*Pinus Banksiana*) and some scrub oaks, perhaps ten feet high and under. There was also a considerable quantity of three kinds of low blueberries, one bearberry, trailing arbutus, wintergreen, eagle fern, sweet fern, some dwarf service berry, choke cherry, and a few grasses and other perennials. Two acres of this land were passed over once with a spring-toothed harrow, which seemed to tear up the soil considerably, though most of the wild shrubs and other perennials were still left in the ground ready to grow. On this land were planted an assortment of the trees obtained of Mr. Johnson. Another lot of the same kinds was planted on a piece where there had been no cultivation.

The list of trees above referred to appears below:

Acer dasycarpum Ehrhart. Silver Maple.
Acer plantanoides. Norway Maple.
Acer Pseudo-platanus Sycamore Maple.
Acer rubrum L. Red Maple.
Acer saccharinum Wang. Sugar Maple.
Betula lutea Michx Yellow Birch.
Betula papyracea Ait. Paper Birch.
Catalpa speciosa Warder. Hardy Catalpa.
Celtis occidentalis L. Hackberry.
Fagus ferruginea Ait. Beech.
Fraxinus Americana L. White Ash.
Fraxinus Sambucifolia Lam. Black Ash.
Fraxinus viridis Michx. Green Ash.
Gleditschia triacanthos L. Honey Locust.
Gymnocladus Canadensis Lam. Ky. Coffee-tree.
Juniperus Virginiana L. Red Cedar.
Larix Europæa L. Eupropean Larch.
Morus. Russian Mulberry.
Negundo aceroides Moench. Box Elder.
Picea alba Link. White Spruce.
Picea excelsa. Norway Spruce.
Pinus resinosa Ait. Red Pine.
Pinus Strobus L. White Pine.
Pinus sylvestris L. Scotch Pine.
Populus argentea L. Silver Poplar.
Populus argentea Vas. Large Silver Poplar.
Populus balsamifera L. Balsam Poplar.

Populus balsamifera, Vas *Candicans* Gray. Balm of Gilead.
Prunus serotina Ehrh. Black Cherry.
Robinia Pseudocacia L. Common Locust.
Salix alba L. White Willow.
Salix alba var. *vitellina*. Yellow Willow.
Salix purpurea Purple Willow.
Salix. Wisconsin Weeping Willow.
Thuya occidentalis L. Arbor Vitæ.
Tilia Americana L. Basswood.
Ulmus Americana L. American Elm.
Ulmus campestris Sm.
Ulmus montana Sm.
Ulmus racemosa Thomas. Rock Elm.
Ulmus fulva Michx. Red Elm.

Michigan is yet a well timbered State, but the time is fast approaching, and will be seen by many now living, when our people will be making all sorts of inquiries as to what to plant and how to manage a tract of young trees for producing timber. It is a question whether considerable portions of our cheapest pine plains and "stump lands" had not better be replanted to forest trees.

We do not know for certain what is the best course to pursue, nor can any one at present tell us. We should continue experimenting till we know more nearly than any one does at present. Much has been done in Europe, but the people are so different, the laws are so unlike our own, and the country so much older and thickly settled, that we are left, to a great extent, to work out the growing of new forests to our own resources.

Detailing the various places in the north, where experiments have been undertaken, Prof. Beal continued:

FLORA OF THE SANDY PINE PLAINS.

The flora of the sandy pine plains are very peculiar, and well worthy of more than a passing notice, as from these we may gather many hints as to what may be expected when the land is cultivated. Such land is often gently rolling and with the scattered low trees presents an attractive appearance. It looks as though it would make a nice farm. The ease with which it can be cleared has induced many a man to purchase and begin to establish a home.

Owing to the poor soil and improper management, after a few years many have abandoned their homesteads in discouragement.

We saw several of these deserted homesteads where much effort had been spent in placing things in neat order. There was a comfortable house, a log barn, hog pen, board fence, with a nice gate in front of the house. There were some fruit trees, shade trees, ornamental shrubbery and the remains of the flower garden. All was left to return to a state of nature. It was sad to view these lonely homesteads.

Many now believe in the words of the late State geologist, C. Rominger, "that the productiveness is so soon exhausted and its moisture so soon lost, that it can never be used for agriculture on a large scale with any prospect of success."

Whether the latter statement be true or not, it is not now my purpose to attempt to decide.

At the risk of being tedious, I will venture to call your attention to a list of 70 plants, all of which are almost certain to be found in considerable quantity on any extended area of jack-pine plains:

Helianthemum Canadense Michx. Frost Weed.
Viola pedata L. Violet.
Viola canina var. *sylvestris* Regel. Violet.
Polygala polygama Walt. Pink Polygala.
Ceanothus Americanus L. New Jersey Tea.
**Prunus pumila* L. Sand Cherry.
**Prunus Pennsylvanica* L. Wild Red or Pin Cherry.
**Prunus Virginiana* L. Choke Cherry.
Rubus Canadensis L. Dewberry.
Rubus hispidus L. Dewberry.
Fragaria Virginiana var. *Illinoiensis* Gray. Strawberry.
Potentilla Canadensis L. Five-finger Cinque foil.
Potentilla tridentata Ait. Three-toothed Cinque-foil.
**Amelanchier Canadensis* var. *oblongifolia* Torr. and Gray. Dwarf June Berry.
Œnethera biennis L. Evening Primrose.
Aralia hispida Michx. Bristly Sarsaprilla.
Diervilla trifida Mœnch. Bush Honeysuckle.
Houstonia purpurea var. *longifolia* Gray. Houstonia.
Liatris cylindrica Michx. Blazing Star.
**Solidago nemoralis* Ait. Golden Rods.
Solidago arguta. Golden Rod.
**Aster levis* L. Aster.
**Erigeron Canadensis* L. Horse Weed.
Erigeron strigosus Muhl. Daisy Fleabane.
Antennaria plantaginifolia Hook. Plantain-leaved Everlasting.
Gnaphalium decurrens Ives. Everlasting.
Rudbeckia hirta L. Cone-flower.
Helianthus divaricatus L. Wild Sunflower.
Helianthus occidentalis Riddell.
Cnicus pumilus Torr. Low Thistle.
Krigia amplexicanis Nutt. Dwarf Dandelion.
Hieracium venosum L. Rattlesnake Weed.
Campanula rotundifolia L. Bluebell.
Gaylussacia resinosa Torr. and Gray. Black Huckleberry.
**Vaccinium Pennsylvanicum* Lam. Dwarf Blueberry.
**Vaccinium Canadense* Kalm. Low Blueberry.
**Vaccinium vacillans* Solander. Low Blueberry.
**Arctostaphylos Uva-ursi* Spreng. Bearberry.
**Epigœa repens* L. Trailing Arbutus.
**Gaultheria procumbens* L. Wintergreen.
Apocynum androsœmifolium L. Dogbane.
Lythospermum hirtum Lehm. Hairy Puccoon.
Convolvulus spithamœus L. Low Bindweed.
Melampyrum Americanum Michx. Cow-Wheat.
Monarda fistulosa L. Wild Bergamot.
**Rumex Acetosella* L. Sheep Sorrel.
Comandra umbellata Nutt. Bastard Toadflax.
**Comptonia asplenifolia* Ait. Sweet Fern.
Quercus alba L. White Oak.
**Quercus coccinea* Wang. Scarlet Oak.
**Quercus tinctoria* Bartram. Black Oak.
**Salix humulis* Marshall. Low Willow.
**Populus tremuloides* Michx. Aspen.
Populus grandidentata Michx. Large-toothed Aspen.
**Pinus Banksiana* Lambert. Scrub or Jack-pine.
Pinus resinosa Ait. Red or Norway Pine.
Pinus Strobus L. White Pine.
Maianthemum bifolium DC.
**Carex Pennsylvanica* Lam. Pennsylvanian Sedge.
Panicum depauperatum L. Panic-grass.
Panicum dichotomum L. Panic-grass.
**Andropogon provincialis* Lam. Finger or Beard-grass.
**Andropogon scoparius* Michx. Beard-grass.
**Oryzopsis Canadensis* Torr. Mountain Rice.
Agrostis scabra Willd. Hair-grass.
**Danthonia spicata* Beauv. Wild Oat-grass.
Kœleria cristata Pers. Kœleria.
Festuca ovina L. Sheep's Fescue.
**Pteris aquilina* L. Eagle Fern.
Lycopodium complanatum L. Club-moss.

The above list consists of representatives of twenty-seven families, of fifty-four genera, and of seventy-two species.

Were we to include all the plants ever found on such plains and all found in the neighborhood of the plains we might find, perhaps, nine hundred species, or twelve times as many as are above enumerated.

The above list is as nearly typical as I am able at present to make it and is the result of repeated studies over a large extent of territory.

The families of plants best represented on the plains are the *Rosaceæ* by nine species, *Compositæ* by fifteen species, *Vacciniaceæ* by seven species and *Gramineæ* by nine species.

The following large and prominent families of the state are not represented in the list above given: *Ranunculaceæ, cruciferæ, caryophyllaceæ, saxifragaceæ, umbelliferæ, orchidaceæ.*

Most remarkable of all is the absence of any *leguminosæ*, though the family contains 6,500 species and is the second in size only to the *compositæ*.

The number of biennials given in this list is remarkably small, and there are no annuals in it. In this list is a thistle and two species of erigeron which seed freely and the wind aids in sowing the seeds. The evening primrose seeds abundantly and often on these plains grows in a globular form, a foot to two and one-half feet in diameter. When ripe it loosens its hold on the soil and becomes a "tumbleweed," rolling for considerable distances before the wind and scattering its seeds on the way.

In like manner, I might lengthen this paper by showing the special adaptation of each of these plants in the above list to survive the severe tests applied to it on these sandy plains.

Of this list of seventy species, sixty-eight are perennials and four are biennials.

The perennials are mostly persistent plants well adapted by long deep roots and rootstocks to live in poor soil, which is subject to severe drouths. Most of them are admirably adapted to surviving, after a severe fire has burned over the ground and killed the tops of the plants.

A CONTRAST OF THE TWO SIDES OF THE PENINSULA.

On the west side next to Lake Michigan, the country studied was at Frankfort and vicinity in Benzie county and east of there.

Besides Harrisville on the east shore, some time has been given to studying the flora at the mouth of the Au Sable river, about fifteen miles south of Harrisville.

The prevailing winds on both sides of the lake are from the west and southwest. In each case the country slopes gently toward the lake to which it is adjacent. It has been long known that the climate of the west shore where the wind sweeps across Lake Michigan was milder in winter, and throughout the year less variable than it is on the east side of the state. This is not only evident by a test of thermometers on the two shores, but tender fruits and some other plants thrive better on the west shore than on the east. So far as observed, the plants of the state which are only found in the vicinity of the great lakes are most abundant in individuals on the west shore.

The prevalent west winds produce the shifting sand dunes which are sometimes 200 feet high and favorable for the shore-plants. The lake is gradually washing down and carrying away the land on the west shore. On the east side of the state the shore is generally lower and there are no sand dunes worthy of the name. At the mouth of the Au Sable river above and below, along the lake for many miles, there are low ridges of sand five to ten feet or more above the lake. The sand is washed ashore by the lake. These ridges are two to eight rods wide and separated by a lagoon about as wide as the ridge. The ridges in some places look as though some company had graded a track for a new railroad. These ridges parallel with the lake shore south of Oscoda up to thirty in number can easily be counted. The last ridge now forming is already much wider than any of the others, and is partially composed of immense quantities of timber which has floated down the streams in connection with the lumber traffic. This timber is composed of rough logs, stumps, limbs, and refuse from saw mills. If one knew when the lumbering began along the Au Sable river, he could readily estimate the rate at which the last terrace is forming.

To all appearances the southern peninsula of Michigan at this latitude is moving eastward. The west shore is scarcely wasting away as fast as the east shore is gaining by sands thrown out of Lake Huron.

To return to the flora of the two opposite shores, I give the following list of northern plants which were found on the east side of the state and not on the west side:

Swamp gooseberry, sheep laurel, swamp laurel, dragonhead, white spruce, sparganium, four sedges, two moonworts.

The following southern plants were found on the west side and not on the east side:

Silver maple, black raspberry, common elder, sassafras, red elm, rock elm, maidenhair fern.

So far as the lists are extended they help sustain the prevailing notion that the west side of the state has the milder climate. True, we have not studied plants throughout the year nor have all localities been searched. Possibly this, if complete, would be much modified. We might be able to see why silver maple, sassafras, black raspberry, red elem, and rock elm thrive on the west shore and not the east, but I am unable to see why the northern plants found on the east shore should not also be found on the west shore.

To some extent, the climate of the two shores of the southern peninsula of Michigan may be contrasted in the same manner as the climate of Oregon contrasts with that of Massachusetts. The difference on the two sides of the state are much less than they are on the two sides of the much larger continent bordered on the sides by broad oceans.

ATTRACTIVENESS OF THE WEST SIDE.

Many observations and numerous notes were made, among them the following:

The resources are many: a healthful climate, good water, plenty of timber, much excellent land and first-rate markets. The roads on the upland are usually good. For farming purposes, the land occupied by deciduous-leaved trees or hard wood is usually preferred.

Passing as we did through the centers of the counties of Alcona, Oscoda, Crawford, Kalkaska, Grand Traverse and Benzie, we could not help thinking that, with some exceptions, the west part of the state was better than the east side, especially when we consider the raising of orchard fruits. In the vicinity of Kingsley we saw many thrifty bearing apple orchards. Good land well covered with hard wood can be bought from four to ten dollars per acre, depending on the soil, timber, and location.

Some of the land in eastern Kalkaska county has recently been stripped of all the timber, which was mainly pine. Much of this can be had for a dollar per acre and some of it goes back to the State for taxes.

In watching the rapid flow of the Au Sable and the Manistee passing by the plains which were thirsting for water, it often occurred to me, "why not turn the waters on the fields and make them fertile, instead of using them to float logs to the lakes?" A thing so easily done, I believe one day will be done, and done with great profit, not likely by those owning small farms, but by those owning land by townships and sections. If we could control the water on these plains so they should not lack for it, we could grow good crops, and with good crops the soil would rapidly improve in fertility.

PROF. BAILEY'S OBSERVATIONS.

The following with reference to the above subjects was contributed by Prof. L. H. Bailey, jr., and was clipped from two articles which he wrote for the Free Press:

"While it is true that the characteristic plants of the plains are such as will not awaken the interest of the casual observer, there are some remarkable exceptions to this statement. Some of the plants are worthy of a conspicuous place in the flower garden. The life root, or senecio of the plains, is very common in places, decking the dull surface with masses of golden yellow. The yellow puccoon, two sorts, is also conspicuous and attractive. Much of the barren land, especially on the eastern side of the state, produces great numbers of the large wake robin or trillium, a plant ordinarily found in low and rich woods. The bird's-foot violet, the handsomest of the native species, gives the ground a bluish cast in some places, its great flowers appearing to delight in the aridity of the plains. Upon the plains of Oscoda county beautiful wild roses are abundant, the bushes sometimes attaining a hight of four or five feet and bearing a profusion of large and bright flowers. A species of the New Jersey Tea often whitens the slopes with its compact clusters. The occurrence of these plants cannot fail to inspire the hope that other plants of economic value can be made to grow profitably upon the plains. For the most part, however, these plants are such as delight in the poorest sands. The experimenter should seek rather to discover plants which naturally thrive upon loose sand than to attempt to cultivate here the ordinary plants of the farm and garden.

The surface of the plains is diverse. It is mostly made up of a broad system of terraces which rise from the Au Sable, Manistee, Muskegon, and other rivers. Adjoining the river is an alluvial soil, variable in width, but usually confined to a few rods. From this rises a terrace of fifteen or thirty feet, leading to a level stretch of plain. Above this is another terrace, often higher than the first, and above this still one or two others. The width of the intermediate stretches varies from a few rods to a mile or more, until the h ght of land is reached beyond the valley. The valley of Au Sable varies from three to five miles in width. The high lands to the rear of the last terrace are often one or two hundred feet above the river bed. They are mostly undulating in character, although in many places there are long stretches of perfectly level country. Some of these stretches which have been recently burned and over which the low herbage has again gained a foothold, have the appearance of great pastures. One of these openings, fully two miles long, was passed through.

Throughout all the plains region there are occasional strips of hard land. The character of the plains soil itself is somewhat variable, some streaks of sand being much more fertile than others. Much of the pine land appears to be no better than the plains. It appears that a considerable part of the plains land is made such by the action of fires, which prevent the trees from attaining a great size, for upon most of the plains one finds young Norways starting up and it is rare that there are not unmistakable evidences of fire having swept the country at one time or another. Before the plains can be reclaimed to the farmer for purpose of forestry and grazing, there must be devised some means of lessening fires. Under the present slovenly and careless system of timbering there is little reason for hope in this direction.

Westward from the Manistee the country assumes a different character. Better land, more hardwood, and occasional and prosperous farms give an attractive appearance to the country. The region is good farming land, the soil being sandy but abounding in vegetable matter. The forests are exceedingly dense and green and undergrowth is luxuriant. The prevailing timber is hard maple, beech, elm, and hemlock, just the admixture which indicates early and rich land. The swamps are filled with cedar and spruce, some of the former attaining great size.

The wild crabapple has not been found. It is usually observed that the culture of the common varieties of apple do not extend much beyond the range of the wild crab; but there is every reason to believe that many of the very hardy varieties may be safely planted here. The few trees now growing in the region appear to represent such varieties largely, the Ben Davis being prominent. Yellow Transparent, Oldenburgh, Whitney, Seek-no-further, and the improved crabs are to be recommended for this region The wild blackberry is everywhere abundant between the two lakes, growing alike upon the plains and timbered lands. The wild red raspberry is frequent throughout. The presence of these species is indication enough that the country possesses possibilities in small fruit growing. It is commonly observed, however, that the cultivated raspberry and blackberry are injured by cold while the wild bushes in the immediate vicinity pass the winter in safety. The reasons for this are chiefly two. In the first

place the natural protectors of the plants, the forests and wild bushes, are destroyed. The wind sweeps over the country with fury, driving the snow before it, and exposing plants to great vicissitudes of weather. If upper Michigan is to become a prosperous farming country natural wind breaks must be preserved.

The second reason for the more frequent injury to the cultivated plants is the fact that cultivation, unless properly pursued, causes a vigorous and somewhat softer growth which is unable to endure great extremes of climate. Wherever the soil is strong enough, currants and gooseberries will thrive. Two or three very small plantings of currants have been seen, and they are uniformly vigorous. In fact, the wild red currant is common in swamps, and other wild species occur. The wild gooseberry is also often seen. The wild plum is found at Mio and other places in Oscoda county, and a critical search would undoubtedly reveal it in other places. Both the red and yellow varieties occur near Mio. At Coming's opening, on the Au Sable, a few wild plums had been transplanted. The common wild plum is exceedingly variable, and it is now being introduced into cultivation very largely. Many improved varieties are largely cultivated. All these will undoubtedly prove hardy and valuable here in this northern country. The sand or dwarf cherry grows abundantly upon the poorest plains. Its fruit is variable, but usually as large as a small grape. In flavor it is good to excellent. The plant is a low and straggling bush, seldom growing over five or six feet high. It is a profuse and reliable bearer. It requires no scientific training to predict that this plant has a wonderful future before it. If the few inhabitants of the plains had even a moiety of energy and a whit of observation, this wild cherry would be found growing in every garden. At present, even the garden is usually missing. If the inhabitants want anything in the line of fruit they will have the old varieties of more favorable latitudes or they will have none. In this happy state of affairs their lot will be to have none. The sand cherry, it is admitted, is not a Governor Wood nor a black heart, but it is good and wholesome, and is capable of great improvement. It thrives in the poorest and driest sand, and is not injured by any extreme of climate. Its possibilities for the plains are great. Another promising plant of the plains is the wild dwarf service-berry or June-berry. The fruit closely resembles a huckleberry, and the plant is often sold for such by ignorant and unprincipled nurserymen. The bush is comely and attractive, growing from four to eight feet high. Of late years it has been introduced into cultivation. As soon as its merits are better known, its culture will become common in all cold climates. Three species of huckleberry closely following each other in periods of ripening, are everywhere exceedingly abundant on the plains. As soon as markets become more acessible there is no doubt that these berries will become a profitable crop on the barrens. It will be only necessary to inclose the land and to remove other vegetation in order to grow them with profit. On the whole, the horticultural outlook is more encouraging for our barren plains than for the rich prairies of many parts of the northwest; an outlook, however, which depends upon the hope that the country will never be denuded of all its forests."

ADVANTAGES OF NORTHWEST MICHIGAN FOR FRUIT AND VEGETABLE GROWING.

Northern Michigan presents to me new advantages every time it is visited. The neat, new school-houses deserve especial notice, as they are an index of the character of the people. The fruit trees and the farming are retarded a week or more in spring when situated near either one of the great lakes. This has more advantages in case of fruits than at first sight might appear. On June 13, 1888, at Harrisville on the margin of the lake, trees of Kentish cherry were just in flower; the same was true of the common sorts of apple, Missouri currant, and dwarf phlox. The flowers of the common lilac were still in the bud.

In brief, we were surprised to find so many advantages for people of limited means to start homes. We are unable to see why so many should leave Michigan for the prairies of Dakota, and believe most of them would not thus leave were they familiar with the better portions of our State. But we should not be in great haste to see this State thickly settled, for our sons and grandsons and their wives will soon want the cheap lands and will convert them into pleasant farms.

The principal native fruits of the jack pine plains that interest the horticulturist are the sand cherry, choke cherry, dewberry, and service berry, all yet to be improved before they be found worth anything. A leading objection to the service berry is the mild taste and the bright color which attracts two birds for every berry. The strawberry has already been improved. There are three species of blueberry, very low shrubs, usually less than a foot high.

How does the above list strike the thrifty grower of the luxurious peach on the west shore and on the favored hills of Washtenaw, Hillsdale, and Ionia? No grapes, no plums, no apples (not even a crab), no raspberries, no strawberries of any account, as there is hardly strength enough in the soil for the plants.

There is precious little good sauce in the list. The crops are light and profits clear down to 40 degrees below zero.

For good crops of most fruits we must have a soil composed of something besides sand. Fertilizers must be liberally added. Fortunately these sandy, barren plains are not very extensive. Northern Michigan has much good land and considerable that is excellent. This is usually sandy, some of it gravel, some clay, and some mixed. It is well watered. Much of the timber is sugar maple, American elm, hemlock, a little pine, and three sorts of birch. This land can be bought for two to ten dollars and upward per acre. At Harrisville, on the Huron shore, in Alcona county, apples of several varieties apparently thrive very well. Here we find Kentish cherries, wild plums, fine red raspberries, and black caps are cultivated. Here is the home of currants, gooseberries, blueberries, and strawberries. The earliest hardy grapes may well be expected to be worth raising.

In most places of the north, as before stated, nature does the mulching in good season with the best of material—"the beautiful snow."

For raising many kinds of vegetables, northern Michigan takes no second place to any part of the country. Here can be grown radishes, crisp and tender, lettuce of the best quality, onions (fair and strong enough), flat turnips and rutabagas in perfection. Their potatoes already have a renowned reputation.

At Grayling I saw a wagon-box full of squashes, including Hubbards, marrow, and turban. They were well grown. Dr. Palmer, in the village of Grayling, raised a nice crop of squashes, which were so good that most of them were stolen. Cabbages do first-rate.

In the north the markets are excellent and will be so as long as lumbering holds out.

On good land, on the west shore, in Grand Traverse and Benzie counties, we saw large orchards of clean, healthy trees of apples and cherries, which told the horticulturist at the first glance some of the possibilities of northwestern Michigan.

You have all heard of the west shore of Michigan, from Berrien county to Mackinaw. Every one here must have heard of, and very likely he has seen and tasted, the plums, cherries, pears, apples, and peaches grown at Traverse City by Judge Ramsdell, or at old Mission by Parmelee and others. These are the glory of the north.

Our hunt for the northern extremity of the fruit-belt in Michigan reminds me of a statement of Bill Nye. He is one of those fellows without any hair on his head, which he calls his "polished dome of thought." As he puts it, his forehead extends clear over and buttons with his shirt-collar behind. So

with our Michigan fruit-belt—it extends clear over from the front, or southern counties, to the Straits of Mackinac, and buttons upon Mackinac Island.

THE SAND CHERRY.

W. N. Cook asked about a "plum" which grew about three feet high and which he used to see near Newaygo, loaded with fruit.

C. F. Wheeler: In 1867 I drove across the counties of Kent and Newaygo and saw the fruit which Mr. Cook refers to. It is not a plum at all, but *prunus primula* or sand cherry. The fruit is by no means unpleasant when fully ripe, and was used by the lumbermen and early settlers as a welcome substitute for other and unobtainable fruit for sauce.

CAN ANY GOOD COME OF WILD RICE?

Mr. C. F. Wheeler introduced discussion of wild rice and its susceptibility to improvement under cultivation, saying the plant is a very luxuriant grass which springs up late, along the margins of rivers and lakes, and is plentiful in nearly all Michigan waters. He did not deem it likely to become very useful, although paper has been made from its fiber and the Indians are known to have long used as food its very palatable grain.

W. J. Beal: It is botanically a near relative of the well known rice found in our markets, which is so very extensively used for food, especially by people living in warm countries. Our wild rice is widely diffused in the cooler parts of North America, Siberia and Japan. It is an annual, starting every year fresh from the seed dropped the previous autumn. The stems are small at first, and of rather slow growth, but under favorable circumstances acquire a height of ten or twelve feet. The stems, when there is room enough, put forth numerous branches which flower successively. The top of each branch bears a panicle, one to two feet long, which has fertile flowers at the top and sterile or staminate flowers below. Each fertile flower bears one seed or grain, which is slender and five-eighths of an inch long. The color is dark, though it cooks as well as the common white rice and is rather more nutritious. Wild rice grows on rich marshes and along streams and the shallow margins of ponds. Birds are very fond of the grain. The stems and leaves make excellent food for cattle. Botanically, wild rice is a very interesting plant. The long leaves have the mid-vein nearer one side than the other; the stems are hollow, like the internodes of wheat straw, only every inch or two there is a slender partition which helps to give it strength. The flowers are beautiful subjects for examination under the microscope. The most serious objection to its cultivation that I know of is now to be mentioned. As was said previously, the stems branch near the base, and the tops of these branches flower later than the main stem. Furthermore, the grain on any one stem ripens very unevenly, and drops promptly when it is ripe, thus making it difficult to harvest. Much of the crop is likely to be wasted unless extraordinary care is taken to harvest the grain every day for a month or more Very likely, if care were taken in selecting and breeding for many years, races of wild rice could be obtained which would branch less, ripen more evenly and hold the grain with greater tenacity.

In connection with his talk upon this subject Mr. Beal remarked that he once read a highly interesting work in which a writer considered whether the

race, had it originated on this hemisphere, would be as far advanced today as it is. He concluded that it would be, for these continents are as richly supplied as the others with fruits, grain, metals, and every other form of matter that enters into our daily life in civilization.

Prest. Lyon: The Green Bay Indians, in Wisconsin, use wild rice as food, and at the harvest time all start in together, it being against their rules or laws for any one to gain an advantage by an earlier start. This perhaps indicates that in that locality at least it does not ripen so irregularly.

Prof. Beal: Green bay is so far north that perhaps only the central stalk ripens.

Mr. Lyon: I agree that the quality of wild rice is superior to that of southern rice, and that its color is undesirable; yet I believe its improvement and cultivation are practicable.

ANNUAL REPORTS.

TREASURER'S REPORT.

Ladies and Gentlemen of the State Horticultural Society:

I have the honor to present you my annual report.

Receipts.

In the treasury Dec. 4, 1887	$983 44
Received from branch societies	39 24
Annual memberships	17 00
Interest on bonds, mortgages, etc	120 85
Total	$1,160 54

Disbursements.

Paid 26 checks, aggregating	$818 51
Leaving a balance in treasury of	342 03
Total	$1,160 54

We have 203 life members, the fund therefrom amounting to $2,030, invested as follows:

Seymour mortgage $1,000, Lytell mortgage $300, Jacob Swell mortgage $300, W. N. Cook mortgage $350, U. S. bonds $150, total $2,100.

All of which is respectfully submitted.

S. M. PEARSALL, *Treasurer.*

Grand Rapids, December 3, 1888.

SECRETARY'S REPORT.

To the Members of the Michigan State Horticultural Society:

In presenting a report I labor under the disadvantage of taking office in the middle of a year and with comparatively slight former acquaintance with the affairs of the society. I therefore can scarcely be expected to present

much of either history or recommendation, especially as this is the only meeting held since my incumbency began.

The total receipts of the year have been as follows:

From local societies	$ 39 25
" annual memberships	17 00
" interest on bonds, mortgages, etc	120 85
Balance from last year	983 44
Total receipts	$1,160 54

Disbursements.

Expenses of president's office	$ 4 00
Secretary's salary	500 00
Expenses of treasurer's office	63
Librarian, salary, etc	76 65
Expenses of executive board	146 03
Incident to state fair	19 35
Printing, stationery, etc	24 25
Incident to volume of 1887	6 09
Expense of exchanges	13 80
Incidentals	1 35
Secretary's postage	15 61
Transferred to life fund	10 00
Letter file	75
Total	$818 51

It may thus be seen that the balance on hand is $342.03.

The life membership fund amounts to $2,030, representing 203 life members.

EDWY C. REID, *Secretary.*

ANNUAL STATEMENT OF LIBRARIAN.

To the Executive Board and Members of the State Horticultural Society:

GENTLEMEN—I have the honor to submit herewith my annual report as librarian of the State Horticultural Society for the year ending December 1, 1888. The following tabulated exhibit shows the number of our reports which have been received and distributed during the past year:

Years.	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887
No. of books in library Dec. 1, 1887	26	1	2	67	36	0	1	477	72	773	782	1,949	2,703	1,759	987	.....
No. of books received during 1888	....	....	....	....	....	....	....	....	....	....	....	.....	.....	.....	....	6,000
Total	26	1	2	67	36	0	1	477	72	773	782	1,949	2,703	1,759	987	6,000
No. distributed during 1888	1	....	....	....	....	....	...		4	7	7	8	10	12	23	4,910
No. on hand Dec. 1, 1888	25	1	2	67	36	0			68	766	775	1,941	2,693	1,747	964	1,090

The following books have been received through exchanges during the year:

HORTICULTURAL REPORTS.

New Jersey State Horticultural Society, 1887.
Illinois State Horticultural Society, 1887.
Western New York Horticultural Society, 1887.
Missouri State Horticultural Society, 1887.
Minnesota State Horticultural Society, 1887.
Maine State Horticultural Society, 1887.
Transactions of the Massachusetts Horticultural Society, 1887.
Iowa State Horticultural Society, 1887.
California State Horticultural Society, 1887.
Ohio State Horticultural Society, 1887.

AGRICULTURAL REPORTS.

Pennsylvania State Board of Agriculture, 1887.
Connecticut State Board of Agriculture, 1887.
Maine State Board of Agriculture, 1887.

MISCELLANEOUS.

Kansas State Crop Reports, 1888.

Very respectfully,
T. H. FORSTER, *Librarian.*

Wednesday Morning Session.

Opening the last session of the December meeting, President Lyon reported, from the committee on revision of the catalogue of fruits, that he had made progress with the work, though only one of the other members had made any report to him, nor had he anything to submit as to new fruits, but would shortly furnish both to the secretary.

The following report of the committee on the president's message was read by Mr. C. J. Monroe and adopted:

Mr. President and Members of the State Horticultural Society:

Your committee appointed to consider the various suggestions and recommendations of the president's address, respectfully report as follows:

1. That the portion of the address relating to the segregation of the society into divisions, for the purpose of considering topics most in accord with the tastes of the several divisions; also the portion relating to outdoor meetings, be referred to the executive board.

2. That the portion referring to the importance of gathering more full and complete fruit statistics be referred to the committee on legislation.

3. That the suggestions relative to experiments in horticulture and pomology on the west shore, with the tenderer sorts of fruits and vegetables, under the auspices of the state experiment station, be referred to a special committee

to confer with the managers of said station, and see what arrangements can be made to have systematic experiments conducted in one or more localities where said fruits and vegetables have been most successfully raised.

4. As to that portion relating to forestry, in view of the fact that we have a commission specially charged with that subject, which will probably look after the needed legislation, we recommend that the society continue in the future, as in the past, to make it one of the topics for discussion, that we may do what we can to educate people upon this important matter.

All of which is respectfully submitted.

C. J. MONROE.
J. A. PEARCE.
W. N. COOK.

W. N. Cook moved, and it was carried, that the committees recommended in the above report be appointed by the chair.

FAVORABLE TO FARMERS' INSTITUTES.

C. W. Garfield said the West Michigan Farmers' Club has taken the initiative as to certain legislation in aid of farmers' institutes, of the details of which Secretary Fuller of that body, now present, would give information.

Mr. Fuller read a resolution of the farmers' club, asking the legislature to appropriate $5,000 for the year 1889 and $8,000 per year for each year following, for the expenses of annual series of farmers' institutes.

E. H. Scott spoke in favor of endorsement of the action of the farmers' club, saying Michigan is far behind in this respect. Wisconsin gives state aid and last year held a series of 84 institutes, and this year one of over 70. New York does the same, providing for 37 institutes this winter. Upon Mr. Scott's motion, the society gave its endorsement of the scheme.

THE ANNUAL ELECTION.

C. J. Monroe moved that two tellers be appointed and the society proceed to elect officers by ballot.

The motion prevailed and the chair appointed Messrs. W. N. Cook and C. J. Monroe. The several ballotings resulted in choice of the following named persons:

President—T. T. Lyon, of South Haven.

Secretary—Edwy C. Reid, of Allegan.

Treasurer—S. M. Pearsall, of Grand Rapids.

Members of Executive Board—For two years, W. A. Brown, of Benton Harbor; for three years, Chas. W. Garfield, of Grand Rapids, and C. A. Sessions, of Mears.

Prest. Lyon announced committees as follows, under provision of the report of the committee on the president's message:

Experimentation—C. J. Monroe, E. H. Scott, S. L. Fuller.

Legislation—W. K. Gibson, C. W. Garfield, J. F. Taylor.

QUESTIONS ABOUT GRAPES.

Three questions submitted, and their answers, were as follows:

What can you say of the Vergennes grape, as to quality and time of ripening?

Prest. Lyon: It is excellent as to hardiness and bearing; its quality is fair; berries and bunches, not large; ripens earlier than the Concord.

2. What are the keeping qualities of the Ulster grape?

Prest. Lyon: It is rather early for me to express an opinion, as I have not yet fruited it.

3. What is the best long-keeping grape for market in central Michigan?

E. Graham: Niagara and Prentiss, and they are about alike.

E. H. Scott: With me Niagara keeps well and Salem is a good keeper.

A. W. Slayton: I have kept the Isabella till town meeting.

Prest. Lyon: But neither the Isabella nor the Catawaba can be depended upon to ripen in central Michigan. Prentiss is delicate and not hardy. Agawam is the best keeper of all the Rogers hybrids, while its quality is fair and it is a good bearer.

J. A. Pearce: I have best success with Rogers No. 15 and Salem, as to keeping. I like the Agawam because it clings well to its stem after ripening and is highly desirable as a keeper.

C. W. Garfield told how, in plowing, he had buried bunches of several sorts of grape last fall and found afterward that the Delawares had kept perfectly.

Prest. Lyon: Had it been in wet soil or a wet season the result would have been different. Burial of grapes can not be depended upon as a means of keeping them unless moisture be wholly excluded.

REPORT ON EXHIBITS.

Prof. Taft read the subjoined report of the committee on exhibits:

Your committee found for its consideration, upon the table, a collection of apples contributed by E. Chase Phillips, of Grand Rapids. For the most part they were of good size, highly colored, and well selected. They form a well chosen collection of winter apples for market purposes, and with the exception of two varieties they comprise a list that can hardly be excelled for home and dessert use. The whole comprises fourteen varieties.

A. Slayton, of Grand Rapids, exhibits seven plates of apples of common varieties, most of which are of merit.

The four varieties from E. Graham, of Grand Rapids, were well selected specimens.

S. M. Pearsall, of Grand Rapids, presented plates of Talman Sweet and Spy.

E. W. Barber, of Jackson, sent specimens of the Oakland, with the accompanying letter.

They are of good quality and are handsome dessert apples, of medium size. Mr. Barber reports a yield of four barrels from a top-grafted tree. They are excellent keepers, lasting well into summer.

Dr. Beal of the Agricultural College exhibited plates of wild rice (*zizania aquatica*). Although the grains are small it is probable that they could be enlarged by careful selection and cultivation. In quality the wild rice exceeds the commercial article.

H. C. Smith, of Grand Rapids, furnished for exhibition and decoration, twenty-four plants of chrysanthemum, two of begonia rex, two of *cordyline indivisa*, two or fern, and two of *cyperus*. They were well grown plants and served to brighten up the room, adding much to its appearance.

L. R. Taft,
A. G. Gulley.

MR. BARBER'S LETTER.

JACKSON, MICH., December 3, 1888.

Mr. C. W. Garfield:

DEAR SIR—I send you by express today, a small basket of apples which have received the name of Oakland in this county. The upper course is from Amos Root, the lower from a couple of trees I had grafted a few years ago. Their history, as told here, is that several years since an itinerant grafter came from Oakland county with a lot of scions, among which were a quantity of Seeknofurthers. When these grafts came to bear, the fruit proved to be such as I send you. For a time the apples were jocosely called "Oakland County Seeknofurthers," but this has been shortened to "Oakland." The trees are prolific bearers, and the apples are good keepers. One year, I remember, in barrels in the cellar, without extra care, they kept in good condition for eating until into May. In 1880 I had the entire top of a tree, perhaps a dozen years old, grafted with Oakland, and in 1886 gathered therefrom three and one-half barrels, and certainly more than half a barrel fell off before gathering. For persons who like a mild apple, not sour enough to set the children's teeth on edge, nor really sweet, we think it one of the best eating apples grown. I take pleasure in sending them. I think they ought to be better known than they are. Good apples, especially in our long winters, are food, drink, and medicine.

Yours very truly,
E. W. BARBER.

RESOLUTIONS.

The above report, and the one following, from the committee on resolutions, were adopted without dissent:

We favor a hearty vote of thanks to the members of the Grand River Valley Horticultural society for their invitation and cordial attention.

Our thanks are also due the officers of several railways for concession of rates; and to Mr. Johnson, proprietor of the Eagle hotel, for low rates and excellent care, we are also under great obligations.

We are very grateful for attention and full reports by the press of Grand Rapids.

Some of us can not help looking back to the early days of this society and recalling the condition of horticulture in our state eighteen or twenty years ago. To those early members the people of our state owe much for their earnest work.

We see marked progress in nomenclature, rejection of worthless varieties, and the successful combating of injurious insects. In these and in other respects this society has won a most excellent reputation. It may be impolitic to call names, but we think the facts will warrant us in naming two persons whose efforts have been most prominent in these reforms. To Hon. T. T. Lyon, so long and well known for his faithful and valuable work, especially as president of this society, and to Hon. C. W. Garfield, so long our secretary, we and the horticulturists of the State, and many outside of her limits, owe a debt of gratitude which we can never repay.

W. J. BEAL.
J. F. TAYLOR.

The finance committee reported approval of the reports of the secretary and the treasurer.

President Lyon made brief remarks complimentary to Grand Rapids and the intelligent horticulturists of her borders.

MORE ABOUT INTENSIVE HORTICULTURE.

The secretary read the following letter from M. Crawford, of Cuyahoga Falls, Ohio, received too late for reading in its proper order:

By "intensive horticulture" is meant such a complete supplying of the wants of the growing crop that it may do its best from first to last. In that case we shall have a maximum yield and, usually, the largest profit. Any failure on our part will diminish the profits accordingly. For want of drainage, surplus water may prevent a natural extension of the roots; for want of thorough preparation of the soil, the roots are being constantly turned aside from their course, and much of the fertility is unavailable; for want of frequent stirring of the surface, a crust forms and shuts out the air from the roots, and weeds are permitted to grow and appropriate part of the food designed for the crops; for want of supplying plant food out of which our crops must be made, a large part of our labor is lost, and if the land be very poor we may lose it all; for want of timely attention, insects may prey upon our crops and remove the last chance of profit. So we see that we must be intensely in earnest during the entire growing season. Only letting go on our part will tell against us at the time of final reckoning. The use of the land, cost of seed or plants, fertilizers, preparation of the soil, planting, cultivation, and harvesting amounts to quite a sum, and an ordinary crop may, and often does, barely pay expenses. Whatever we gain in excess of this is our profit. This should be our incentive to effort. It is the part of wisdom for us to study how we can increase the profits. It will hardly be accomplished by any ordinary effort. Anybody can do things in an ordinary way, and things thus done yield but ordinary results. Increasing the amount of fertilizers to the point of producing a maximum crop usually increases the profits; cultivating so frequently that weeds never get a start is more profitable than killing them after they have started; and sometimes the profit comes from careful sorting and packing. In any event our profits may be regarded as the reward of whatever efforts we put forth above the average.

M. CRAWFORD.

Whereupon the society adjourned, after authorizing the president and secretary to fix the time and place of the February meeting.

ROBERT C. KEDZIE, M. A., M. D.

TRANSACTIONS

OF THE

West Michigan Fruit Growers' Society

FOR THE YEARS 1886, 1887 AND 1888.

SECRETARY'S NOTE OF INTRODUCTION.

EDWY C. REID, *Secretary of the Michigan State Horticultural Society:*

I herewith submit for publication in the forthcoming volume of Reports of the Michigan State Horticultural Society for 1888, a part of the proceedings of the West Michigan Fruit Growers' Society, including papers read at the meetings. Beginning is made with the sessions at South Haven, June 23–25, 1886. I have included the meetings at Grand Haven and Douglas, and the fourth annual meeting at Paw Paw, December 7–9, 1887. The June meeting for 1888 was held jointly with the State Horticultural Society, at Benton Harbor, June 13–15, a report of which appears with the latter's transactions.

The annual membership fee is one dollar. The constitution and by-laws of the society provide for four regular meetings annually, but a greater or less number may be ordered by vote of the members. The society's territory, as the name indicates, includes the western half of the State of Michigan.

G. H. LAFLEUR,
Secretary West Michigan Fruit Growers' Society.

OFFICERS OF THE WEST MICHIGAN FRUIT GROWERS' SOCIETY FOR THE YEAR 1889.

President—Walter Phillips, Grand Haven.
Secretary—G. H. LaFleur, Allegan.
Treasurer—W. A. Smith, Benton Harbor.

EXECUTIVE BOARD.

Joseph Lannin, South Haven. Wm. Corner, Saugatuck.
A. C. Glidden, Paw Paw. W. B. Andruss, Allegan.
R. Morrill, Benton Harbor.

VICE PRESIDENTS.

R. A. Morrill, Benton Harbor. Geo. S. Chubb, Lisbon.
O. Beebe, South Haven. Benton Gebhardt, Mears.
Harrison Hutchins, Ganges.

ARTICLES OF ASSOCIATION OF THE WEST MICHIGAN FRUIT GROWERS' SOCIETY, ADOPTED MAY 28, 1884.

ARTICLE I.

This society shall be known as the West Michigan Fruit Growers' Society.

ARTICLE II.

The officers of this society shall consist of a president, five vice presidents, a secretary, a treasurer, and an executive board of seven, two of whom shall be the president and the secretary; all the above officers to be elected by ballot at the annual meeting, and to perform their duties until their successors are elected and qualified.

ARTICLE III.

The object of this society shall be to promote the best methods of cultivating and marketing fruit.

ARTICLE IV.

This society shall be limited to twenty thousand dollars' worth of property.

ARTICLE V.

Every person who shall subscribe to these articles and pay to the treasurer the annual fee of fifty cents,* shall be entitled to membership.

ARTICLE VI.

The district embraced in this organization shall be the counties of the lower peninsula of the state of Michigan lying west of the principal meridian. The counties divided by said line not to be included.

ARTICLE VII.

All disbursements of money shall be made on orders made by vote of the society and signed by the president and countersigned by the secretary.

ARTICLE VIII.

The treasurer shall give such security as the by-laws of this society may require.

ARTICLE IX.

The annual meeting of this society shall be on the third week of December, at such hour and place as shall be named by the executive board.

ARTICLE X.

By-laws may be made or amended by a two-thirds vote of members present and voting at any regular meeting of the society, provided notice, in writing, shall have been given at the last previous regular meeting.

ARTICLE XI.

These articles may be amended by a two-thirds vote of the members present and voting, at any regular meeting of the society, provided notice, in writing, shall have been given at the last previous regular meeting.

Amended, December, 1888, to one dollar.

BY-LAWS.

OFFICERS' DUTIES.

1. In addition to the duties elsewhere expressed in these by-laws, the officers of this society shall perform the several duties indicated by their titles, the executive board being the main operating force of the society. Also, the president and secretary shall arrange for the presentation of papers and shall submit an order of business at each regular meeting of the society.

MEETINGS.

2. In addition to the annual meeting, three other regular meetings shall be held, in spring, summer, and autumn, as may be determined by vote of the society, or in default thereof, by call of the executive board, of which meeting due notice shall be given, at which meeting ten members shall constitute a quorum for the transaction of business.

EXECUTIVE BOARD.

3. The executive board shall enact all rules and regulations (not otherwise provided for) necessary for conducting the business of the society, and shall have the management of the exhibitions of the society. It shall have power to fill all vacancies, by appointment, to continue until the next annual meeting for the election of officers. The board shall hold four regular meetings, each year, for the transaction of business. It may hold other meetings when called together by the president and secretary, at which meeting four members shall be necessary to constitute a quorum. The chairman of the board shall submit to the society, at its annual session, such facts, and make such recommendations, as they may deem for the interest of the society.

4. All reports and papers presented before the society, at any regular meeting, shall be open for discussion by all the members.

5. The executive board may arrange with kindred societies for holding fairs on such terms as they can make.

SECURITY.

6. The treasurer, with two sureties satisfactory to the executive board, shall be bound to the fulfillment of his trust in the sum of $1,000.

FINANCE COMMITTEE.

7. The executive board, at its first regular meeting in each year, shall appoint, from their own number, three members who shall constitute a finance committee for that year. All claims against the society, for money, shall be submitted to this committee and receive its approval before payment. The chairman shall sign all accounts audited by the committee, before the secretary may draw an order upon the treasurer for the same.

THE TREASURER.

8. All moneys belonging to the society shall be paid into the hands of the treasurer. He shall disburse the money belonging to the society, that may come into his hands, only upon the order of the secretary, countersigned by the president. He shall, at the close of each year, made a detailed statement to the executive board of all money received and paid out during the current year, and settle with the finance committee and receive their endorsement of his account.

NEW FRUITS AND METHODS.

9. There shall be appointed, annually, by the president, a committee of seven, who, upon warrant of experiment or testimony, shall recommend to the society such new fruits, and also such new methods of culture and defense, as they deem profitable.

THE SPRING MEETING,

HELD IN HOLLAND CITY, MARCH 3, 4 AND 5, 1886.

Soon after the annual meeting in Allegan, in December, 1885, Mr. A. J. Knisely tendered to the executive board his resignation as secretary, which was accepted. G. H. LaFleur, of Allegan, was then appointed secretary to fill the vacancy for the rest of the year.

His first official work was to prepare for the March meeting of the society, which was held at Holland City, from the 3d to the 6th of that month, on invitation from the local horticultural and agricultural societies.

At this meeting, after an address of welcome by Dr. O. E. Yates, of Holland, and response by A. S. Kedzie, of Grand Haven, a paper on "How to Protect the Vineyard against the Cut-worms" was read by Mr. C. A. Dutton, and followed by a general discussion. There were arguments for and against growing turnips among the vines, affording the worms other food than the buds; salt sown broadcast, some declared, had been efficacious, while others had found it of no effect; and President Phillips told of the destructive qualities upon the cut-worm of crops of buckwheat turned under when in bloom, a remedy now generally accepted as a specific.

Following this was a paper by the Hon. H. H. Holt, of Muskegon, upon

"CAN SANDY SOILS BE MADE PROFITABLE?"

The question proposed as the subject of this article will perhaps suggest several inquiries, among which may be these: What has this question to do with horticulture? and why should the writer of the article presume to teach practical fruit growers? Candor compels me to say that no answer can be given to the last of these inquiries. In reply to and in explanation of the query as to the relation of the successful cultivation of sandy soils to fruit growing, I will say this: That while it is admitted that no portion of our country is better adapted than western Michigan to the cultivation of all kinds of fruit and vegetables grown at the north, still experience has shown that we can not depend upon one kind of fruit alone, or in fact upon various kinds of fruit. We have learned, as was the case last year with strawberries, that the crop may be so abundant and the weather be such in the various portions of what is known as the strawberry belt, that the entire crop of the country may be thrown upon the market at once, thus causing almost a total loss of profit. Sometimes a late frost or a hard winter may ruin a particular crop while others escape. The proper course, it would seem, for fruit growers to pursue, is to devote a portion of their energies to the cultivation of

vegetables. Not only this, but most fruit growers own land sufficient to allow them to raise more or less of the cereals used by their families and upon their farms. If this course were followed, fruit growers would not be so dependent upon the results of any particular crop. If this is true, and I think it can not be successfully contradicted, the fruit grower as well as the farmer is directly interested in the question under discussion. This is not all, because while it must be admitted that most fruits may be successfully cultivated upon lighter soils than are required for the various cereals, it is also true that fruits are greatly benefited by good soils, provided other surroundings are favorable.

The various works devoted to the description of the soils covering the surface of the earth divide them into three classes according to the amount of alumina or clay contained in each, to wit: the sandy soil, of which sand and silica are largely in excess, with a small per cent of clay; the clay soil, which contains a large amount of alumina or clay, and the loam, which contains a medium amount of clay. It is therefore true that all sandy soils contain more or less alumina and that all clay soils contain more or less sand and silica. There is another fact which may be mentioned, that is none the less remarkable, which is that the analysis of plants and general vegetation, show that none of them contain any alumina, and but very little silica, and that this silica is rather accidental than as forming a necessary ingredient of the plant. This would rather lead to the belief that nature furnished both the sand and the clay, not directly for the formation of vegetation, but rather for the purpose of regulating the heat and moisture of the ground, while other agencies are carrying forward their growth.

When we recall the fact that such an immense proportion of the bulk of the earth is composed of sand, silica and alumina in their various forms, and that their office is only to keep trees and plants in position and convey moisture to their roots, the thought seems almost incredible. Whether this be true or not, experience has demonstrated the fact that a soil in which clay is largely deficient is not regarded as being a good one for any kind of vegetation, and that a very stiff clay is almost, if not quite, as poor as a barren sand. It is also a fact that both soils are affected about alike by the extreme heat of summer, while the clay soil has the further disadvantage that it is not so readily susceptible to the rays of the sun in the spring.

Undoubtedly the soil to be preferred, particularly for the fruit and vegetable raising, is that in which there is a medium amount of clay, but not enough so that the soil would be termed a clay soil. But we can not all select such a soil as we might desire, were it in our power to make the choice. Those of us, then, who have farms the soil of which does not contain the requisite proportions of alumina and silica to regulate the moisture of dry weather in summer, must seek to remedy the defect. Not only this, but a further analysis shows that the soil of our sandy farms is also wanting in a proper supply of lime, soda, potash, magnesia and certain other ingredients of a first-class soil, which nature would have furnished had the requisite amount of clay been present to retain whatever amounts of these substances came from the vegetation that grew thereon.

The latter deficiency is not so great, however, as is generally supposed, as shown by some experiments made some years since by Prof. Kedzie, of the Agricultural College, consisting of analyses of specimens of soil from about thirty different localities, including some of the poorest as well as the

best soils of the state. Among these were specimens from the sand plains near Baldwin and from those near Kalkaska, all of which contained magnesia, lime, soda and potash in sufficient quantities for a successful cultivation of the soil, were it not for the great deficiency of moisture, or rather the lack of ability in the soil to retain moisture. Dr. Kedzie also experimented with these specimens of soils for the purpose of ascertaining their capacity for retaining moisture. He did this by first removing all sticks, stones, and other foreign substances from the soil and drying it as thoroughly as possible. He then filled a funnel-shaped vessel, having an opening at the bottom large enough to allow water to escape without the loss of any of the soil; and after weighing it carefully he poured water upon the soil until it would retain no more. It was then again weighed, and the difference in the weight of each specimen thus tested necessarily showed its ability to retain moisture. This demonstrated the fact that soils containing the most vegetable matter retain the most moisture, while those containing the largest amount of sand and silica retain the least.

Experience has also shown us that no tree or plant can retain life any length of time without obtaining moisture in some manner, while many plants will grow luxuriantly when placed in bottles of water which is changed occasionally, without any nutriment more than they obtain from the air and water about them. A man can live a long time without food, provided he is supplied with water, as shown in the case of Dr. Tanner; and there is really a greater similarity between human life and vegetable life then is generally supposed. Both require light; both require pure air, and are poisoned by noxious gases; and both require water in some form to retain life any considerable length of time.

If all that has been thus far advanced is true, and I think it will not be disputed, the new query comes up: Can we, as a prerequisite to the successful cultivation of sandy soils, treat them in such manner that they shall retain moisture sufficient to allow the vegetation that we plant upon these lands to come up to our expectations? Irrigation of course is out of the question, and we must rely upon fertilizers and a proper mode of cultivation. In selecting fertilizers we must bear in mind that it is not plant food proper that we most need. It is plant drink, if this expression is allowable. We should select fertilizers which will assist nature in retaining moisture in the ground. Barn-yard manure, when applied alone to sandy soils, does not meet our expectations, for the reason that at the time when it is the most needed much of it is lying on the land in a dry state or is being drifted about by the wind, possessing no more real value than so much pine sawdust. Manure without moisture is as worthless as tea without water in which to steep it.

The substances, as we have seen, which are more or less deficient in sandy soils are lime, soda, potash, and magnesia; and these may be supplied in the form of ashes, salt, lime, and plaster, and these, too, are the substances which experience has shown are the most beneficial to the soil, in the matter of fitting it for the retention of moisture. We would not by any means discard barn-yard manure, but would advise that it never be used alone, and when used always applied in connection with more or less lime, ashes, and salt, so that its strength shall not be wasted.

The other improvement that we think might be made in the cultivation of sandy soils is in the amount of labor bestowed upon the land. Many sup-

pose that if the soil is hoed or cultivated, so as to keep down the weeds, that all is accomplished that a sandy soil requires. This is a great mistake. Experience has shown that if the surface of a sandy soil is changed very often, say every week, while vegetation is growing, the result shows that the labor is not lost, both in the crop and the soil itself. There are many minerals in every soil which remain in their normal or natural state unless exposed to the air, and when they become oxidized, act as fertilizers and are valuable. The frequent hoeing and cultivating of the soil produce these changes, with the beneficial result, as suggested, which is shown in the case of what is commonly known as summer-fallowing.

The nurseryman understands that budding can only be done when the bark of the tree will peel, and finds that many times he can work in the morning, but when the sun is hot in the middle of the day the bark becomes set and he can work no longer. He then starts his horse and cultivator between the rows of trees, and before he has passed many times he can again commence work, as the bark is found to be all right. He pursues this course as often as the bark becomes set. A tree can only grow when its bark will peel. Consequently, it may grow in the forenoon and remain dormant in the afternoon, which fact is undoubtedly true in regard to plants and vegetables.

I will say, then, in conclusion, that the cultivation of sandy soils can be made profitable if sufficient attention is paid to the manure that is used and the amount of labor that is bestowed upon the land.

FURTHER ON THE SAME SUBJECT.

The Rev. Chas. Scott, President of Hope College, gave this additional testimony to the great agricultural possibilities of sandy soils :

We may toil and sweat upon these Michigan sands, but labor and care and skill will bring forth from them far more than a harvest of thorns and briers.

When I was a boy, in the east, Judge Buell was editing the well known Albany Cultivator. He was an earnest advocate of turning down green crops upon light soils, in order to produce fertility. He took a barren, sandy tract, back of Albany, and said he could thus turn it into a fruitful garden. If I remember rightly, he thoroughly succeeded in his experiment. Near my home were the "Armenia plains" of Duchess county. Barn-yard manure had been used upon these sandy fields for years, but you could have bought them for from $5 to $10 per acre, and I think in some cases could have had them as a gift. The occupants adopted Judge Buell's idea—began to "turn in" rye and buckwheat and clover as the basis of their home-made fertilizers; and what was the result? You must pay for that same land, today, at least $100 per acre. I may add that at about the same time, along the Hudson, began the general use of gypsum or plaster in order to stimulate the growth of the crops thus needed by the farmer.

When I went to a college in New Jersey, the lands along the ocean in Monmouth county were not highly valued. I think those Jersey farmers well knew the utility of the barn-yard and practiced their knowledge as best they could ; but the thirsty soil set at naught their skill and lost reputation and sale. Then came the era of marl or green sand and its liberal and almost universal use by all the cultivators of common sense, and lo! the waste became as a pleasant vineyard. Marvelous was the work of this Jersey marl.

May not our richer sands of Michigan command over $100 per acre as well as those of Monmouth?

You have heard of the city of Vineland. Where is it? In the very center of the South Jersey barrens—yes, barrens, such as we know not in our sand region. What is it? A sort of paradise of fruit and flowers and happy homes made since my ride over a dreary highway of sand barrens which were only three times worse than from here to Grand Haven. What happened? The "green sand" and green manure have been "life from the dead," and have robed that land in beauty and richness.

About that time I was wont to visit the central portions of Long Island and had relatives near the Hempstead plains. These were a "common" of scarcely any market value, and squatters were allowed to inclose and cultivate land for their own use if they only had means and patience to exchange toil for hope. A cousin was one of those squatters. His son lives there today on a finely cultivated farm, and close by, upon that once rejected common, is Garden City. But what was here the transforming power? Fish—simply fish. Tons upon tons of finny fertilizers were carted to the fields, and soon other tons of city refuse were supplemented and aided the compensating crops. You may go to Long Island and buy plenty of that old "good for nothing sand" at $300 per acre.

Before the war I was living in the sea island cotton region of South Carolina, the region along the coast from Edisto island to Savannah. Common upland cotton was 8 to 12 cents per pound, but this fine variety bore treble value in the market. The soil was light, and poor enough, and without manure eight or ten bushels of corn per acre would be a full crop. The coast is interlocked with salt flats and lagoons, and this salty mud, mixed perhaps with pine needles and crushed cotton seed, would be placed in the bottom of the trenches and fed the plant which made cotton king. Surely there is something to put a crown more potent on our realms of sand.

Fifty years ago the Coxsakie flats region in Greene county, N. Y., was a celebrated producer of hay. The rich clay bottom was deemed a gold mine and the adjoining sand farms were but a term of reproach. But this thing could not last. Some thirty years ago manufactured manures began to be used, and soon it was found that what seemed to be wasted on the flats was a valuable boon upon those reprobate sands—the one decreased and the other increased until the latter gained a double value over their old hay rivals.

Yes, it may not take fifty years for these Holland sands to laugh to scorn the now boastful meadows of Graafschap or Friesland.

This is enough to indicate my belief and reasons for it. This sand in Michigan has a good deal in it; no doubt about that. The problem is to bring its virtues out. I trust you will be able to find some way of doing this with eminent success. Surely there is a way, just as in the places I have named, a mode of fertilization; but in the first place not by barn-yard manure. This follows after some foundation is laid in the soil; and I conclude by declaring myself a firm believer in the capabilities of this west Michigan which a gazetteer of 1820 pronounced "unfit for settlement or cultivation."

A. S. Kedzie read a paper on "Marketing Fruits," reviewing the commission system, and on the whole condemning it; contending that canneries afford only local relief, and advocating establishment of some such system as that of the California fruit union.

Byron Markham, of Saugatuck, with inclination to caution if not pessimism in the fruit business, read a paper on

GREAT MISTAKES MADE BY BEGINNERS IN FRUIT GROWING.

I have chosen this theme because I am satisfied that fruit growing in western Michigan is still in its infancy, and with a desire, so far as may be, to save the inexperienced beginner from the disappointment which so many have suffered who have gone into the business without experience. When the time shall come that fruit growing shall be seen in its true light—when the producer shall study the wants of the consumer instead of his own convenience, and send so good an article to market as to create a desire for it—then will all our resources be in demand and fruit growing will be one of the legitimate and successful business enterprises of this land. But there is probably no business in which men engage that is so little understood, and by which so much disappointment is caused; no calling which is more deceptive, and none which, if properly managed, is more conducive to happiness as well as prosperity.

It ill becomes me to try to tell how these last may be accomplished. I can at least point out the sources of my disappointment. I think the assertion will not be questioned, that no one man is competent to do all, or even many, things well. Still the idea is very prevalent that fruit growing is "just as easy as falling off a log;" that all the fruit grower has to do is to stick a few trees and plants into the ground, rush to the factory, get his packages, pick, pack, and ship his fruit to market and then seek some profitable investment for his money returns. So very many, utterly ignorant of the business, without the least love for it, or in any wise adapted to it, engage in it, and by their very multiplicity doing the business great harm in the production of an excessive quantity of inferior fruit, which is usually badly gathered, worse packed, and sent to market to take the place of good fruit. And for this state of things the fruit growers themselves are largely to blame. Every locality is anxious that its particular spot should have the reputation of being a veritable garden of Eden, and to this end letters written to friends abroad, articles read at local gatherings of fruit growers, as well as communications to the local papers, are filled with statements of the enormous yields and splendid profits of the fruit grower. Many men with level heads upon their shoulders are drawn into saying extravagant things when called upon to speak or write upon the subject, especially if to be read or said away from home. This is often done inadvertently. As an instance, a reverend gentleman whom I am proud to call my friend, and who under no circumstances could be induced to deceive or in any way mislead, knowingly, once wrote an article upon the possibilities of the lake shore in fruit culture. I happened to read it for the first time when he was present. One statement in the article gave me the impression that $30 worth of peaches from one tree was no uncommon thing. It didn't read so to him. Yet, after his explanation that such a thing had frequently occurred, it didn't change the reading to me, and if I was misled it could hardly be called egotism if I were to think others might be also. Add to this the fact that a number of men have accumulated wealth in the business rapidly, and is it any wonder that the idea should prevail that orchards would prove profitable just in proportion to their size, or that the inexpe-

rienced should bend every energy to get as extensive orchards as possible? To this end every cent is put into land and trees to plant it with. In not a few instances, to my knowledge, men have made only a small payment on their lands and used the balance of their means to buy nursery stock, and trusted to the large returns sure to follow to meet expenses and pay for their lands. Result—a life-and-death struggle to meet payments and expenses. Why? Simply because it takes years before a fruit farm becomes self-sustaining, even in the hands of one skilled in the business. There are exceptions, of course, but this is the rule. What chance, then, has the novice if his means is all used up to begin with? He can not support his family, pay his help, buy his tools, feed his teams, and meet all other expenses necessary for the cultivation of his orchards, vineyards, and berry fields. This without means he can't do, and something must be neglected. The small fruits will be first to yield returns, and so they absord his time and attention to the neglect of his orchard. Positively, orchards must not be neglected; and by the time he is enabled, by working night and day, by depriving himself and family of many needed comforts, and by exercising the strictest economy, to give his orchards the needed care, they have become so much injured that he might about as well begin at the beginning; but if health and strength are left him and he continues economical, energetic and persevering, he will still succeed. In any event, the risk attending fruit raising on a large scale, without practical as well as theoretical knowledge of it, is altogether too great.

Now, as I said to begin with, I am a firm believer in the healthfulness, pleasantness and profitableness of the fruit business in western Michigan. But it is a business, which, like any other, to be profitable, must be learned, and learned practically. No amount of theory or book knowledge will take the place of personal experience, though they may be, and often are, great helps.

In view of the facts above stated, I will venture to make a few suggestions for the benefit of the inexperienced who contemplate entering into the business of fruit raising. I set above all other requirements a love of and taste for it, and he should bend all his energies to it until he has fully mastered it; and if I mistake not he will find the subject large enough to engage all his time, energy and brains. No branch of agriculture requires more brains than this. As but comparatively few men can employ laborers profitably, he should not undertake more than he and his family can accomplish; and this should be adhered to for at least the first five years. He should not undertake any other branch of business unless absolutely necessary to obtain means for the support of his family or the care of his orchards. It will, of course, be necessary for him to raise such farm products as are to be consumed on the farm. But ordinary farming and fruit growing do not go well together. If general farming is carried on at the same time, the fruit will be quite likely to be neglected, for the corn must be cultivated and the wheat must be harvested at the time when the berries should be picked and otherwise attended to.

ARE COLD WAVES MORE FREQUENT AND SEVERE THAN FORMERLY? IF SO, WHY?

was the title of a paper by Joseph Lannin of South Haven, who spoke thus:

These two questions, combined as they are in our scheme of topics, assume

in advance that cold waves are more frequent and severe than formerly, and under this assumption I am asked to tell why they are so. At first sight these innocent little questions appear easy of solution, but I confess the more I thought them over and inquired into all they comprehend, so far as I am able to grasp them, the more difficult it is for me to arrive at conclusions that may appear satisfactory to you. If the questions have reference solely to atmospheric changes in Michigan, or even in the United States, our inquiry will be more limited than if we refer to other countries. In history we find reference to the severity of winters in almost every age, and in both Europe and Asia. The writer of the article "Black Sea," for the American edition of the Encyclopedia, informs us that that large body of salt water was almost entirely frozen over in the year 401, and again in 762. Such results, however, could not be brought about by a cold wave passing over, but rather by a long period of excessive cold weather. In former times the Rhine, between France and Germany, and the Rhone, in the south of France, were frequently frozen over and the ice was so thick that the people crossed for weeks at a time on carts and sledges. The Danube has often been frozen over from its head-waters to its mouth. While an event of this character is of rare occurrence in modern times, in the reign of Edward III. of England the river Thames was frozen over, and again in the reign of James I. We are unable to determine the intensity of the cold at the times referred to, as no record remains further than that of the freezing over of rivers, the depth to which the frost penetrated the ground, the destruction of fruit trees and the freezing to death of persons and cattle. A philosophical historian writing on this subject says: "Some ingenious writers have suspected that Europe was much colder formerly than it is at present, and the most ancient descriptions of the climate of Germany tend exceedingly to confirm their theory. The general complaints of intense frost and eternal winter are perhaps little to be regarded, since we have no method of reducing to the accurate standard of the thermometer the feelings or the expressions of an orator born in the happier regions of Greece or Asia. But I shall select two remarkable circumstances of a less equivocal nature.

"1. The great rivers which covered the Roman provinces, the Rhine and the Danube, were frequently frozen over and capable of supporting the most numerous weights. The barbarians, who often chose that severe season for their inroads, transported without apprehension or danger their enormous armies, their cavalry and their heavy wagons, over a solid bridge of ice. Modern ages have not presented an instance of a like phenomenon.

"2. In the time of Julius Cæsar the reindeer, as well as the elk and the wild bull, was a native of the Hercynian forest, which then overshadowed a great part of Germany and Poland; while at present the reindeer can not subsist, much less multiply, in any country to the south of the Baltic.

"The modern improvements sufficiently explain the causes of the diminution of the cold. These immense woods have been gradually cleared, which intercepted from the earth the rays of the sun. The morasses have been drained, and in proportion as the soil has been cultivated the air has become more temperate." [See Gibbon's "Decline and Fall." Vol. I, pp. 252, 253, 254, Milman's edition.] The winter of 1635 is memorable in history because of its severity. In the Thirty Years' war an imperial army of 5,000 men crossed the Rhine on the ice opposite the city of Heidelberg, and in the winter of 1794 and '95 the rivers of France and Holland were frozen over to con-

siderable depth, enabling the French to invade Holland and destroy the ships frozen in on the Zuyder Zee. The winter of 1812 was another of unusual severity in Europe, and to its severity in a great measure may be attributed Napoleon's terrible disaster in Russia. From these instances of severe winters in Europe, in former times, we conclude that cold in that quarter of our globe is not on the increase. We should bear in mind, however, that certain natural causes combine to render the climate of Europe more temperate than the climate in the same latitudes on this side of the Atlantic.

We are assembled here today in the same latitude with the south of France and the north of Spain, where the severe effects of winter are but seldom felt. On this side of the Atlantic the winters are not of uniform temperature. We read of fruit trees being totally destroyed and the trees of forests being split open by the intense cold in the eastern states. I regret that we have no knowledge of the exact intensity of the cold waves referred to in history. If we had we could then compare and determine the result. My opinion is that cold waves are not more frequent than formerly; but for certain reasons, and through certain causes, we feel them more than we did on former occasions. As you all know, cold waves are generated at the far north and deflected by the Rocky mountains in a southeastward direction. While passing over the broad prairies of the northwest the cold wave meets with no obstacle, and finally it expends it force at the Gulf of Mexico. Oftentimes the cold wave turns eastward after reaching Wisconsin, when, if persisting in its course, it passes over Lake Michigan, which robs it of its intensity and moderates its fury. I know of no case when fruit trees were injured in western Michigan, by a cold wave blowing from the west. The injury was caused in nearly all cases when the wind was from the south, east, or southeast. The severest of the cold waves from the west, since Jan 1-3, 1863, inclusive, have by careful observation only reached from 10 to 12 degrees below zero, on the western shore of this state, from Grand Traverse to Stevensville; while inland, and in other states the mercury moved down to 30 and in many intances to 40 and 45 degrees below. On the 9th of February, 1875, at 6:30 A. M., under a gentle east wind, the thermometer ranged from 14 to 22 degrees below, according to location, on this side of the lake, while at Chicago and Milwaukee the mercury did not register quite so low. I need hardly call your attention to the unusual length and severity of our winter of one year ago, when peach buds, except in orchards on high, dry ground, were all killed. This fact proves, to some extent, that cold waves move close to the ground, or that the higher side of the wave is not so cold as the lower.

During the early part of this present winter a cold wave of more than ordinary magnitude rolled down from the north, enveloping the northwestern, middle and southern states in its cold mantle. This wave was scarcely felt here in Michigan, while it entailed much suffering to man and beast in the west and southwest; and so severe was it in the south and southeastern states that one man was frozen to death in Galveston and two in Mobile. Fish were frozen in the river and the oranges were frozen on the trees in Florida.

Having drawn your attention to the most notable cold waves recorded in history, as well as to those within our own recollection and experience; and having advanced the opinion that cold waves are not more frequent and severe than formerly, I will give reasons for my opinions, and hope these reasons will be fully discussed by members of this society, and if the premises upon which I base my opinion are unsound I shall stand corrected. I need

only to refer you to a few years ago when the farmer or the fruit grower planted his peach trees in the most convenient place, without any regard to fitness or location. What was the result? Why, he knew no such thing as a failure in a crop because of cold. Ah! exclaims some one, this proves that the cold is more severe now, because we cannot raise peaches under like conditions. Wait a moment. It is admitted by all geologists and climatologists that large bodies of timber have wonderful influence in modifying the nature and character of the atmosphere in their immediate locality. The greater the natural growth of vegetation in any given country, the greater will be the humidity and the rainfall; while on the other hand, barren wastes of sand are scarcely ever enlivened by a thunder shower. It is admitted, too, that a hot wind of eighty degrees, blowing through a belt of timber 50 miles in extent, will lose 15 degrees of its heat and 25 degrees of its force; and on the other hand, a cold wave of of 20 degrees below zero, of like force, passing through the same belt of timber, will lose five degrees of cold and a like quantity of force. When we say the wave, whether hot or cold, loses its heat or its cold, what do we really mean? Why, we mean this: The timber of the belt absorbs so much of the heat or of the cold.

From the first settlements in this state until 1862, but little attention was paid to weather records. The severity of that winter, causing as it did such wholesale destruction of fruit trees, drew the attention of fruit men more particularly to the effect of cold upon their trees. I wish also to draw your attention to the fact that prior to 1862 the vast pine forests of our state stood in all their sublime grandeur, like sentinels guarding us from the frosts of the northwest, north, and northeast, absorbing the cold and thus rendering the wave harmless. Those mighty forests have fallen under the greed of the lumber monopolist, and the safeguards of our tenderer varieties of fruit are removed forever.

Now, as I view the matter, the cold waves are not more frequent nor severe in themselves, but the forests of our country having been destroyed, and nothing standing in their paths to modify their terrible fury, we are left exposed to their chilling breath and blighting influence. But while we lose by the destruction of our forests we gain in proportion by the enhanced temperature of Lake Michigan. The cutting away and removal of the vast body of timber grown in this state, permits the solar rays to reach the ground. Its surface is thus rendered several degrees warmer. Streams shrink and morasses dry, consequently much less water is poured into the lake during the summer months. But the quantity poured into the lake is many degrees higher in temperature. The heating rays of the sun are only in part absorbed by a thin coat of the surface of the ground, and since there is no mobility in the particles of earth, the heat can be communicated downward only by conduction; and as you all know, the solar influence does not penetrate many feet into the ground, and what does soon passes off by radiation. In fact, six hours in a still night, with the mercury at 28, only 4 degrees of frost, will give a coating of ice although the thermometer registered 85 the preceding day. On the other hand, the sun's rays falling on water are not, as in the case of land, arrested at the surface, but penetrate to the depth of from 500 to 600 feet in clear water. The amount of heat communicated by the sun to equal surfaces of land and water is alike, but that imparted to the water is diffused through a larger body and is less cooled during the night by radiation. This being the case, Lake Michigan stores

away a large amount of heat during the summer months, which interposes between orchards and the westerly cold waves. In other words, Lake Michigan may justly be compared to a vast caldron of warm water, diffusing its beneficent influence during the rigors of the winter months; and to all who reside on this side of its border, whether Jew or gentile, Greek or barbarian, citizen or alien, it dispenses alike its genial influence.

THE JUNE MEETING AT SOUTH HAVEN.

Wednesday Evening Session.

No reflection is made upon the quality of the former meetings of this society when it is said that the June assembly of 1886 was the most successful in points of attendance and enjoyment of any the society has held. The attendance of pomologists from beyond the locality of the meeting was surprisingly large. One of the pleasantest features of the occasion was the ungrudging hospitality of the people of the village and adjacent country, who left no guest unprovided for and spared no effort to make everyone comfortable. Their cheerful homes afforded warm welcomes and their kind attentiveness the most hospitable of entertainment. The town's reputation as a community of intelligent and fraternal people in no way suffered but was in every respect strengthened and increased.

Wednesday evening found a goodly company of people in the opera house to witness and take part in the opening meeting. President Phillips called to order and the Rev. Bullock offered appropriate prayer, when the Honorable C. J. Monroe made the following address of welcome. It is subjoined in full because on such occasions Mr. Monroe always departs from the usual formal style and presents thoroughly practical thoughts about pertinent and practical questions. He said:

MR. MONROE'S ADDRESS OF WELCOME.

Mr. President and Members of the West Michigan Fruit Growers' Society:

As president of the South Haven and Casco Pomological Society, and at the request of the president of the village, it is my pleasant duty to welcome you here. While I may lack the words and the grace to do this as appropriately as I could wish, I have the satisfaction of feeling, and of assuring you, that back of my words stand a community which will give you such cordial greeting and such generous hospitality as to assure you of our appreciation of your coming among us. Remembering that you are the representatives of the fruit belt of western Michigan, and knowing something of the knowledge and the skill which your great and growing interest requires in order to make proper selection of desirable sorts of fruits and suitable soils, in the care and cultivation, and in the packing and marketing, also the vigilance and the perseverance needed to save our trees and fruits from the myriads of insects and the numerous diseases—many reasons are suggested why we should welcome you to this locality. I will mention three, and designate them as selfish, business and social reasons. First, as to the selfish reason. This vicinity, in common with those you represent, possesses natural climatic influences

and soils adapted to the raising of all sorts of fruits known to this latitude. It is favored by near markets, with excellent facilities for reaching them. These fortunate surroundings make us ambitious to so educate ourselves that we may derive the greatest benefit from them. I believe our pomological societies and gatherings like these are among the best to give us such education. In welcoming the members from St. Joseph and Benton Harbor we appreciate that they come from the oldest fruit growing section of western Michigan, a region which has given wide fame to the state as a producer of choice and tender fruits—a locality which has prospered wonderfully and brought to its citizens a large amount of wealth for the time and money spent and the acres cultivated. We are aware that they have had reverses and failures, but many more successes, and hence we want to draw upon their knowledge and their experience that we may reverse their failures into successes. In welcoming the members from the eastern portion of our county, from Ganges, Fennville, Allegan, Douglas, Saugatuck, Holland, Grand Haven, Muskegon and other points, we are aware that they are younger in the business than St. Joseph or Benton Harbor, but with their youth comes more hope and enthusiasm, of which we shall try to absorb freely.

We welcome you in a business sense, feeling that your society specially represents the fruit interests of western Michigan; that from north to south we need the same knowledge and skill to properly select the soil suitable for the fruit, the best methods of preparation, obtaining the most desirable varieties, subsequent care and cultivation, picking, packing, and marketing; the most effective means to guard our trees and fruits from insects and disease—how best to fight the one and control the other. The recent drouth has emphasized the importance of some cheap method of irrigation. It won't do to pass this question as a "dry" one. It must receive earnest consideration, and any practical solution will apply to the whole territory covered by your society. These and other questions are of such paramount importance that they not only require the best thought and the most diligent investigation which we can bring to them, but we need the associated effort and the combined influence and experience of all interested. I think I speak advisedly in saying that there are few if any classes of business or employment more in need of close, associated work, or of a more intimate acquaintance with past experiences. To know the right thing to do and to be in a position as a community to act promptly, is of the utmost consequence in fruit growing. A few days' neglect of diseased trees may destroy the work of years, or a few days' delay in attending to the insects may ruin the season's crop. Besides, we do not reap in the fall the spring's sowing, but have to wait from two or three years to a life-time. Hence experiments are costly, usually in proportion to the time required to test their correctness or get returns for the outlay. We have a direct interest in the largest number raising good fruit, and honest packing concerns all. To market promptly, at the best points, at the right time, and in quantities needed, is important over most products because of the perishable nature of our delicious fruits. The short time between maturity and decay makes it urgent to place ready our products for consumption or for canning and preserving. The need of concert of action in marketing will be more apparent with increased production. California and Florida have proven the futility of independent shipping with large crops. With limited supply, individuals may get better prices by "going it alone," although it too often comes out of some less fortunate neighbor. The largest

net returns to the community is what we want, and it can only come through united action. This has been repeatedly demonstrated in large manufacturing towns or districts. California and Florida are doing some pioneer work in marketing their fruit which will be profitable for us to study.

We welcome you for social reasons. The separation into classes and the tendency to create "caste" among our people is a growing evil fostered by isolation. Frequent social intercourse breeds friendship and excites interest in the welfare of others. Discussing the ways and means of our business, the successes and failures, stirs a fraternal feeling of good-will which nothing else can. Note the man who absents himself from companionship with others—selfishness results. The pleasant greeting, the hearty hand-shake, and the kind inquiry after health and family and business, brings out better thoughts, stimulates to more helpful deeds, sends each on his way with nobler aspirations.

In conclusion, I repeat that we selfishly welcome you here because of your long and varied experience and the helpful advice we expect from it. We welcome you in a business sense, as we have need of all the knowledge and skill we can obtain in order to glean the best results from the complex and many-sided callings of the pomologist. We know that any calling is promoted not only by close attention and diligent perseverance, but by an enthusiastic love for it and a hopeful determination to succeed. I know of no way in which enthusiasm is so easily kindled and hope revived as by frequently meeting those having common aims, similar interests, and mutual difficulties. It is like bringing the lighted brands of the logging-fallow together—each burns with a brighter glow.

We welcome you socially, knowing that continued plodding and absence from social gatherings tends to sordid motives and selfish actions—that frequently getting together, especially of those in like employments, renews old friendship and adds that which is new. It increases our desire for the welfare of others and impresses the fact that individual welfare is the community's welfare.

For these and many other suggestive reasons, I sincerely give you a cordial welcome to the hospitalities of our homes and village.

PRESIDENT PHILLIPS' REPLY.

To this President Phillips made a most earnest and thankful reply. Such cheerful words of welcome make us feel that such meetings do indeed prove of much value to pomologists and are of great social benefit as well. He had often heard of South Haven as a center of pomology, and today he had found that it was so, as the spreading and bountifully laden orchards attest. He had heard, too, that South Haven people never do things by halves, and of this also he had been convinced by the interest already shown, the open-handed welcome everywhere extended. If in any way the meeting shall not be successful no blame can attach to the people of South Haven. He knew of no calling which so develops men to the highest degree of civilization as does cultivation of fruits and flowers. Take these from us and we have only a desert remaining, but with them we advance to man's highest estate.

THE SEASON'S OVERPLUS.

Discussion followed upon the prospective surplus of fruit for the season, the chief remedies proposed for the anticipated low prices being honest packing, shipment of good fruit only, and better distribution of it, together with thinning, even to destruction then of half the existing green fruit. Mr. J. N. Stearns of Kalamazoo, pertinently remarked "that he never saw an overplus of first-quality of fruit. He is now selling 100 quarts per day of strawberries at 12 cents net and 300 quarts at 8 cents, but could sell 800 quarts of the better grade. People will buy more of good fruit than poor. The thinning of apples, pears, and peaches is the way to get good fruit, and when we make that and that only there will be no cry of overproduction."

Thursday Morning Session.

President Phillips having appointed the usual committees, Mr. E. W. Branch of Grand Haven read a paper on "The Life of a Fruit Grower."

Mr. Branch is the Artemas Ward of the society; and whenever he arose to speak, people began to laugh but had to stop suddenly, sometimes, to think, only to resume laughter again. His paper at this time, in its opening, promised to concern everything but fruit growing; but after various comicalities he got around to say: "If I were to live my life over again I would be a fruit grower, for the man who has planted a tree or vine, or whose wife has nursed a flower or plant, can esteem himself a prince or a potentate and monarch of all he surveys. He can enjoy the sweetest of flowers and the finest of fruits. What better is a king upon his throne? I hope the time will soon come when every lover of fruit culture may sit under his own vine or fruit tree, happy and contented, surrounded by the beauties of nature and the luxuries of fine fruits. I rejoice that the life of a fruit grower was granted to me. To do the work, however perplexing and fatiguing, has been a pleasure—and more, a perpetual joy—and yet more, an intoxicating delight. Great men, honored and noted, have passed over the river of Time. I imagine them, congenial spirits, camped on the other shore. So you may behold Washington, Lincoln, and Grant. But such are not the only great men who have gone hence and merit our reverence and respect. I may here fittingly mention James Vick, the lover of flowers, and imagine him passing in the paths of Paradise with that veteran fruit grower, Charles Downing. Long may their names be revered and their good deeds be recounted from generation to generation."

A. S. Dyckman of South Haven, A. C. Glidden of Paw Paw, and Joseph Lannin of South Haven, each spoke of the pleasures and delights of fruit culture and its wholesome influence on both mind and body.

D. B. Williams said he had, in thinning peaches, taken in one season from one tree 12,000 young fruits, and that tree always bore a fine crop.

From the afternoon's programme was borrowed Mr. A. S. Dyckman's paper on

PAST, PRESENT, AND FUTURE OF FRUIT GROWING IN MICHIGAN.

A complete history of all this would fill a large volume. But what I apprehend you desire is a brief *resumé* of the subject from an economic standpoint.

In the "fifties" the peach business in Michigan was just taking root, mainly at St. Joseph. In the "sixties" the large prices realized, sometimes as high as $7 per basket, gave a wonderful impetus to the business, and there was a large area planted, mainly at St. Joseph and Benton Harbor, Grand Haven and Spring Lake. The next decade (the seventies) brought a no less remarkable set-back to peach culture. Yellows and the severe winters of 1873 and '75 reduced the peach orchards to a small fraction of what they had been. Our great rival in peach production (southern Illinois) was equally or perhaps worse injured than Michigan by the same causes.

But for the supply from Delaware and Maryland which began western shipment in 1875, Chicago and the great northwest would have been for the next several years almost destitute of peaches. Since this period of calamity peach planting and culture have been pursued more prudently and wisely, the most favorable situations and methods being well considered, so that now we may say the business is on a more safe basis. The chances of failure have been greatly reduced and the probabilities of a regular supply greatly increased.

THE STATUS IN 1870 TO 1886.

Some time during the first half of the seventies an inventory of the number of peach trees in orchard, in the then principal peach regions, was taken. The region around St. Joseph and Benton Harbor had about 900,000 trees, and about Grand Haven and Spring Lake about 300,000 trees, and perhaps Allegan and Van Buren counties had 100,000, and the balance of the state 100,000 peach trees. This would make an aggregate for twelve or thirteen years ago, of 1,400,000 trees. At that time southern Illinois, besides sections of other states, was shipping immense quantities of peaches to Chicago and other western cities. There was a lively demand for peaches in the fresh state, subject only to those losses which unfavorable weather in the peach harvest will always bring. There was very little canning and drying of peaches in the west at that time.

Now, with the population of the upper Mississippi valley largely increased, how do you suppose the area in peaches in Michigan will compare with that period? Without the statistics necessary to determine definitely, I venture the assertion that there are not in Michigan, in good growing condition, more than 1,000,000 peach trees, Perhaps this meeting can give estimates by which we may be able to approximate the actual number. If my estimate be correct we have not yet reached the number we had before the hard winters of 1873 and 1875. Then the upper Mississippi valley (Ohio, Indiana, Illinois, Michigan, Wisconsin, Missouri, Kansas, Iowa, Nebraska, Minnesota, and Dakota), did not contain more than 15,000,000 inhabitants. Now the same territory probably contains about 20,000,000 inhabitants. These million trees, old and young, probably do not yield, in a good year, more than an average of one basket to the tree. This is only one basket to every twenty inhabitants.

PROBABILITIES OF THE FUTURE.

Suppose, in the next decade, this production should be multiplied by ten, making a supply of 10,000,000 baskets, or 2,500,000 bushels, and the increase of inhabitants in the upper Mississippi valley to be 5,000,000, making the population 25,000,000, Michigan would still produce only one bushel of peaches to every ten inhabitants of the region which is its natural peach market. Making allowance for all sources of supply, I do not think this could be regarded as over-production.

In the light of these figures and the difficulties and disasters we shall have to contend with there seems little reason to doubt that the skilled culturist, having a favorable situation, will be able to make the culture of the peach profitable in Michigan for long years to come.

In the selection of land for a peach orchard there are two very important things to be considered, namely: Elevation and proximity to Lake Michigan, on the most sheltered portions of the east shore.

The peach grower of the future must have the eyes of Argus and the merciless execution of Robespierre. He must be persistent as the hero of Appomattox and honest as the Great Emancipator. He will thus become the benefactor of small boys and girls who discover in peaches an indescribable relish. He will enjoy good health and graduate into the floral and pomological department of Paradise.

AGREEMENT AND DISSENT TO THIS.

A. C. Merritt, of Casco, said his experience had been similar to that of Mr. Dyckman, he had enjoyed much in the growing of fruit. The business calls out all of a man's best thought and was continually educating the mind. There is something stimulating and inspiring in watching the trees, the leaves, blossoms, and fruit, constantly lifting men up to a higher plane of life. The men and women engaged in growing fruit and flowers are as a class of the most social and intelligent, as their calling brings them frequently together.

Harrison Hutchins, of Ganges, said that his neighborhood included Douglas, Fennville, and Saugatuck, and in it were not less than 250,000 peach trees.

Mr. J. F. Barron, of Fennville, said that from 35,000 bearing trees in that vicinity 234,000 baskets were shipped four years ago, since when there has not been a full crop.

Mr. Hamilton thought Mr. Dyckman had placed the estimate nearly right at one basket per tree, counting trees of all ages, bearing and otherwise.

J. G. Ramsdell thought the estimate too low. If it is not, we must be more careful in our investments.

G. W. Griffin said there were in Casco township five or six hundred acres of trees three years old or more, containing 70,000 trees; and there are 35,000 unbearing trees.

Mr. Hutchins would quit the business if he thought the product only one basket per tree.

Mr. Dyckman reminded that the estimate included all trees, young and old, in thrifty condition. He expects to see a ten-fold increase in the product in ten years. In 1873 and '74 when it was estimated there were 900,000 trees, the shipments were but 600,000 baskets. Many were young trees.

James Gardiner, of Ganges, believed Mr. Dyckman's estimate correct.

G. W. Richards, of the same place, thought it right for Crawfords, Mixons, and Richmonds, but too low for others. Our climate does not favor much setting of the varieties named, though what we have may by better fertilization be made to yield more.

President Phillips, in answer to inquiry, said peach growing was unsuccessful about Grand Haven and pomologists are turning attention to grapes; but he thought Mr. Dyckman's estimate high enough.

Mr. Dyckman said his estimate of one million trees was divisible into 250,000 in Casco and South Haven; 500,000 in and about Fennville, Ganges, and Saugatuck, with 250,000 for the rest of the state. There are less now than in 1874.

CULTIVATION OF NUT-BEARING AND OTHER DECIDUOUS TREES,

was a subject introduced by W. A. Smith of Benton Harbor, in the following paper:

In every well timbered country there are three distinct and well defined periods or epochs. The first period furnishes the conditions for a wild or savage state of mankind, and during its continuance, nature provides in great measure for the simple wants of her children. When the supply in one locality becomes exhausted they need only migrate to other and more favorable locations, like the birds of the air and the fish of the sea. Bye and bye the pioneer comes along. The country is wild, the land is clothed in its primeval forests, the sound of the woodman's ax has not been heard to echo among these stately trees. The timber which has been growing and decaying upon the virgin soil for hundreds, thousands—yea, perhaps millions—of years is in the way of human progress and must, at least in part, be removed. The land must be tilled in order that man may rely upon his own energy and resources for the necessaries of life.

In a new country, before railroads are constructed, and not being favored with water transportation, timber is of little or no value save for fuel and the rude cabins of the first settlers. Hence, in days not long past, the logging bee was a common frolic. The timber was burned upon the ground where it grew, and the ashes added additional fertility to the soil already enriched by the decomposition of vegetable matter for unknown ages.

The second epoch is the period of commercial activity in the lumber regions. Saw-mills are erected at all convenient points, and there is logging in the winter, running logs in the spring, and a general activity in the lumber business the balance of the year. In our own peninsular state this system is entirely and systematically in vogue even now.

Those of us who came to Michigan not more than a quarter of a century ago remember well the majestic and magnificent stretches of forest over much of her rich domain. In 1836, fifty years ago, Michigan entered upon her career as a state. Then she was one of the best, if not the best, timbered state in the Union. Her timber, even to the present time, has been a source of munificent wealth to her citizens. The laborer had his wages, the capitalist his large percentage of the money invested. The ax has been applied to her forests with a ruthless and savage hand. "Today is the day of our need," says the lumberman. "Let tomorrow take care of itself;" and how swiftly and how thoroughly has he accomplished his work! Fifty years, a mere point in the cycle of time—only a day, as it were, in the age of a state—and yet we

are brought face to face with one of the most important problems of agriculture and prosperous statehood, viz: How can we best protect and preserve our remaining timber? Already our climatic changes have been mainly for the worse, summers hotter, winters colder, drouths and floods more frequent and destructive. Today the remaining pine timber of the state is mainly in the hands of capitalists, who will, in the next twelve or fifteen years, use up about all the valuable pine, at least in the southern peninsula. In 1900, sixty-five years of statehood, will be stripped from Michigan almost entirely her great pine forests, and about another quarter of a century thereafter her hardwood timber will likewise be used up. This estimate is upon the present basis of consumption, which is likely to continue.

As a people, we shrink from and abhor too much government, hence we will be slow to adopt (if indeed we ever do) the European system of forestry. There the government owns large tracts of timber lands and have reduced forestry to a fixed and well defined science. In some of those countries even private timber claims are placed under governmental control, and thus instead of waste, depletion and destruction of timber for immediate gain, their forests are made to yield them a perpetual revenue, which is yearly becoming more valuable. Instead of using up the principal, the interest is accumulating new principal.

In this country, without a radical change in our national and state laws, in our system of growth and culture, little can be hoped for in the future. Sooner or later our national and state governments, will, by force of circumstances, be compelled to adopt a radical system of forestry. For the present, our timber preserves and culture will be mainly in the hands of individual owners of the soil. Singly we can do but little, collectively we can do much. Landed proprietors will soon learn that growing timber can be made as profitable as growing grain and fruit; and when they once plainly see the everlasting dollar the problem will be solved.

As a people we invest millions sometimes in rotten life insurance companies for the benefit of our families when we are laid away. This shows a disposition on our part to leave that portion of mankind in better circumstances for our going. If we would pursue a like policy in timber culture we might not only leave our families in better circumstances but make the world more prosperous and happy, and the earth more beautiful and homelike.

But men must sow today and reap tomorrow, and the idea of deferred profits for one, two, three, or more generations is a stumbling block to too many. On this point we do not act like wise, rational beings. He who lives for the present alone, without regard to the welfare of the future, is at enmity to the best interests of mankind. But we overlook the fact that timber culture can be made a sure and safe investment in a much shorter period of time than is usually reckoned upon. Many varieties of forest timber grow rapidly and in one or two decades are available for various purposes. While growing they make windbreaks, shelter crops and stock, equalize moisture, and beautify the earth. For the best interests of agriculture and every interest dependent upon that, about one-fourth of the land should remain permanently in timber.

Every man or woman who owns a country homestead should see to it that a part of said homestead be well stocked with valuable timber. Among the trees should be a liberal supply of nut-bearing trees. The walnut will grow on any soil that will produce good corn and even on soil that will not grow good

corn, for its native habitat is rocky, hilly, and mountainous land. Yet it will readily adapt itself to any soil and locality suitable for farming purposes, and prove fruitful. This and the black chestnut are the delight of the small boy in the fall of the year. Then why not grow them? They soon come into bearing and will continue to bear bountiful crops of wholesome and delicious nuts for many generations of boys in the dim future. These trees, too, are ornamental and useful for many other purposes. The black walnut is today the most valuable timber tree in this latitude. I would now rather have a thrifty, growing, young black walnut orchard than an apple orchard of equal extent and of the most approved varieties. Within the last thirty years I have seen large, stately black walnut trees felled and split into common rails for fencing purposes, which if they were standing today and sound would be worth more per tree than an acre of the best improved land upon which they grew. The black walnut in its native state is not only a good tree, but always indicates a good soil. This fact should be remembered in growing this tree.

In timber culture due regard should be had for the different varieties of timber and their adaptability to particular kinds of soil, also the various periods of maturity of the various species. This knowledge will enable us to grow different varieties upon the same tract of land to the best advantage. For 200 years France has had her forestry laws for the protection and culture of timber. In Germany the forestry and timber culture laws date still further back, under which a system of forestry schools has been established, which for thoroughness and system in every detail connected with the growth of timber are superior to that of any other country.

In many of the European countries much of the timber land is owned and under the direct control of the governments. The forests are divided and subdivided, as cities into wards and precincts. The police force, not being influenced by ballots from trees, are expected to do impartial justice to all. When the age of greatest usefulness of the various timbers has arrived, it is removed and room is made for a new crop. In this way they have succeeded in growing not only three times as much timber per acre as the unaided forest produces, but timber of superior quality. They thus make their forests pay a revenue besides beautifying and adorning the country. We can hardly imagine anything in nature more lovely and inviting than a clean, well kept forest. The various periods of maturity or greatest usefulness is found to be as follows, in their latitude and under good management: Larch and birch, 50 to 60 years; locust and maritime pine, 60 to 70 years; Scotch pine 50 to 90 years, beech 80 to 140 years, ash 90 to 100, chestnut 90 to 120, spruce 90 to 140, fir 100 to 140, elm 100 to 140, oak 100 to 200. Our black walnut will probably require nearly the same time as chestnut.

For roadside planting the rock maple is perhaps one of the most desirable trees we have—easy to propagate, a free grower, and cleanly in all seasons. To give the best satisfaction it should be transplanted into nursery grounds a year or two before being permanently transplanted. This tree when old enough will furnish refreshing shade in summer, a delicious sweet in spring, and a valuable wood for manufacturing purposes.

I can not help noting here the great service rendered the cause of timber culture in this and other states by that indefatigable worker, C. W. Garfield, in the last report of the State Horticultural Society. The collations, report, opinions, experiments, therein set forth and given to the world, although in

fragmentary form, by Mr. Garfield, should entitle him to the gratitude of every well-wisher of the human race.

Let us see to it that we do something, individually and collectively, to rehabilitate our beautiful state, in part, with timber-belts, windbreaks, and shade trees for many beasts and birds.

If we set but one tree individually, somebody will rise up and call us blessed.

VARIOUS OPINIONS.

A. C. Glidden was disinclined to play the pessimist about the future, as it was quite likely to care well for itself with respect to a timber supply as well as other things. If we who are here owned the pine land we would cut the timber and realize upon it; and all our talk here against the cutting of the forests will make no difference. The arts will no doubt find for us some substitute for wood. Perhaps it will be aluminum from the clay which lies about us so plentifully. Stranger and more wonderful discoveries have been made than this would be, and we would almost prophesy that this substitution of aluminum for wood and iron would yet occur. He hopes to see more shade in highways and door-yards, but not to see one-fourth of each farm kept in or turned into forest. He did not think the cutting of the forests had had so much influence upon the climate as many believe it has. Mere cultivation of the prairies had increased the rain-fall and the best thinkers, he believed, now teach that denudation of forests has not decreased the amount of rain.

W. A. Brown of Benton Harbor said Mr. Glidden might be right in this, for the planting of crops had increased the rain west of the Missouri river. It is true that with the forests we had a more equable climate and grew safely the tenderer fruits, but the cutting of the trees was necessary. We may need to replace them for sake of timber supply, for he doubted if any mineral substitute would ever be found for good hickory or black walnut. We shall live more pleasantly if we have more trees and our children will bless us if we plant them, especially those trees that bear nuts. The chestnut is very successful in Berrien county. He believes we should plant more trees and that the government should do something to replace those cut from great forests.

A. C. Merritt of Casco said that if asked with what objects of childhood his tenderest emotions were associated, he would say they were the delightful old chestnut trees. Since his growth to manhood he has planted and grown chestnut trees successfully. They may not be adapted to every soil—they will not flourish on hard clay—but he urged young men to plant nut-bearing trees. Chestnuts will come to bearing as early as apples or pears. Filled with such zeal he once put out a lot of young hickories which more experienced men soon told him were butternuts. He knows more about chestnuts, however, and would always plant only fruit from those trees which grow three nuts in a bur. He does not wish to see the forests swept away. Michigan is glorious in her woodlands and it is our duty and that of the state to preserve that glory. The future may be all right, but let us hand down to our children some of these good things we have enjoyed.

Thursday Afternoon Session.

In point of attendance the meeting of Thursday afternoon was the largest of all, and had the most varied programme. It was opened by six members of the village cornet band with an excellent selection rendered in thoroughly artistic style. Gov. Alger and wife had arrived in the morning and, as the guests of Mr. and Mrs. Geo. Hannahs, had enjoyed a drive about the village and to some of the surrounding fruit farms and been entertained at dinner. They appeared quietly in the hall, and soon President Phillips called to order and very briefly announced the Governor for a short address. Mr. Alger made an exceedingly good impression and spoke with a great degree of freedom and good sense.

A. S. Dyckman moved a vote of thanks to Gov. Alger. It was given unanimously and an adjournment taken, during which Mr. and Mrs. Alger shook hands and conversed with all who presented themselves.

MUTUAL RELATIONS OF FRUIT GROWERS AND NURSERYMEN

was next considered, Mr. J. N. Stearns, of Kalamazoo, introducing it with the appended paper:

I suppose the reason why I am selected to open this subject is that I in sort represent both sides, being a nurseryman and fruit grower. I do not feel competent to handle the topic from a literary point of view, but as I consider it one of the most important topics in the programme and one I would like to hear discussed, I have consented to open the discussion with a short paper. I am sorry to say there is not in all cases the true mutuality between the nurseryman and the planter that there should be, as their interests are one. Neither can exist and prosper without the existence and prosperity of the other.

WHY THE LACK OF MUTUALITY?

So we are first led to examine and try to discover the cause of this lack of mutuality. In many cases I find there is in the fruit grower a lurking suspicion of the nurseryman—that is that he is a schemer seeking how he may trap him in the purchase of something he does not want. From a quite extended acquaintance with nurserymen I am led to believe that as a class they will stand high up as compared with any other class of men we can mention, for I take the position that a tree or fruit grower whose soul is in his work can not well be a very bad man. I will admit I have heard some very eloquent sermons, and some that strongly appealed to the finer senses of man, but I never yet heard one preached from the pulpit that was so elevating to me and that seemed to bring me so near to the God of nature, as the healthy growth of the young plant and tree, or the development of the ripening fruit. There is in these something truly grand, that creates within me a desire to glorify the author. Then where does this trouble originate? I can solve it only by placing it on the trickster tree dealer. In many cases he hardly knows a rose bush from a raspberry plant, and takes the position that the average planter is equally ignorant. The fruit grower is quite apt to associate this individual with the nurseryman, and quite naturally, for many times he will have catalogues and even certificates of reliable nurserymen.

A SAMPLE SWINDLER.

I have in mind one of these fellows claiming to represent the well-known firm of Elwanger & Barry, with all the equipments. He took a quite large order of the superintendent of the Kalamazoo Asylum and of many others in our town, at, of couse, about three prices. At least, the bill furnished the asylum at $40 I would have been glad to fill for $12. One of his customers said to me that none of his fruit came true to name. I said I would venture the price of the bill none of it ever came from Rochester, and I asked him to write Elwanger & Barry, asking if they had such an agent. The reply was, they knew no such man. I afterward learned the stock was packed in Ohio. So it is easy to see that the planter who has none of these inside facts becomes prejudiced against the nurseryman when his fruit is sometimes entirely different than ordered.

BUT THERE ARE HONEST NURSERYMEN.

But I am fully convinced, as far as the practical nurseryman is concerned, in general he desires to know just what the fruit grower is going to want, and to grow that and nothing else.

This calls to mind a little experience I had a few years ago, which I think gives an illustration of the point under consideration. I had a block of peach seedlings to bud. I was desirous to bud such varieties as would be wanted by peach growers. This was before I had quite as much experience as now. I wrote several parties whom I knew had considerable experience, asking them to give me a list of what they would plant in planting 1,000 trees. From most of them I received a prompt reply, giving a list of what they would plant. From a few I received no reply. The most of you, I apprehend, will ask why. Of course I am not fully prepared to say, but I will give you my conclusions and my reasons for aiming at these conclusions. I knew my men. They said to themselves: "Now he is a nurseryman and he wants to make something out of my experience, and I am not going to give him a chance."

Now I hope the discussion of this subject will help to do away with any such feeling, for I know it will be far better that both parties be free to give each other all the information they can, and become better acquainted with each other, and in all cases for the planter to buy directly of the nurseryman and not of the tree dealer. The fruit grower need not look for perfection in the nurseryman, or presume that he never makes a mistake; for, I speak from experience, there is no business that requires such vigilance in keeping everything straight as the nursery business. But I believe if you deal directly with the grower he will try as hard to give you just what you call for, and nothing else, as any class of men in trade, and I say this, though being at the present time more a fruit grower than a nurseryman.

THE TREE PEDDLER A NUISANCE.

H. Dale Adams said the keynote of the proper relationship of fruit growers and nurserymen, desired by both, was in Mr. Stearns' latter words—do away with the tree dealer, the traveler with samples and pictures. He told how a friend was swindled by one of these gentry, and how he vowed he would not be "taken in" again; but he was, and even for the third time. We can

have no sympathy with such men. Deal directly with the nurserymen and there will be no trouble.

A. C. Glidden believed the trouble to be as much with the public as the peddlers. Inexperienced growers demand shapely trees, refusing the genuine Greenings because they do not know that a Greening tree can not be grown straight. They demand what can not be honestly furnished, and so Spies or Red Canadas are sent instead of the crooked trees of the order. It is safe to say that the nurseryman who attend these meetings will not cheat.

FRUIT AS AN ARTICLE OF FOOD,

by Mrs. G. H. LaFleur of Allegan, was a paper here introduced out of order because of the large number of ladies present. Mrs. LaFleur said: I did not wish to write this paper. There were too many "lions in the way." Busy housekeepers will understand their nature and sympathize with me. But your secretary lives in our neighborhood and would listen to no excuses. He was very persistent and a little dictatorial. He not only insisted on my writing, but chose the subject, which is so very material, so entirely "of the earth, earthy," there is no room for flight of fancy or play of the imagination—only a plain, matter-of-fact affair about something to eat. This would seem gross were we Oscar Wildes, but as we require a more substantial diet than sunflowers, and are so material, for our physical well-being we must give the subject of what we shall eat, and the best method of preparing it, some attention.

I am aware I run some risks of telling you many things which you already know, yet could I feel assured that if these experiences of mine could impart to any the satisfaction I received in learning, I should feel amply repaid. I have ever delighted in being a learner—have never aspired to be a teacher—yet by a mutual interchange of thought we help to smooth the pathway of life, and that is why we are here.

When we observe how prominent a place fruit occupies in the great "economy of nature," and how much attention is given to its cultivation and improvement, we believe that a wise providence designed that we should use it in every way conducive to our happiness and well-being. These delicious fruits not only delight the eye and gratify the taste, but are a physical necessity in a hygienic point of view. Fruits should form a conspicuous part in our daily food. We should have them twice a day on our tables, and I would not object to the third time. When fruit occupies a more prominent place in our diet, and meats, stimulating condiments, rich pastries, and sweetmeats less, we shall have better health, happier thoughts and better lives; for who can partake of these God-given bounties, prepared by his own munificent hand, and not have his soul rise in thankfulness to Him who causes the earth to yield her increase that we shall not lack?

Apples stand at the head as the most useful of all fruits. They are excellent in many ways and all ways. They are lovely, fresh on our dinner tables for dessert. We can them, pickle, jelly, make into vinegar, and make apple butter. We all know how delightful is a well made apple pie—it is the queen of pies. Good, sweet ones are excellent baked; tart ones are delicate and delicious halved, the core removed, the cavity filled with white sugar, and baked. Stewed ones are much improved by being spread on tins, sprinkled with sugar and baked. Apples, as well as all fruits, as far as practicable,

should be cooked in their own juices. The ways are almost legion in which we can utilize this excellent fruit.

We ought to have peaches, we ought to have all we want if we can get them. We are not so sure of them as of the apple. They are delightful. Everyone is fond of peaches, or ought to be. If one were to say he is not fond of this lovely fruit we should be afraid of him, we would naturally conclude he was destitute of a cultivated taste. This delicate food is so perishable that we resort to various ways of preserving, such as canning, spicing, pickling, jellying, etc. In each they are delicious if carefully and properly done. Many persons, I think, make a great mistake in canning peaches. They sacrifice too much for looks. Canned peaches are often lovely to the eye but utterly flat and insipid to the taste. I believe in a due regard for looks, and admit that food which is pleasing to the eye, is often more gratifying to the taste, but this should not be carried too far. Peaches are often put up in a too unripe state—too hard—that they may come through the process retaining their form in an unbroken condition. This is a great mistake. To have this lovely fruit perfect we should allow it to remain on the tree until fully ripe, until by taking it in your hand it yields readily to the pressure. They should then be prepared, placed in a steamer, and steamed until the juices are thoroughly cooked, which may be known by their settling down in the dish. They should then be slipped out carefully into a bright pan and allowed to become perfectly cold. Then add three fourths pound of white sugar. Put over the fire and bring to a boiling point, or allow them just to boil up, then remove and can immediately. If carefully done the fruit will not be broken, you will have all the delicious aroma of a peach ripened and colored on the tree, and the syrup will be beautifully clear, almost white. By this process the natural flavor of the fruit is retained to a much greater degree than by any other method I have ever tried. It is also economical, as the long boiling of sugar with acid fruit converts cane into grape sugar, and we lose one-fifth of its sweetening qualities.

Pears should be grown in abundance. They are very delicious when they are right—I mean the best varieties. Flemish Beauty and Bartlett are nice for canning. Too much can not be said in favor of canned pears. Some fruit is greatly injured by cooking but this lovely fruit bears cooking very well. Baked in a light puff paste, with no flavoring but their own, canned pears make a delicate and delicious pie. Cooked in spiced syrup, made of best vinegar one pint and three pounds good sugar, they make an appetizing pickle for the tea-table. They can be dried as readily as apples, and this is a good way of saving a surplus.

The quince has always been esteemed a very choice fruit. This is because it can only be grown in certain localities, and also on account of its high and peculiar flavor and rich and lovely looks. Quinces canned by the process named for peaches would require longer cooking, and a little water to the sugar to make sufficient syrup. Quinces make one of the loveliest jellies, as we all know.

Plums and cherries are always prized as delicious, and are nice in any and every way.

In the warm June days comes the strawberry, that prince of berries, with its delicious coolness, to refresh us. I would particularly recommend the process named for canning peaches, only more sugar should be added—one

half pound to one pound makes them about right. This process I think eminently desirable for all kinds of small fruits.

The currants with their nutritious and medicinal qualities are just what we need during the heated term. The red currant is unequalled for jelly—it seems designed for that. The black currant makes a very delicious canned fruit. Few persons, I think, are aware how entirely delightful they are in this way, or they would be more extensively grown and used. They lose in cooking the musky aroma so disagreeable to many. Wash them well in tepid water before cooking, during which process the natural aroma undergoes an entire change, and when done they are simply perfect.

Gooseberries are excellent, canned with plenty of white sugar. When done a beautiful, clear jelly is formed among the berries, which is quite as delightful to the eye as the taste.

Blackberries, raspberries, whortleberries, cranberries—indeed all of the edible berry family—are greatly relished and are very healthful.

Last but not least I mention the fruit of the vine. Superior to all of the small fruits is the grape in healthful qualities and nutrition. I have read that one might subsist on grapes alone—that they contain all of the qualities necessary to sustain human life. Be that as it may, we all know that they will allay hunger and thirst. We only wish we could preserve them in a fresh state at least half of the year, that we might have all we wish to eat. Yet we are thankful we can save this useful fruit by cooking, that we may have it the entire year. For canning grapes have two dishes—slip them out of the skins, drop the pulp containing the seeds into one dish and the skins into the other. After this is done put the pulp into a preserving pan and boil until the seeds are set free. They will then drop to the bottom of the pan. Pour the pulp from the seeds, add to the skins and boil until tender, adding one-half pound of sugar just before removing from fire—then can. Grapes put up in this way are unsurpassed for sauce. This also makes one of the most delicious pies imaginable.

A good supply of fruit jellies is greatly appreciated. They are essential in sickness and we enjoy them in health. The juices of fruits for jelly-making should be reduced nearly to proper consistency by boiling twenty or thirty minutes, removing the scum; then add the sugar, boil a few minutes more, and it is done. Three-fourths pound of sugar to one pint of juice is enough for most fruits, excepting the red currant, which requires one pound. By this process you do not lose sugar by skimming it away, the jelly will be clearer, lighter colored, and finer flavored.

I would recommend the putting up of fruit syrups. A few bottles of blackberry, raspberry, strawberry, or other fruit syrups are very useful and add greatly to the comfort of a family. The juice of any good fruit boiled down, with sufficient sugar to make it rich enough to keep, is useful in many ways. It is nice for flavoring sauces and creams. A tablespoonful in a glass of cold water makes a delightful beverage when the mercury is at 90. They are also useful in preparing relishes for invalids.

Let us not only prune, cultivate, and care for these delicious and healthful fruits, that our tables may be bountifully supplied, but let us have the lovely flowers, with their incense-laden cups, to perfume and adorn them, that our thoughts may be raised from these material things upward to the great source of all beauty and goodness, that we may grow into better types of man and womanhood. We who dwell in the country have many things wherewith to

console ourselves for the lack of some which denizens of cities possess. We have our luscious fruits, fresh picked and perfect, from tree and vine. In addition to our cultivated flowers we have the sweet wild-wood blossoms by brookside and meadow, and the song of the happy birds—the sweet, wild birds in their happy freedom. It is delightful to have near one's home a grove to call the birds. Then, in the gray of the morning, one can have the exquisite bird-music, the heavenly melody from a hundred tiny throats, blending together and swelling upward in a sweet song of praise to the Great Creator.

NEW FRUITS.

Mr. T. T. Lyon, the honored president of the Michigan State Horticultural Society, presented this subject, saying :

Since it seems appropriate to the season, we may be pardoned if we confine our remarks mainly to small fruits. If we were to name but one strawberry of recent introduction which for large size, medium quality, superior productiveness, and health and vigor of plant, after two seasons' fruiting, promises to take the head of the list for market purposes, we would unhesitatingly name the Jewell. For similar reasons we would specify the Parry for the same position in the list for family or home use, since it is quite as large or even larger, even more beautiful in color, and of superior quality nearly equaling Prince of Berries in this particular. The plant also is quite satisfactory.

Cornelia, originating with Mr. Crawford of Ohio, seems equally likely to occupy a leading position as late market variety.

The chief fault of the Jewell lies in the fact that it is pistillate, and therefore requires that a perfect-flowering variety be planted near as a fertilizer; and the same is true of the Cornelia. The Parry is bi-sexual.

If we were to name four varieties giving a succession from the earliest of any value to nearly the latest, we should specify Alpha, Maggie, Bright Ida, and Arnold's Pride. It is a very unusual fact that these were all originated by that notable experimenter, the late Chas. Arnold of Ontario, from a simple batch of seed as a second reproduction from a cross of the Wilson upon a foreign variety—the Dr. Aicaise. These are all large size, of mild, pleasant flavor, and exceedingly productive. Their worst fault, even for market purposes, is a slight lack of rich, high color, by some of them. They ripen in the order named, the Alpha coming in within a single day of the very earliest strawberries we have tested.

Atlantic, Daniel Boone, Indiana, Woodruff's No. 1, Piper, Phelps (Old Ironclad), Early Canada, New Dominion, Mrs. Garfield, Vick, and perhaps others, may be named as just coming short of the mark as successful and leading popular varieties, but which, under favoring or exceptional circumstances, may be found capable of giving highly satisfactory results.

Jersey Queen and Connecticut Queen are by no means queenly, either as to productiveness or quality. May King needs a longer trial to determine whether it is really a king or only a pretender. It is promising.

Ideal seems from its name to assume to be a perfect variety; but we regret to say that, with us, it is merely of fine size and form but lacking decidedly in quality. The plant is fairly vigorous and apparently hardy, but rather lacks productiveness—in fact, quite beneath our standard for the ideal strawberry.

Hathaway's Nos. 3, 5 and 9, not yet offered for sale, are doing very well

indeed this season. Mr. Hathaway of our state has now been so long engaged in the work of producing new varieties in a single line of succession from a pistillate, also of his own origination, that his seedlings have come to assume the characteristics of a race, fully as much so as in the race of Shorthorn cattle, or in other families or races of animals—a fact of the truth of which any person may assure himself by visiting and examining the hundreds of seedlings in the plantations of the originator.

Mary Fletcher and Grand Duke, received from Ontario, and Sucker State, an Illinois seedling, have suffered severely during the past winter, while other varieties in the same or adjacent rows were uninjured, indicating a decided lack of hardiness. The last named is, however, somewhat popular at home as a market variety.

Garrettson, Henderson, Emerald, Pautucket, Howell and Hart are on trial and afford in this season's crop of fruit a good degree of promise. The Henderson was disseminated a year since by Peter Henderson of New York, and is praised in some quarters for its very high quality, together with large size.

An unnamed seedling, received from a prominent grower of Ontario for trial, gives, in this season's fruiting, decided indications of value as an amateur and even as a market variety. The plant is vigorous and exceedingly productive. The fruit, in size and form, is much like Bidwell but rather darker in color. Gipsy and Cheney are very much alike—not vigorous, highly productive under favorable circumstances, and quite acceptable varieties for home use.

Vineland, of New Jersey origin, and Lacon, an Illinois seedling, seem to have been locally popular, but we suspect that they can never become generally so.

No. 6 and No. 93, received for trial from Mr. Crawford of Ohio, are very promising seedlings, not yet offered for sale. They are quite similar, in general character, to the Cornelia, a seedling of Mr. Crawford's already spoken of.

Fruit and plants received from Mr. Collins of New Richmond, Allegan county, Michigan, last fall, show valuable qualities as a market variety. The original plant was found growing wild in the forest.

Ontario is very highly praised by the grower, Mr. Johnston of Shortsville, N. Y., as the largest, most productive, and vigorous of strawberries. We have not yet fruited it. The plant is certainly very vigorous.

Park Beauty is neither more nor less than the well-known Crescent.

Jumbo, recently sent forth with a flourish of trumpets, is beyond question the old, well-known Cumberland.

RED RASPBERRIES.

Rancocas, Prosser, and Marlboro have not yet had time to acquire a reputation outside of their original homes. The latter certainly is very vigorous, and comes with a reputation for great hardiness and productiveness. It has come through the past winter, here, in good condition.

Crimson Beauty showed exceedingly well on spring-set plants, the first season, but the next season's fruit proved more or less imperfect, apparently attributable to imperfect fertilization of the blossoms.

Surprise and Queen, kinds of, to me, unknown origin, are hardy, very pro-

ductive, with fruit of fine size and fair quality, though the latter lacks brightness of color. They seem to me to deserve more attention than they have received.

Early Reliance and Early Prolific, although hardly new sorts, are valuable varieties for house use. They have inherited the hardiness of their parent, the Philadelphia, as well as its dark color, which is objectionable in the market.

Welsh, Niagara, and Talcott, are comparatively recent introductions, which present few if any specially valuable characteristics.

Hansell was disseminated several years since as the earliest red raspberry; but it proves to have but slight advantage in this particular, while it is rather small, not quite productive enough, and of but moderate quality. The plant is sufficiently hardy at the lake shore but is not very vigorous.

Superb is of the same season as Hansell, doubtless a seedling of the Philadelphia, with the same dark color. It can only be commended as a variety for home use, as, although the berries are very large (often seven-eighths of an inch in diameter), they are so closely put together that they crumble a good deal in picking, which, together with their dark color, unfits them for the market.

Michigan Early seems to be almost unknown in Michigan, although said to have originated here. It comes to us from New Jersey. So far it seems to be of very little value.

If we were to name a single variety, strictly for home use, it would still be the Herstine. Although not hardy enough to stand the winter with certainty, even at the lake shore, and not quite as productive as might be desirable, its large size, very bright color, and rich, sprightly flavor, commend it strongly to those wishing fruit for itself rather than for the money it will command in the market.

INTERMEDIATE VARIETIES.

It is quite customary to speak of these as hybrids, but the correctness of the assumption is very doubtful, and all these being accidental originations there are no means of determining the fact.

Shaffer is one of the most valuable of these. It is the strongest grower of either class, very productive and hardy, usually producing a late crop from the tips of the young canes of spring-set plants. Its fruit is very large, dark purple, with a whitish pubescence, which is objected to at least in markets where it is not well known. A superior fruit for canning.

New Rochelle is much like the above in color and quality, but otherwise differing little from an ordinary black-cap.

Caroline is an alleged hybrid between the finest of the European class of suckering raspberries—Brincke's Orange—and the black-caps. It roots somewhat reluctantly from both the roots and the tips of the shoots. Unlike all other yellow "caps," it retains its bright, clear yellow even when overripe.

TIP-ROOTING OR "CAP" VARIETIES.

These have now come to be quite numerous. Of the more recent ones Souhegan and Tyler (which are practically identical) with Ohio and Hopkins are the most valuable.

Hilborn, which is quite new, is very nearly as large as Gregg, clear, glossy

black, and in flavor the richest and juciest black we know, excepting, possibly, the old Miami. It stood the past two severe winters, with me, perfectly, and seems likely to prove highly valuable. It is yet very rare.

Centennial, Canada, Kellogg, Chapman, Indiana, Springfield, Nemaha, are quite recent introductions, having yet to establish a reputation.

Beebe's Golden is exceedingly productive but is a mere reproduction of the ordinary yellow cap, with the objection, common to them all, of turning to a dirty looking brown when over ripe.

BLACKBERRIES.

The most popular so-called hardy blackberries, Snyder, Taylor, Stone, and others, failed of a crop last season, from injury by the previous winter's cold, while those who relied upon the confessedly tender Lawton and Wilson, by protecting the plants at a very slight expense, reaped a heavy and highly remunerative crop. From this and other experience we have become thoroughly convinced that a strictly hardy blackerry is yet unoriginated, if not in fact unattainable, and that the sooner we abandon such expectation the better for all concerned.

From our limited experience we regard Wallace Wilson, Jr., Barnard, Ancient Briton, Western Triumph, Agawam, and perhaps Knox, as promising and likely to prove valuable, somewhat in the order named.

Dehring, Freed, Bumton, Early Cluster, Bonanza, Stayman, Wachusett, and Missouri Mammoth, are either yet too new or too imperfectly tested to warrant a definite opinion respecting them.

Early Harvest, Texas Early, and Crystal White, are all excessively tender here—the last exceedingly beautiful, when we get the fruit, which is but seldom.

CURRANTS.

Fay's is very vigorous and the fruit very large and good in flavor, but with us it has not yet justified its claims to its title—prolific.

Lee's is no more prolific, so far, than Black Naples, to which it is very similar though less hardy.

GOOSEBERRIES.

Industry, recently disseminated by Elwanger & Barry, although a European variety, has thus far withstood mildew quite as well as our natives.

Champion, an alleged native of Oregon, withstood the previous very trying winter here and made a fair growth last year; but we regret to say it is now dead.

A recent seedling by Jas. Dougall of Windsor, Ontario, is now in the hands of Albertston & Hobbs of Indiana but not yet offered for sale. A trial plant, received from them last year, is doing well but has not yet fruited.

QUINCES.

Champion is rather late and does not properly mature its fruit within our season.

Rea is a somewhat more vigorous plant than the common apple or orange

quince, but the two are very much alike in fruit. So far it has with us proved to be no larger.

Hong Kong was shown at the New Orleans exposition, of enormous size, as grown at the south. The plant is moderately hardy and vigorous here, but we think has not yet fruited in our state.

A VOTE OF THANKS

was given Mr. Lyon for his excellent paper, and Mr. W. A. Brown of Benton Harbor said he was glad to see this vote of thanks, as it showed that President Lyon's great efforts are appreciated at home. New fruits is a subject not many can be well posted upon, as what sorts are best can not be really known until after trial upon different soils and under various modes of cultivation. His section had stood by the Wilson strawberry, but must bid it good-bye because of blight of the foliage. But what shall take its place? In the South they have had the same difficulty—these evils usually travel north—and they have generally substituted the Crescent. He doubted if we could do any better, and thought it would be generally adopted next year. Some have done well with the Sharpless, getting $2 to $3 per case, but not all can grow it. The Jewell seems to be a coming berry, but it will be three or four years before we can test it well. Mr. Brown further said he set three acres of the Marlboro raspberry, a year ago last spring. The plants look well, being large and vigorous; and the fruit, though poor in taste, promises to become a favorite market sort. The Turner holds its own against all comers. The Cuthbert runs out in a few years. He hoped the Wilson Jr., blackberry would prove to be distinct from the old Wilson, and thinks it will be so. Trouble occurs there this season by imperfect fertilization of some blackberries, due to a double blossom. Mr. Brown was asked as to the conditions of success with the Sharpless strawberry. He said the growing of this berry is one of the fine arts. He made a failure of it, having put the plants on low ground where the blossoms were ruined by frost. The Sharpless must have good soil and location, with mulch and culture, and be kept in hills.

Rufus Brunson, of Benton Harbor, said that in growing the Sharpless one must first look to his plants, getting them from strong, heavy soil and from plants that had proved to be most prolific bearers. They do best on new soil, sandy loam, in hills three feet by eighteen inches apart. Keep runners back until late in August, then allow a few to set in each hill, four to six inches apart. Cultivate until ripe and then put on a marsh hay mulch. He had got this season the prices named by Mr. Brown and had shipped fruit that in size looked more like peaches than strawberries.

Mr. Linderman said he would not give up the Wilson for all the blight that had so far appeared, which he thought due to the last and unpropitious season. He will stand by the Wilson and Crescent until something better appears.

Localities were called upon for designation of the sort of strawberry chiefly cultivated in each. This gave two points for the Manchester, three for Wilson, three for Crescent, and two for Wilson and Crescent together.

Thursday Evening Session.

The proceedings of Thursday evening began with a grand anthem, "Make a joyful noise unto the Lord," sung by eight voices, accompanied by about as many brass pieces from the cornet band. It was a unique combination which gave fine effect to the impressive words and music.

FRUIT STATISTICS OF THREE COUNTIES.

Senator Monroe brought before the meeting statistics of peach growing in the counties of Allegan, Van Buren and Berrien, which he had procured from the secretary of state. Although not of recent date they were the latest obtainable at that time. They show that every township in Allegan county had bearing trees and a crop in 1883; one town in Van Buren had neither and four others had trees and no fruit; and only five in Berrien had both and the crop was very slight. As matter for future reference we subjoin the tables in full:

COUNTY OF ALLEGAN.

Townships.	Acres. 1884.	Bearing trees. 1884.	Bushels. 1883.
Allegan	420	27,564	8,471
Casco	943	56,100	14,866
Cheshire	49	3,935	2,165
Clyde	253	17,745	9,240
Dorr	44	1,677	769
Fillmore	79	7,568	727
Ganges	1,660	102,579	46,917
Gun Plain	47	1,455	348
Heath	316	8,758	2,067
Hopkins	149	5,665	1,704
Laketown	455	24,502	3,811
Lee	39	1,341	188
Leighton	47	2,687	110
Manlius	741	38,425	19,761
Martin	11	989	311
Monterey	505	27,288	9,603
Otsego	20	1,226	366
Overisel	33	1,600	800
Pine Plains	104	5,093	2,039
Salem	53	3,767	1,311
Saugatuck	2,108	134,812	43,330
Trowbridge	82	4,702	1,230
Watson	152	4,342	2,304
Wayland	57	931	411
Total	8,367	484,091	172,849

COUNTY OF VAN BUREN.

Townships.	Acres, 1884.	Bearing trees, 1884.	Bushels, 1883.
Almena	29	1,787	126
Antwerp	616	51,991	828
Arlington	241	3,140	2,333
Bangor	53	3,905	1,072
Bloomingdale	10	50	80
Columbia	46	1,942	930
Covert	146	132	.....
Decatur	5	547	.....
Geneva	28	1,890	118
Hamilton	1	20	.....
Hartford	10	90	20
Keeler	2	.....	.....
Lawrence	9	575	12
Paw Paw	157	14,350	175
Pine Grove	69	1,002	386
Porter	149	9,950	.....
South Haven	605	35,077	7,395
Waverly	5	345	80
Total	2,181	126,793	13,555

COUNTY OF BERRIEN.

Townships.	Acres, 1884.	Bearing trees, 1884.	Bushels, 1883.
Bainbridge	9	400	200
Benton	13	100	.....
Berrien	.....	.....	.....
Bertrand	.....	.....	.....
Buchanan	3	200	.....
Chickaming	153	11,242	.....
Galien	3	95	.....
Hagar	33	1,120	80
Lake	3	.....	.....
Lincoln	39	510	93
New Buffalo	110	7,185	.....
Niles	.....	.....	.....
Oronoko	1	.....	.....
Pipestone	2	80	.....
Royalton	24	2,600	.....
Sodus	21	601	.....
St. Joseph	34	657	.....
Three Oaks	20	1,029	20
Watervliet	35	600	205
Weesaw	.....	.....	.....
Total	503	26,419	598

Mr. Monroe declared it a matter of necessity that we get reliable data of the number of trees and amount of fruit grown or shipped each year, and stated that the department desired the society to aid in every possible way in the perfection of such statistics. To secure this end he moved for the appointment of a committee of six members, one for each important shipping point upon the lake shore. This was agreed to and later the president announced this committee as follows: C. J. Monroe, South Haven; H. A. Brown, Benton Harbor; E. C. Reid, Allegan; Harrison Hutchins, Fennville: A. Visscher,

Holland; C. Russell, Grand Haven; H. H. Holt, Muskegon; J. G. Ramsdell, Grand Traverse.

J. G. Ramsdell, of South Haven, read the following paper upon

"HOW SHALL WE FEED THE ROOTS OF OUR FRUIT TREES AND PLANTS ?"

The chief object aimed at in this paper is not to attempt to interest the fruit growers of western Michigan in that hidden mystery of "how plants grow," or to solve the question of the chemical changes of Nature's great laboratory, but only to give my experience as to the results of several years of successful as well as unsuccessful fruit raising. I think you will all agree with me that the raising of poor or inferior fruit and forcing it on the market is the greatest drawback that has ever cursed the business, and should be classed with other abominations, such as oleomargarine, shoddy, and adulterated food.

Nearly all fruit trees and bushes whose roots are protected from excessive freezing in winter and the extreme heat in summer, and stand in a well-drained soil, will be a success, if properly cultivated and not robbed by straw crops, until they have borne two or three heavy crops of fruit. After this time it becomes almost impossible to cultivate the orchard or fruit garden so as to obtain the best results without resorting to some system of feeding the roots. To be able to do this properly, and without injury to the trees or bushes, depends very much upon the distances apart each kind of fruit has been planted. Of course there will be different opinions among fruit growers in this matter, but after long experience and observation I am satisfied with the following distances: Apples, 40 feet each way; peaches, 16x16; standard pears, cherries and plums, 20x20; grapes, 16x24; blackberries, raspberries, currants and gooseberries, 5x8. Strawberries I cannot advise about, as I only raise enough for family use.

These distances may seem too far to some, but they are not so necessary on account of the crowding of the tops of the trees or plants, as for the purpose of giving room to cultivate the ground in the right manner and not to interfere with the feeding roots. All fruit trees except standard pears and apples depend much more on the surface roots than those that go deeper into the soil; therefore the question arises, how shall we cultivate the ground thoroughly and continuously for years without injury to the roots, and at the same time put the ground in a condition to obtain the best results? Of course this implies not only the thorough tillage of the soil through the season, but the application, from time to time, of some fertilizing material. Perhaps it would be safe in this connection to state that we, the fruit growers of western Michigan, are only novices in this matter of applying special manures or fertilizers to trees and plants. How often do we see the fruit grower drawing out green manure from the barn-yard and piling it around his trees and plants? It may do some good in a few instances, but often results in actual harm. It certainly is a great waste of material that ought to be applied in a more economical way.

From general observation among fruit orchards and gardens, I am more than satisfied, that, in order to grow first-class fruit for market, we need not only fertilizers and thorough cultivation, but a system that will not involve too much labor and expense but give the fruit grower the best possible returns for the labor expended. Perhaps one of the first questions to be determined

is, what is thorough cultivation—such as will prepare the ground in the best condition for root-feeding?

We fruit growers have all been warned a thousand times not to cultivate our trees or plants late in the fall. Now, without wishing to invite discussion on this subject, whether it be injurious generally or exceptionally, I am firm in the belief that we may cultivate or plow our fruit orchards from the time the leaves begin to fall until the ground freezes, without incurring any risk of being injured or winter killed. The fruit grower who begins his cultivation in his fruit orchard in the spring, after the fruit has set, and keeps his ground clean until the last of August, should then cease cultivating until about the last days of October, when he should prepare his ground for winter and spring.

The chief object of this late cultivation is not entirely for winter protection, but to avoid the necessity of plowing and cultivating trees and small fruits so early in the spring, while in blossom or before the full leaf. But more than this, if our grounds are left from the last of August until the next May without any cultivation, it not only necessitates a great amount of labor to subdue the grass and packed soil, but can not be done without more or less injury to the roots. This brings us to the question of late fall ridging.

For several years I have practiced this system of late fall ridging with all small fruits with very satisfactory results. With a one-horse plow I turn the furrows toward the bushes, being careful to plow as shallow as possible the first one or two furrows, then go gradually deeper to the center of the space between the rows. The last two furrows should be done with two horses, as deeply as possible. Then, with one horse, turn two furrows to the center again, and in these furrows I would put the manure or fertilizers for feeding the roots for next year's crop of fruit. My rule is, as nearly as possible, to have these furrows which contain the manure or commercial fertilizer three-fourths the distance from the row to the dead-furrow. In the spring, when the ground needs to be cultivated, this fertilizer can be worked to and from the centre and being thoroughly mixed with the soil it becomes available plant food. This method of cultivation and enrichment of the soil is in direct opposition to the practice of applying fertilizers to the surface, either in the fall or spring. I am satisfied from experience that surface manuring in the ordinary way, as applied to all small fruits, except strawberries, is wrong both in theory and practice. Whatever the material may be, either compost manure or commercial fertilizer, the common practice of placing it on the surface near the bush or tree is unnatural, causing the small, fibrous roots to grow back toward the base of the tree, or receive no benefit from the fertilizer. Trees and plants feed and derive their sustenance mostly from the roots which are furtherest from them, as they are constantly reaching out in search of food. If the ridging is properly done in the fall, the tree or bush will be sufficiently protected and mulched without the aid of manure, and if the middle part of the space between rows is worked deeply in the fall, every two or three years, the increase in the crops of fruit will prove the benefits of such cultivation.

It may be asked: "How are you going to do this deep plowing in the dead-furrows and not injure the roots by breaking them off? The answer is that this plowing would only be done once in three or four years, according to the conditions of the soil, and being done late in the fall, after growth has ceased and the tree is at rest, no harm will ensue. This could not be done in safety

when the tree is in active growth, nor could large roots near the base of the tree be broken at any time without impairing the vitality of it. Root pruning is beneficial to trees and bushes to a certain degree, the same as top pruning, but it can not be done indiscriminately. We prune the roots of trees and plants for their good when we transplant them; why not prune for the same reason those that are already well established in a permanent situation?

In conclusion, one more word on the advantages of the ridging of our fruit orchards late in the fall. It is not only a protection to the roots in winter, being a perfect mulch, but serves to drain the water away from the trees and bushes, and prevents their heaving out by severe freezing. These ridges are rendered light and friable by the action of the frost, and are dry and in good condition to work much earlier in the spring than lands that have been left with a flat surface.

It has been wisely said that "The three most important things to be done to insure a perfect fruit crop are severe pruning, severe thinning, and thorough cultivation." I will only say that one more thing, of equal importance, should be added and not forgotten, and that is root feeding.

A SPIRITED DISCUSSION OF FALL PLOWING.

C. H. Wigglesworth: We make a practice of plowing up to our trees and ridging, usually in the fall, and have good success. Fall rains will puddle about a tree and unless the water is run off, the freezing will kill the tree. We have lost but few trees since we began to practice fall ridging. In September is the best time to do this work, so that the ground may settle before winter sets in. I would not wish to do it so late as after the leaves fall. The ridges fill with fibrous roots, and the deeper we plow the deeper these roots go.

Frank Linderman: I would not wish to plow after the leaves fall. I ridge up my trees in the spring, and for manure plow under green rye. I have tried some of the commercial phosphates and liked the effect, but think green rye and barn-yard manure sufficient.

A. S. Dyckman: I have never practiced late fall plowing and would dislike to do it unless there was danger from water about the trees. I would not be apprehensive of danger, on moist soil, from August or September plowing. The sowing of some crop in August or September, for green manure, is the best method of fertilizing and is important as a means of holding light soils against the severe winds. This is best, but a limited quantity of barn-yard manure each year is beneficial.

Joseph Lannin: As I understood Mr. Ramsdell, he said you could not injure trees by late fall plowing, as it will keep the water off. He is going back on the old idea that September plowing will start the growth of young, tender shoots that will likely to be lost by frost. In young trees we would certainly start growth by September plowing, especially in a warm fall, but perhaps trees may well be plowed in October when it is too late to start growth.

A. C. Merritt: I do not believe one thousand dollars could hire another grower here to plow his peach orchard as Mr. Wigglesworth intimates. We all know better. [Applause.] All the fall plowing is done in August, so that we have a full growth of manure crop or of weeds to hold the leaves and snow. I am astonished. I don't know what is meant by this new departure! [Loud applause.]

A. S. Dyckman: I never plow in fall or late summer, but do cultivate peaches in September. If on these you stop early in August your trees will be heavily strained to carry their load of fruit with no cultivation.

Mr. Wigglesworth: I must get out of this somehow. It seems from what is said that that if you plow in August you are safe, but if you do it on the first of September it is ruin! Now the disc harrow that some use in the later cultivation, stirs the ground deeper than we plow. Late varieties should be cultivated up within ten or fifteen days of ripening.

Friday Morning Session.

THE QUESTION BOX—THINNING PEACHES AND APPLES—METHODS WITH THE CURCULIO.

Friday morning the work began with the contents of the question box, and a very lively time was had of it.

1. The proper time to thin peaches and to what extent.

Clark Sheffer: From now on, and pretty thoroughly, leaving them six inches apart. Where there are three, take out the middle one. When a tree is overloaded, thin as soon as you can—early enough to relieve the tree. Sometimes is necessary to go over a tree twice. Do the work when the fruit is the size of hickory nuts or smaller. Time varies by varieties.

R. R. Cockburn: I find the preferred time varies. Some do the work when the fruit is very small, some when the pit forms, but there is general agreement that six inches apart is the right distance.

Samuel Sheffer: If peaches are thinned before the pit forms it is very much better. for the pits take much substance.

Mr. Dyckman: When I was investigating the peach business some years ago at St. Joseph and Benton Harbor, one man said, as to thinning: "I take a club and knock off all I can see and then pick off two thirds of those left." I have always practiced thorough thinning since then and it is now the general custom. As to time, the earlier the better. Several years ago the rose chafer was troublesome and then I did no thinning till through with him. Now something, perhaps a parasite, has made way with most of these pests and I thin earlier. Of those sorts that set very full, the trees have to throw off and they sometimes throw too many. Thin early and get the full season's growth is the best way.

J. G. Ramsdell: We can save much of the labor of thinning by proper pruning. Some, like Stanley's Late, will need thinning any way; but with most kinds if we cut out little limbs and leave others, the latter will need very little thinning. Leave little limbs all along large ones; but trees, as a rule, have too many little limbs. Do this work in March, whether the tree will blossom or not.

2. What is the most practicable way to thin the apple?

A. C. Merritt: Saw out the excess of limbs so as to give the others the room they need; then thin after it can be seen which are to be fine specimens,

picking off the poorest. In this way you may get large and extra fine fruit, but otherwise the amount of good fruit will be small.

A. S. Dyckman: I once started out to thin an apple tree. I timed myself for one hour and found it would take me three days to thin one tree. I gave it up as a profitless job.

Mr. Merritt: If I could prune that tree three seasons I could then thin it in half an hour. It is early enough to begin thinning apples now.

H. Dale Adams: The difficulty lies in the expense of picking over large orchards. Something, perhaps trimming, must be substituted.

Mr. Monroe asked Henry Chatfield to tell how he gets such fine apples as he has every fall, and he said: I always keep pigs in my orchard and they eat the fallen fruit. Last year I thinned some by pruning and hand picking, but not enough. I would thin Spies and some choice kinds by hand. I fertilize my apple orchard and get a crop each year.

Clark Sheffer: Last year I thinned the fruit on one of a row of Snow apples and had very fine fruit. I had heard that by thinning we can get a crop of apples each year; but that tree this year has no fruit and the others hang full. I once knew a man who thinned apples by taking a long club and knocking off fruit and twigs.

Mr. Merritt: That doubtless is a very effective way of thinning, but I would turn my back upon an orchard and never see it again before I would attack it with a club.

S. Sheffer: But I knew a man who did that very thing and got good fruit.

3. Can any other course be successfully followed for destruction of curculio than jarring the trees, and if so, what?

A. S. Dyckman: Until a few days ago I believed there was no other remedy than jarring. I thought the talk about carbolic acid to be nonsense. But I went then to the orchards of J. N. Stearns, near this town, and I must own to complete relief from my skepticism. On his peaches I could not find a single curculio mark, and only a few on one kind of plums; but the Lombards were wholly free and were loaded full of fruit.

H. G. Buck: I have tried to raise plums but always found the curculio too thick for all the jarring. Last year I sprayed my trees with London purple and got a full crop.

James Gardiner: This season I sprayed my plum trees with Paris green three times, in the evening, and have promise of an abundant crop of plums. I used a teaspoonful in a pail of water but this same solution hurt my peach trees.

CUT-WORMS ON GRAPES—RUST—CHOICE OF GRAPES—PACKAGES.

4. The cut-worm and the grape.

President Phillips: I have on a former occasion spoken of my experience in destroying the cut-worm, or preventing its ravages among the grape vines, and various reasons for freedom from damage were advanced, besides my own; but I know what the fact is, and whatever theory may be advanced is immaterial. If in June or July you sow your vineyard to buckwheat and plow it under when in full bloom, I will guarantee that not a bud will be hurt the next season. I learned of this through the remarks of a French delegate to one of our national pomological meetings. He said there was some principle in the buckwheat flower fatal to the life of all larvæ. This will protect equally well both old and young vineyards.

5. Is salt a cure for rust in blackberries and raspberries, or only a preventive? and when should it be applied?

One had cured rust and killed the bushes too. Mr. Farnum of Benton Harbor had the same experience. Mr. Seaver pulled up the sprouts that first showed rust, and that ended it. Clark Sheffer did the same. J. G. Ramsdell last year took 16 out of 500 Kittatinny plants and burned them. This year 28 new rusty spots appeared, with prospects of still more.

6. Will peach trees do well in places where others have died of yellows?

It was said that upon Geo. W. Griffin's farm resetting had been successfully practiced, muck having been mixed into the pit for the new tree. Joseph Lannin had succeeded in the same way.

7. Is the Ives an early black grape?

All but Mr. Cockburn of Muskegon said it was, with season the same as Worden; but he would have it with the Hartford, just before the Concord.

8. What style and size of package?

A voice: Full pecks for peaches and full quarts for berries. Mr. Seaver: But no one is using either at present. Mr. Cockburn: It costs $1 per bushel to send in fifth baskets, while 33 cents may be saved by use of the bushel basket. So he advocated its use in part. Mr. Barron: The bushel basket actually costs the grower nothing, as it is worth more in the west than here, and fruit sent in it always sells first.

9. Which are the best early red, white and black grapes?

Mr. Palmer: Brighton, Lady and Worden. Mr. Adams: Brighton for red, Worden for black. Mr. Phillips: Brighton, Niagara, Worden. Mr. Cockburn, Brighton, Niagara and Concord.

The following resolution was introduced and adopted:

Resolved, That we, the fruit growers of western Michigan, are in favor of using a full barrel and bushel, a full peck and quart measure when sending fruit to market.

Following this were the reports of committees on fruit exhibit and resolutions; Grand Haven was chosen as the next place of meeting; President Phillips spoke his thanks to the members for their courtesy and aid, and the meeting adjourned.

THIRD ANNUAL MEETING, AT GRAND HAVEN.

The third annual meeting was held at Grand Haven, Dec. 14-16, 1886. Many prominent fruit growers and delegates were present from the counties of Berrien, Van Buren, Allegan, Ottawa, Kent, and Muskegon. Grand Haven is the home of President Phillips and several members of the society. On this account the citizens of the city manifested much interest in the success of the meeting. This was evident from the hospitable manner in which the delegates were received and provided for during their stay.

The first session was held Tuesday evening, in the Congregational church. Messrs. George Hancock & Son, proprietors of an extensive greenhouse of that city, had presented the committee of arrangements two exceedingly fine bouquets and a handsome collection of flowering plants and vines, which were artistically arranged and placed in front of the president's stand. The convention opened with prayer by Dr. Knapp, followed by a song of welcome by the choir. The singing was grand, seldom equaled by others than professionals. Following this the Hon. G. W. McBride gave the address of welcome, and the Hon. H. H. Holt made fitting response. After another song by the choir, President Phillips delivered his annual address.

To the Members of the West Michigan Fruit Growers' Society:

It is now two years and six months since representative fruit growers in their several localities in the western part of this state assembled in the court house in this city, and organized themselves into a society for the purpose of developing fruit culture to the highest standard attainable; also to attain to better and more profitable methods of picking, packing, and marketing fruits; and last, but not least, for educating the public mind to a higher appreciation of the beauties of nature represented by fruits and flowers. And in looking back over the short time since the organization of this society, and noting the success that has followed its efforts, we trust that every member at this time in its history will be greatly encouraged to renew their efforts to help this organization to attain to the most complete methods of advancing the interests for which it was organized.

During the past year three meetings of this society have been held, with abundant success. The annual meeting one year ago was held at Allegan, attendance fair, interest good. Some interesting and valuable papers were read at this meeting. The meeting at Holland, in March, was a good one. Large numbers of prominent fruit growers were in attendance, and the interest in the meeting was good at the opening and increased to the very close. The summer meeting at South Haven was a great success, and was probably one of the best meetings of the kind ever held in the state. The leading fruit growers of western Michigan were out in large numbers, and discussed

the different topics before the meeting with much interest. Gov. Alger was present and made an able address, after which the convention adjourned and gave a hearty reception to Gov. and Mrs. Alger. This meeting closed with deep interest, and will long be remembered by those present.

And now, nearly at the close of the present year, we meet in council at this, our annual meeting, to sum up the results of our year's work and also to discuss topics calculated to educate us to a higher standard of fruit culture.

As regards the quantity of fruit raised within the territory of this Society during the past year, we have no reason to complain. Small fruits have yielded abundandantly. The crop of apples, peaches, pears, and grapes, has been very great. Thousands of barrels of apples and millions of baskets of the smaller fruits have been shipped to Chicago, Milwaukee, and to many of the leading cities of the great northwest, thereby strengthening the position already assumed by western Michigan, viz: The producing and marketing emporium of native fruits in northern America. As regards the prices received, they have been only fair—not so good a return for labor and capital invested as in some former years; not as much as, in my opinion, would be received under a more complete distribution of fruits over the territory looking to us for their supplies. When we look upon fruit growing from a commercial standpoint, I do consider, in order to make it a success, that one of the most important problems that we must solve in the near future is, how to distribute our fruit products more perfectly—how to reach more markets. This involves the questions of handling and marketing, as well as a complete system of distribution. In this year of great abundance of fruit, especially in western Michigan, there has not been so much grown but that, if it had been properly distributed in the markets of the great west, prices would have been realized that would give the producer fair profits. But our system of distribution is so defective that it leaves one-half of the families in the states lying west of us, where fruit is not grown to any gret extent, without any fruit at all. When the time arrives that apples, pears, peaches, grapes, and all the small fruits, find their way into every farm house and laborer's cottage all over the great west, and to each miner's cabin among the mountains, to all the new homes being built on the wide plains, then, and not till then, will we receive the highest prices obtainable for our surplus fruits. In view of this, let us at this meeting awake to the great interests involved in this matter. With this end in view, I would recommend that this Society take action at this meeting relative to developing a plan or system whereby our fruits going into market may be more evenly distributed all over the large territory looking to us for its fruit supplies.

And now, after summing up the results of the past year to some extent, and also having called your attention to the points already referred to, for a few moments let us consider the importance of the social and educational advantages of our Society. We need these regular meetings for mutual encouragement. It is well to have this interchange of practical experiences, and thus be enabled to instruct and encourage each other. It is also good for us to have this social inspiring communion of thought, that we may learn new ways and means that will enable us to rise higher and higher, to a more complete standard of fruit culture; and also, as we come together from time to time, or in everyday practical life, let our intercourse be of that high, genial character that our hearts may be drawn nearer together and that we may feel day by day a marked sympathy for each other in the struggles of a practical life.

And now, last but not least, let us consider briefly the educational advantages of this society, and the profession which we follow. It is not necessary to ask: What is pomology? What is floriculture and horticulture? What are their influences, their tendencies, and their teachings? I shall not refer to their commercial advantages, though they are of great importance. But will remark, in an educational point of view, they affect the innermost character of a people. Their whole tendency is of a conservative and refining character, which attaches a people to the land in which they dwell. They not only adorn, but they build up and establish the country. Their special mission is to beautify, ornament, and make attractive, country life. They take hold of the social, the intellectual elements of society, and nourish them, while they give rest and peace to the head and heart. They attract from the city to the country, the very best elements of the city. And it has been found that the influences of trees and flowers, and of fountains and parks, are purifying and restraining, and the bringing of fruits and flowers to the city table at all seasons of the year, is combining the advantages of city and country life, and throwing these advantages open and into the hands of the rich and poor. I have no admiration for a pomologist who has no higher thought of his occupation than that of work. I have no admiration for the son of a farmer who leaves the farm to become a sort of city gentleman. As a sovereign, he is, in his occupation, head and shoulders above all others. It is his part to create. All other occupations are the results which his necessities have created. The advance of railroads from the most distant points of civilization to the seaboard, and the ships which whiten the seas, are the results of this class of men who demand a rapid and safe transportation for the products which Nature's lavish hand has thrown into their possession.

The profession which we follow and which we represent here this evening, not only educates us to a higher life, but it also teaches us to love the beautiful in Nature. The robe of the earth above is spangled and sparkles with beauty; the earth clothes herself annually with natural flowers. How beautiful the garment Nature's hand has thrown over and around the world. Even the infant child pays homage to Nature, in its admiration of the beauty and fragrance of flowers. Flowers are the alphabet of angels, and if we will cultivate them and cherish them they will write on our hearts the language of heaven. In fact, the influence that flowers have in making our homes happy and beautiful, can hardly be estimated. Flowers form one of the most important factors of civilization. Then let us cultivate flowers. We are glad to note their beautifying presence here with us this evening. They particularly speak to us in loving tones to be cheerful and happy. And while we contemplate them as one of nature's choicest gifts, we are led to higher thoughts and purposes in life. When we look at the majestic sunflower we are taught a lesson of constancy and devotion to the teachings of Him who made this earth in all its beauty. For it is an emblem of constancy and devotion to its god, the sun. Moore has given us the following beautiful language:

> "The heart that has truly loved never forgets,
> But as truly loves on to the close
> As the sunflower turns on her god when he sets
> The same look that she turned when he rose."

To all whom I address this morning, and to every person seeking the higher forms of pleasure, floriculture holds out the most enticing rewards.

Are you a lover of beauty? Have you an eye which delights in colors?

Look upon those flowers! No human artist ever mixed such colors; no brush has ever equaled that delicate blending; no canvas has ever revealed such effect of light and shade. Are you a lover of nature? Seek her then, in that department where she displays her rarest beauties—amid gay flowers and clambering vines and graceful plants.

And now gentlemen of our society, in conclusion let me say we have much reason to be encouraged, in view of our efforts being largely crowned with success during the short time we have existed as an organization. Let us remember what a large field of research and promise is open before us. Not only are we to furnish the luscious fruit of earth for future generations, but also, by the calling and profession which we represent, we seek to raise man to the highest grade of Christian civilization. Truly a noble work—a grand mission!

Let us then be active in fulfilling it, and let us be encouraged by the thought that long after we have passed away from earth, the results of our labors, like the dews of heaven which continue to refresh the earth, shall be gratefully remembered by the many thousands that shall rise up all over this beautiful land and call us benefactors of our race. Work on, then, my brothers, work on. Let us persevere to the end. And as surely as the sun shall shine and the rain descend so surely shall your labors be crowned with a noble success. Let us be true to the profession in which we are engaged. Let us remember, "United we stand—divided we fall." Let us, then, be firmly united by the common bonds of friendship; united by the common memories of the past; united by the common interests of the present; united by the common hopes of the future—a friendship that will burn on the altar of our hearts, bright and pure—a friendship that will stand the test of time—a friendship that will finally unite us together in that beautiful world where Nature stands revealed in all her glory.

Joseph Lannin of South Haven then moved that a special committee be appointed to report upon the president's address, to report at this meeting, which was carried.

A rising vote of thanks was tendered the chair. Major Safford made a neat and appropriate respone.

Wednesday Morning Session.

After prayer by the Rev. Mr. Gibbs, the standing committees were appointed, new officers elected, and some official reports made. A brief discussion of packages ensued, all speakers contending for uniformity and full measure, at the close of which Mr. J. Lannin pertinently remarked that resolutions of this sort usually fall to the ground when the meeting adjourns, each member going away firm in the belief that his own judgment in th matter is sufficient.

PROSPECTS OF COMMERCIAL FRUIT GROWING.

BY W. A. SMITH OF BENTON HARBOR.

Our close proximity to this large body of open water, our high altitude, and generally warm and well drained soil, have in times past established the reputa-

tion of western Michigan as one of the best and safest locations in the lake region for horticultural purposes, and our people have not been slow in utilizing a large portion of the country for that purpose. While a country is comparatively new, farmers seldom fail in growing good and remunerative crops with a minimum amount of labor; but when the soil in the course of time, by long continued cropping, becomes exhausted of its humus, phosphoric acids, potash, and other essential plant food, the farmer find his crops more uncertain and his yield much smaller. The fertility of his depleted soil can, however, soon be restored by a judicious rotation of crops, a liberal application of clover ("the poor man's friend"), and a generous use of barn-yard and commercial fertilizers. This is a matter entirely under his own control. But in common with the fruit grower he suffers from the lavish and often unreasonable destruction of our forests, rendering our winters colder, our summers hotter. and more subject to long and severe drouths.

Those of us who live close to the lake shore and are in proximity to lake harbors flatter ourselves that our advantages are highly valuable and permanent; that water transportation is easier and cheaper than freighting by rail, and that our products, especially tender and perishable fruits, are more safely carried to market in this way. Twenty years ago this was true. Then the cultivation of small fruit in the west was quite limited, and the demand was small, partly because the supply was meager; yet as a rule the products of the orchard and garden yielded the producer larger profits than now.

Various causes are assigned for the depressed condition of the market. Some say it is over-production; some say it is under-consumption, owing to the labor strikes, while other maintain that it is due to the large amount of poor or worthless fruit thrown upon the market and put into competition with the better class of fruit. All these conditions and causes doubtless have a tendency to depress the general markets of the country, and in no department of commerce will this depressing tendency manifest itself more readily than in the market for perishable fruit.

But will, or can, the knowledge of these facts change the order of things in this direction? The plea of over-production may not be good. If so there is certainly a want of proper distribution. Too much is consigned to some markets and not enough to others. Time and perseverance will in measure remedy this defect. Every one cannot grow first-class fruit. If all could, and would, there would be no inferior, or second-class fruit on the market, consequently no standard of comparison, and much of the better class would necessarily have to be sold at the same rate that the poorer quality is now sold for. A large portion of mankind never or seldon buy any thing but cheap products. Debar them of this privilege, particularly in the fruit trade, and you virtually close the market against them, as they can hardly afford to pay for the better class of goods. This condition would soon bring about an over-production of any kind of fruit. Every sudden and radical change in the relation of man to man, such as the frequent and ruinous conflicts of late between capital and labor, known as labor strikes, must of necessity reduce consumption and thus depress the general markets of the world.

Twenty years ago the cultivation of small fruits was confined to a few favored localities, having ready access to our large towns and cities. Now the multiplicity of railroads has changed the entire order of things. Now nearly every farm and hamlet can contribute daily to the wants of the city. The competition in every department of industry has become close and fierce.

In this connection no class of persons suffer more than the fruit grower. His products are perishable and must mainly be sold on arrival. No trifling with time and waiting for a more congenial season can be allowed. While we on the lake shore, in some localities at least, have easy access both by land and water to the great markets of the west, we are yet greatly lacking in system and organized effort in the small economies of our business. In seasons of great depression, like the past, the package, transportation, cartage, and commission eat up so much of the proceeds that but little remains for the grower. This fault, in some respects at least, lies at our own door.

Our packages for small fruits, as a rule, are too small. Many of our grape-growers the past season shipped the bulk of their grapes in eight-lb. baskets, thus paying the transportation company, from our port, 60 cents per one hundred pounds for carry freight 55 miles, or more than one cent per mile. While we were paying these rates for water transportation across the lake, the grape-growers in western New York, along the Hudson river, and other eastern points, were shipping their grapes to the same markets, in packages costing considerable less than ours, and shipping in car lots, six or ten times the distance, for about one-half the rates we paid. While our Concords (and they never were better) were selling for 3 and 3½ cents per pound gross, through the season, those eastern growers claim their Concords netted them 3 cents per pound. By the use of these small packages, paying freight as we do, by the package, it is a question whether we are not working for the interest of others more than ourselves. The same objection applies to the shipment of other fruit as well as to grapes. Peaches have been shipped from Delaware to Chicago for years in half-bushel baskets, without netting or other covering, at a cost of 35c per basket, the basket costing probably 8c, cartage 1c, making a total of 44 cents per half-bushel. From our port the freight on a fifth-bushel is 5c—on 5 baskets, 25c; five baskets and netting, 25c; cartage, 5c making a total of 55c per bushel. Our berry-boxes, too, are all "snide," and our apple-barrels are cut down to 2¾ bushels. All these things in connection with our loose, irregular, and often dishonest manner of putting up fruit for market, have had a ruinous and depressing effect upon the entire business.

There is no profit in growing apples, gathering them, and hauling them from two to ten miles to a cider mill and selling them for ten cents per bushel. Better by far root out the varieties that have no market value or home use and give to the remainder better care, more cultivation, and restore back to the soil the elements of plant food which, by long practice of cropping and depletion, it has lost. As a rule orchards have far too many varieties. For market purposes winter apples of good keeping qualities pay the best.

The codlin moth has been the terror of the orchardist. Some years, in many localities, it well-nigh destroys the commercial value of the crop. But now it is safe to say we have a remedy, if properly applied, a cheap, expeditious, and sure remedy. The spraying of our trees, say twice, once as soon as the fruit is set and the trees out of bloom, and again two or three weeks later, with a solution of one pound of London purple to 100 gallons of water, applied in the form of fine spray, thrown over the tree instead of being forced up among the branches, is a sure relief from this destroyer. In the early season the blossom end of the fruit is up, and here is where the poison must be applied. The poison should be prepared in the form of paste and then

mixed with the water and the whole kept in constant motion during the process of spraying.

Another branch of our business, which in many localities in western Michigan has for some time been virtually abandoned, owing to the prevalence of yellows and cold winters, is peach-growing. One flower will not make a summer, but one good crop of peaches will produce a wonderful stimulus to the future production of this most luscious and healthful of all our fruits. Give us good peaches on this lake shore and we can compete successfully with the whole country in our western markets. But to be successful in this branch of horticulture we must needs be vigilant, industrious, and persevering. The soil we can prepare, the yellows we may check or finally remove, but the climate is beyond our control. In this branch we hold the key to success in our locality, and when we fail from climatic causes the great west and northwest will have to depend almost if not entirely upon the far-away Atlantic coast and the south for their supply.

The past season has been a most favorable one for the luscious grape. A warm, dry, long season gives us good ripe grapes. While in some localities the crop has been affected to some extent by rot, we are as yet comparatively free from this scourge. The fruit was good, the crop large, but the margin small.

The pear orchards in our locality (Berrien county) have of late years been almost entirely free from blight. Our crops average fair to good, and we found a ready sale at paying rates for all good fruit sent to market. I think the production of this fruit is out of all proportion to its excellent properties and its market value; and for home use while it lasts no other fruit can take its place.

VIEWS OF OTHERS.

This paper was followed by considerable discussion upon the several points touched upon in the essay.

Mr. Corner said nature had stored up large amounts of food for plants and fruit trees in the soil, sufficient probably to produce the needed supplies for ordinary uses of the inhabitants; but when orchards covered the larger part of the ground in any district, and immense crops of fruit were shipped from them, year after year, for a long term of years, in time the necessary elements in the soil must be exhausted unless restored by the use of proper fertilizers in large quantities.

Frank Linderman said he had used fertilizers freely and found bone-dust, ashes, and barn-yard manure of great value. He believed in a liberal use of fertilizers.

W. A. Smith said that while his vineyard was young, for the first few years, he received good crops from it, but it failed to produce satisfactory crops afterward for some years. He then used ashes at the rate of four tons to the acre. This had been followed by good crops of grapes. President Phillips said that he had used ashes freely in his vineyard, with good results; had faith in the use of ashes in the vineyard. H. H. Hayes had used ashes and bone-dust freely. The grape is improved in color and flavor thereby.

Wednesday Afternoon Session.

The first hour was occupied in discussing transportation and fruit packages, after which Joseph Lannin of South Haven presented the following paper on

PEARS FOR PROFIT.

Osband's Summer—Is very productive, ripens early in August; fruit as large or larger than the Buffum, and much superior in quality. The stalk is short and strong, fruit showy, being of a pretty glowing color on the side next the sun. It sells well. Originated in Wayne county, New York.

Madeleine—Is an excellent early pear; ripens about the time of Osband's Summer, but like all early pears is inclined to rot. It is considerably larger than Osband's Summer, but will not keep quite so long. This fine pear is of French nationality; was cultivated long ago by Carmelite monks. The tree is hardy and very productive, fruit salable.

Clapp's Favorite—This is a large valuable pear, originated by William Clapp of Massachusetts, from seed. The tree is vigorous and sufficiently hardy to stand our Michigan winters. When planted on good ground and well cared for it will repay with interest the labors of the orchardist. I gathered from eight trees, fifteen years old, 192 peck baskets, this last season. This fruit should be gathered at least eight days before ripening, or it will begin to rot at the core and lose its flavor. When well grown and properly ripened this is one of our most beautiful pears.

Bartlett—Is perhaps the finest pear grown, take it all in all. We are informed by Mr. Downing that "this noble pear" originated about the year 1770, in England; was brought to this country and disseminated by a Mr. Bartlett from whom it took its name. As everybody knows the Bartlett, its great qualities, and the universal demand for it in the market, it is not necessary for me to speak of it further.

Flemish Beauty—This is of Belgian origin, as its name imports. The tree bears early fruit, large, juicy, sweet, if on good ground and well cultivated; but if neglected the fruit will hardly grow to medium size and will crack and be of little value for home use or market. When planted on strong clay ground the fruit assumes a brown color, but if planted on a rich loam it is a beautiful light yellow. When well grown this is one of our most delicious pears. It ripens about the middle of September.

Buffum—This pear is, according to Mr. Downing, "a native of Rhode Island." Its form is a good deal like the White Doyenne. The tree is an upright, vigorous grower, but seldom comes into bearing until ten or twelve years after being planted. This is far from being a dessert fruit, but is excellent for canning and preserving. When the tree becomes fifteen years old or more, it bears immensely and the fruit sells fairly well in the Chicago market. One year ago I gathered nine bushels from one tree seventeen years old, and the fruit netted me $9.90.

Hardy—This pear ripens directly after the Buffum. The skin is of a greenish color, russety and sprinkled with brown dots. The tree is a strong grower and very productive. In an orchard of 500 trees I would plant twenty-five of this variety. The fruit is above the medium size and is highly perfumed.

Stevens' Genesee—This is one of the most showy of our native pears. The fruit is large, of a yellow color, flesh white, aroma rich, juicy. It ripens in Michigan about the 15th of September. It is very tender as a fruit and will not keep, unless carefully handled, for more than two or three weeks.

Bosc—This is, in my opinion, superior in flavor to every pear grown in this country, unless it may be the Seckel, and while it approaches the Seckel closely in flavor it has the advantage of being nearly three times larger. This splendid pear was raised in Belgium, in 1807, and named in honor of M. Bosc, superintendent of the Jardine des Plants, Paris. The fruit is small at the stem but increases in size toward the calyx end. Nurserymen complain because of the difficulty they experience in propagating the trees, and for this reason the nursery stock is dear. When transplanted from the nursery it is difficult to raise the trees, there being no fibrous roots, but only two or three stout prongs. When ripe the fruit is of a beautiful golden yellow. In an orchard of 500 trees I would plant 50 or 75 Bosc. It ripens about the 15th of October.

Clairgeau—This large, showy pear was raised near the city of Nantes in the west of France. The tree bears young, is remarkably productive; so much so that it is found necessary to thin at least three-fourths of all that desire to grow. The fruit can hardly be classed as second rate; but because of its large size and fine appearance it always commands a good price in the markets where appearance takes the lead.

Anjou—This noble pear is also of French origin. Fruit is large, of greenish color, russet dots, of a light crimson color next the sun. The flesh is white; not so fine in flavor as the Bosc. It is, however, of a fine, melting, delicious flavor, and highly perfumed; ripens early in November and sells well.

Boussock—This pear is of Belgian origin. The tree is one of the most vigorous of all our pear trees, and very easy to propagate. The fruit is above the medium size, of good appearance and always commands a good price. Flesh white, fine in grain, juicy; first in second class; ripens Oct. 1 to 15.

Sheldon—This splendid pear originated from an accidental seedling on the farm of a Mr. Sheldon, in the town of Huron, Wayne county, N. Y. The tree grows erect, vigorous, hardy, and is a good, regular bearer after it arrives at the age of eight or ten years. The fruit grows very slowly until the middle of September, when it begins to enlarge, and becomes of fair size. If well cultivated on rich ground the Sheldon will grow to nearly the size of a Baldwin apple. Mr. W. A. Brown and myself had plates of this variety of pear at our fairs, last fall, as large as Roxbury or Golden Russet apples. When growing it is of a green russet, but when ripe it is a beautiful golden hue. In flavor it will nearly compare with the Bosc. I had from one tree last season 32 peck baskets. It ripens about the 20th of October to the first of November.

Howell—Originated at New Haven, Connecticut. The tree is an upright, fair grower and on arriving at maturity will, with fair play, bear a good crop every year. The fruit is large, roundish, a little small at the stem, but broad at the calyx end. When growing and until it begins to ripen, the fruit is of a greenish color. When ripe it often has a finely colored cheek, sprinkled with small russet dots. The flesh is white, of fair quality; sells

for a good price. Ripens in the last week of October, but will keep in a cool, dry place until September.

Seckel—There are two varieties of this delicious little pear. The brown, or original Seckel, originated on the farm of a Mr. Seckel who lived a short distance from Philadelphia. This pear is said to be distinct from all other varieties, and is not equalled by any variety in this country or Europe. The tree is hardy, but not quite so vigorous in its growth as some other varieties. The fruit is small, regularly formed, of a brownish color, somewhat russety toward the stem; flesh white, rich, juicy, melting. Ripens Sept. 20–Oct. 10. Foote's Seckel was raised by a Mr. Foote of Massachusetts from the seed of the Seckel. This variety is from two to three weeks later than its parent, is one-half larger, and nearly if not quite as good in quality. The tree is more spreading and vigorous than the Seckel. Every fruit-grower should plant some of these desirable varieties of pear in his orchard, as there can be no danger of overstocking the market with the Seckel pear.

Louise Bonne—This is a French pear. It grows equally well as a standard or on quince stock. The tree is a strong grower and very productive, fruit of medium size and good quality, flesh white, sweet, and slightly perfumed. Ripens in October.

Duchess—A pear imported from France. It is grown to greatest perfection when grafted on quince stock. Indeed, when grown as a standard the fruit is so insipid as to be wholly unfit for use, but when well grown is perhaps the largest of all our pears. The flesh is white, juicy, of fine flavor, and were it not for the little hard substances scattered through the flesh, it would be one of our finest pears for dessert. Because of its large size and showy appearance it always brings a good price in the market. If not allowed to overbear the tree will produce a good crop every year. Ripens first of October to 25th.

Onondaga (known as Swan's Orange)—Originated in Connecticut. The tree is vigorous and very productive. This variety proves to be profitable for market. The fruit is large, skin a little coarse and uneven, quality excellent; ripens last of September.

Lawrence—Is a native of Long Island. The tree very hardy, an early bearer. Fruit medium in size, flesh white, good to very good; ripens in December, and will hold good until March.

White Doyenne—Is recognized as one of the best varieties of autumn pear. It is known as Butter pear in Philadelphia, as Virgalieu in New York, and as St. Michael's in Boston. It is a French pear and has been known to fruit growers for over 200 years. The fruit is a little above the medium size, of a pale yellow, sprinkled with small dots. This fruit ripens in the latter part of September, but if picked before fully ripe will keep a couple of months. This pear is of very rich flavor.

In this paper I mention 17 or 18 varieties of pear, but were I about to plant in orchard I would reduce this nearly two-thirds, because several of the varieties referred to ripen at the same time.

FERTILIZING PEAR TREES.

Some discussion followed upon Mr. Lannin's paper upon pear culture. J. G. Ramsdell said that some varieties of pear were more profitable on quince than as standards. He cited an instance where Mr. Yomans of Walworth,

Monroe county, N. Y., had grown large quantities of the Duchess pear as dwarfs and had succeeded perhaps better than any other man in the United States. Mr. Yomans had used large amounts of ashes, bone-dust, and barn-yard manure, with other fertilizers. He probably used more fertilizing material than any other grower in that state, and had received larger returns than any man within his knowledge. Yomans practiced cutting back his pear trees annually, leaving only three or four buds of the previous year's growth. The pears were all first-class fruit and sold in the New York market for almost fabulous prices.

Wednesday Evening Session.

The Secretary read a paper by Mrs. G. H. La Fleur, of Allegan, on

THE DUTY OF HORTICULTURISTS IN THE ORNAMENTATION OF PARKS AND PUBLIC SCHOOL GROUNDS.

The history of mankind may be divided into periods or cycles of time, each producing types peculiar to themselves, differing somewhat from any that preceded them. Each has left traces of its character, in relics or letters. They have stamped their impress, one by one, upon the pages of the book which chronicled the events connected with their coming and going, their advances and retreats, their victories and defeats, during the ages in which mind has struggled for the mastery over matter. The footprints of these departed men, on the road over which they have traveled, have been, in the main, toward the light which was thrown upon them from a source of wisdom superior to their own, warming and causing to germinate and grow the seeds of knowledge, which is one of the distinguishing characteristics between man and the lower animals.

The temples, mosques, cathedrals, and monasteries of the past, convey to the mind something of the character of those who reared them. Churches, schools, and colleges are only the outgrowth of the people who constructed and maintain them, and they will remain to testify of the thoughts, sentiments, and incentives, which governed those who pass by in a given period of time upon the calendar of ages. These inanimate things did not make men what they were, but are the results of their condition at the time of their existence—only the external expression of the unseen man.

It follows, then, that the people of any age may be ambitious to leave behind them work that will mark the highest degree of moral and intellectual growth to which they can attain. The occupations in which men engage have much to do in forming their habits and directing their thoughts. In looking back over the history of nations we find that where agriculture has engaged the attention of the masses, and its interests have been protected, the people were prosperous and contented, and developed the best traits belonging to man. By their labor forests have been cleared, roads made, communities formed, and homes builded up. A pastoral people are a permanent people. They become attached to their surroundings, and with this sentiment comes the desire to improve and beautify the homes where they expect to live and educate their children. They live nearer to and see more of nature than the

inhabitants of cities, consequently are more inclined to observe and obey her laws. In their midst schoolhouses and churches are reared, not for pride or display, but because these things are the outward expression of the innate principles of an agricultural people.

Such were the pioneers of this state, and they have left evidence of their lives and works to remind us of the debt of gratitude we owe them for having laid the foundation for this grand and beautiful state which is year by year becoming an ideal land. Following closely the agriculturist comes the horticulturist. Fruit, trees, vines, and berries are planted, and this is the second stage entered upon toward making Michigan one of the most desirable of lands for the homes of men and women of culture. The numerous orchards which have been planted and improved, the vineyards so frequently found, trained with care, are so many evidences of their love for Pomona's gifts. Combined with the more substantial productions of agriculture the cultivation of fruit leads us to a love for the beautiful—nay, compels us to admire flowers and plants, and this results in the ornamentation of our homes and grounds. One good work begets another, until we find the best elements in a rural people drawn toward each other by similar tastes and sympathies, and this fraternal feeling has resulted in the organization of horticultural and pomological societies, a step which has been fruitful of much good, enabling members to co-operate and undertake still greater improvements. The great work accomplished in the past, by those who have labored to improve the home comforts and surroundings of the people of their time, is and ever will be, recognized as worthy of the gratitude and remembrance of us all.

How greatly the beauty of any country is enhanced by the planting of trees along the highways, and how gratifying the shade to the weary traveler. If every freeholder would plant along the public thoroughfare, as far as his lands extend, ornamental, forest, or fruit trees, it would enhance the value of his possessions and confer a boon upon the traveling public. I would particularly recommend the fruit trees in such places for the use of the public. It is done in some countries—why not here? How refreshing to the thirsty and weary traveler is a handful of cherries or a nice apple. In cases where landowners are not able to purchase, horticultural societies might unite and donate the needed trees and thus leave beautiful and useful waymarks to awaken the gratitude of future generations.

Almost every county has a fair ground near some city's limits. These grounds are usually places of public resort, and where towns have no other public park the fair ground might be owned jointly by the municipality and the agricultural society, and converted into a public park, through which walks and driveways should be made with regard to convenience and the beauty of the landscape. These, with the trotting course, would furnish pleasant drives for the citizens as well as strangers, upon whom a favorable impression would be made—they would remember such towns as desirable places of residence, where they would be sure to find cultivated society for themselves and families.

A public park in any town adds greatly to its beauty, and is always sought, for enjoyment, by both old and young. If we educate ourselves and others to love and admire beautiful places, the result will be to turn the attention of the masses to this important factor which does so much to endear us to our homes and the country in which we dwell.

When any great change is desired for the better, we should bring an influ-

ence to bear upon those who are most susceptible to impressions. Thus, naturally, we turn to the young and endeavor to instil into their minds the importance of the desired result. If this is thoroughly done the seed is sown which in time will materialize and produce that which was impressed upon them as an idea. Where, then, can we better begin this work than at the district school ground? In place of the schoolhouse standing almost in the road, on a plat of about one-fourth of an acre, and the highway for a play-ground, let us have ample grounds surrounding the schoolhouse, planted with trees, vines, and flowers. Among these let the children take their first lessons in botany. The impressions received—the lessons learned amid such surroundings—will not be lost. In after life memory will revert to the pleasant places where so many happy days were spent. The love of the beautiful, and an appreciation of the fitness of things will grow with their growth and strengthen as they mature into man and womanhood. They will not be content with having things no better than their fathers', but will ever be reaching out after a higher type of life and will rise to and live upon a higher plane of existence. The current which is bearing the race to a higher destiny will run a little broader through their lives.

Have we, then, no duty to the children? If horticultural and pomological societies had no other work before them than the ornamentation of school grounds, would not this alone be worthy of the time and money spent? There is need of improvement in this connection, and the people are looking to you to lead because the work is in sympathy with your tastes, thoughts, and occupations.

Another important work for horticulturists would be the fitting up and making beautiful the resting place of the dead, because it is the place where we lay away our loved ones, and also where we expect to be laid. How fondly memory reverts to some gentle slope, where the sunshine lingers lovingly and warms into life and beauty the fragrant blossoms planted by loving hands over the grave of the departed. How much more satisfying to the sensitive mind, than costly monument of sculptured stone, are the few fragrant flowers, tended carefully, and the tear of sorrow on the blue and white vincas which creep tenderly over the mound beneath which the dear ones are laid.

We have in our great land, thanks to the wisdom and skill of our horticulturists and artists, many beautiful cemeteries, but we want more. Every village and hamlet should have its "City of the Dead" made lovely by united effort, with trees, vines, and flowers. All honor to our horticulturists whose lives have been spent so closely to nature's heart that they learned her secrets and from her have drawn their inspiration. How different is the sensation produced on the mind, as we think of our departed laid away amid such surroundings, than thought of cremation. Only a few dry ashes! To the sensitive, how shocking! In densely populated countries (as a sanitary measure) it is doubtless best, but in our own broad and beautiful land no such sacrifice is needed. Let us think of the remains of those who have left us as resting amid nature's loveliest productions. Let us plant our burial-places with that which is most beautiful and appropriate, that they may become places where we shall wish to go with tributes to the memory of those who are gone.

Thursday Morning Session.

Thursday morning's session was spent in discussing several topics which had been provided for this session, and some from the question-box.

In answer to the second question, "How shall we prune peach trees to prevent the accumulation of so many dead limbs each year?" Wm. Corner said he had made this question a study for several years; had tried several experiments; had found that most varieties of the peach need thinning. This involved a large amount of labor and expense. A much better plan is to thin the tops of peach trees by cutting out a part of the limbs, leaving the tops open. The peaches would need much less thinning by hand and the fruit would be improved by the influence of the sun. Peaches could be grown in this manner at less expense, be more uniform in size and color, with less strain upon the tree. Most peach growers allow their trees to carry altogether too much foliage for the good of the tree and fruit. By following the method he had named, that is, thinning mostly by pruning, and then furnishing plenty of fertilizing material for the tree, as food from which it could draw to produce the large annual crops which are almost sure to follow this treatment, one may be quite certain of good fruit and good profits.

Mr. Ramsdell said that he had learned by practice and observation that growers who feed their trees liberally receive in return the largest crops of peaches. Severe thinning, and plenty of fertilizer, produced the finest peaches, and those orchards withstood the low temperature of our cold winters and were more free from borers and disease. He believed in the theory advanced by Mr. Corner of thinning the peach by proper pruning.

The discussion was followed by the report of the treasurer for the year.

The several committees appointed made reports, after which the customary resolutions were passed.

An invitation was received from the Saugatuck and Ganges Pomological society to hold the June meeting at Douglas. The invitation was accepted and the time set for the meeting the second Tuesday in June next.

MEETING AT DOUGLAS, JUNE, 1887.

Tuesday Evening Session.

The meetings of the society were held in the public school building, except in the evening, when the pleasant auditorium of the Congregational church was used. The local attendance was large at all times, having never been exceeded, with perhaps one exception, in the society's history.

The session Tuesday evening, called to order by President Phillips, was begun with a duet, "Fly Away Birdling," by Misses Mary Andrus and Hattie Spencer, with Miss Belle Spencer as organist. Their voices were highly pleasing and their execution of a quality doing them great credit.

The Rev. E. Andrus made fervent and appropriate prayer.

ADDRESS OF WELCOME.

J. F. Taylor of Douglas, having been appointed to make the address of welcome, spoke thus:

MR. PRESIDENT AND GENTLEMEN—You have come to us as representatives of the West Michigan Fruit Growers' Association. We heartily recognize your mission, and I am authorized by the fruit growers of Ganges, Saugatuck, and Douglas to welcome you to our hospitalities and our homes during the continuance of this meeting. We have not much to offer you, except lunch and lodging, in return for the wisdom and experience you may leave us for future use in our fructiferous surroundings. This is the first gathering of the kind you represent ever held among our people, and you may be assured we are hungering and thirsting for a feast on the knowledge of those who have grown gray in exploring the broad fields of pomology. In choosing this fruitful vocation, which has proved to be an appetizer to bring us together for a feast, we wish to recognize the fact that men are everywhere, to a very large extent, the creatures of their own environment. Nor are these environments entirely arbitrary. They are greatly modified by our choices and changed by our acts of loyalty or disloyalty to the Moral Governor of the universe. It was manifestly so with the great progenitor of our race. His fruitful surroundings, with the fair hand that handled them in their beauty, proved a temptation greater than he could bear, and hence brought toil and trouble on all his descendants. We share their fate. The thorns, and the thistles, and the briars which so increased his labor, as the first results of evil, are now easily subdued by gang plows and wheel cultivators. But in these days of evolution and progress they have made their appearance in numberless diseases and insects preying upon trees and plants and fruits of

all kinds to make the divine sentence effective, "In the sweat of thy face shalt thou eat" fruit, or without go hungry. As that beautiful garden of olden times was located in the same grand division of the globe where the peach is supposed to have originated, some have thought that its golden body and blushing cheek comprised the identical fruit which was forbidden to our first parents. And perhaps it is on this account that so many enemies of the peach are ever on the alert to baffle the wisdom and skill of those who are striving to retain or improve its original beauty. However this may be, the fact is patent that success in fruit growing is the result of vigilance and ceaseless toil. The orchards that you will look upon as you pass along our streets represent a large amount of concentrated mental and muscular exertion—and the work is not yet completed. Peach-growing is only in its infancy. Its fragrance in flower and fruit and fortune, if the fortune is not too far off, is attractive beyond measure, and sometimes seems to have the same moral effect on the producer that the unknown specimen did on mother Eve, when she saw it was good to look upon, and therefore good to eat. Ten years ago you could count the bearing peach orchards in these townships on your finger ends. Now we are shipping a few hundred thousand baskets of fruit every summer, and only our door yards and gardens are in bearing, in comparison to the tress under cultivation in the surrounding fields. That you may be assured of our efforts to provide some part of the fruit which is consumed by the millions of eaters living in cities and colder climates, we welcome you to a view of the landscape around us. We think it is full of promise. It betokens health and happiness to the carniverous portion of the human family. The fruit-bearing trees which you will see on the morrow are for the "healing of the nations." Fruit is a better diet than drugs, and lays a good foundation for moral and physical health. It relieves the system of many impurities and the mind of that bilious miasma which so often clouds its vision. It inspires men with a love of the beautiful, for it appeals to the appetite as well as to the eye. Its delightful fragrance always furnishes a tempting appetizer for the pure and the true in nature and in life. We welcome you to the fresh breezes of Lake Michigan, which "temper the winds," not so much to the "shorn lamb" as to the sensitive peach trees in all stages of growth. These are nature's shields for the fructifications of frigid climates. We welcome you to our homes, not so much as places of luxury and ease, as scenes of domestic tranquility, where work and wages go hand in hand to minister to the necessities of life. To all these things and to as many more as you can find to enjoy, we welcome you.

RESPONSE.

H. Dale Adams of Galesburg, responding for the society, said:

REVEREND SIR—It becomes my pleasant duty to respond to your kind and generous welcome. I only regret my inability to express in words the sentiments of my heart. In behalf of the society of the Western Michigan Fruit Growers, permit me to say, as their representative, most cordially do we accept and thank you for this generous greeting, and in whatever we shall fail in our voiced expressions, I can assure you we shall make it up in the deep and silent gratitude of our hearts. We have come among you to discuss and learn the most possible, concerning the subjects laid down in the programme for this occasion. And in looking over this people and recognizing the many intelli-

gent, enthusiastic, and practical ladies and gentlemen here assembled, we must lay all doubts aside and confess whereof we know, that our visit among you can be none other than a pleasant and a profitable one. In your generous and hospitable welcome you have extended to us the freedom of your municipality; a welcome to your society, to your homes, and to your hearts. What more can a people offer? What more can a guest or a stranger at your gate desire? We who have come from afar, and whose opportunities have not permitted us to aspire to that degree of perfection so fully attained by yourselves, in this favored region of the peach and other specialties in the field of pomology, would only suggest, that in the discussion of the subject before us, you shed abroad and among us the results of your practical experience in the calling you have chosen, that we may profit and add to our store the blessings founded on your labors. The society whose welcome bidding is this day assured, is comparatively new as an organization, but in its united membership is the oldest of any in our beloved commonwealth in practical expression and devotion to the calling of the fruit grower. Far from any purpose of mine to make invidious comparisons between this society, as an organization, or its members as individuals, and others of like character; but an intimate knowledge of its members and those of others compels me to say that none other, not one, can more than claim an equal place by its side. Our programme, as will be seen, is largely devoted to the peach—its culture, varieties, and management in detail. I take pleasure in informing you that the gentlemen selected to treat the various divisions of these subjects, so interesting and essential to the wealth and prosperity of this locality, are men chosen from the veteran ranks of the calling, and I bespeak for them your candid consideration. Sir, again I thank you for your generous welcome, for your assured hospitality, and your devoted friendship; and when is given that last evidence of continued friendship, exemplified by the hand-shaking at the parting, may we return to our homes laden—yea burthened—with the lessons learned among you, and the reminiscences of this occasion be annually in our memories so long as life extends. Friends, you have laid us under a debt of gratitude too great for us to repay, with the uncertainties of life before us.

The only topic assigned for the evening was "Prospective outlook for a peach crop in 1887." Several members from different sections were called upon, and they reported concerning every other sort of fruit crop as well as peaches, all agreeing that the promise for full crops was seldom better, though some injury to trees by the severe winter was noted.

Thursday Morning Session.

President Phillips announced the following committees:

Resolutions—J. H. Wetmore of Allegan, A. C. Merritt of Casco, and L. H. Wilcox of Benton Harbor.

Fruits—Chas. Alford of Ottawa county, A. Adams of Shelby, W. A. Brown of Benton Harbor.

Flowers—H. Dale Adams of Galesburg, Mrs. Roxina Sheffer of Casco, Mrs. G. H. LaFleur of Allegan.

Frank Linderman of Casco, read the following paper on

MARKETING FRUIT.

I will confine myself mostly to peaches, as my experience has been mainly in that fruit. Before we can market our fruit we must first get it ready to market. In this preparation of our fruit for market lies our success or failure in marketing, at least to a great degree. The first and most important thing to mention is, very careful handling from the orchard to the boat or depot.

PACKING IN GRADES.

We will first give our attention to the style of packing the peaches. We have our packing benches made about the right height for convenience, say about two feet and eight or ten inches. Then take a basket of peaches and put between two empty baskets and pack both grades at once, putting all first grades in the right-hand basket, the second-grades in the left and the culls in a basket by themselves. By this way of packing you handle each peach just once. When we get our basket packed, if it is a first-grade we put the card upon it so there is no chance for a mistake. This card is a guaranty, and it means that that basket of peaches is straight No. 1, all the way through, and the commission man is instructed to make it so at my expense if there is any case where there has been a mistake in any way. The fruit is packed in layers from the bottom of the baskets, so when the top is on you can turn it bottom up and not move the fruit. Peaches packed this way stand shipping very nicely, and when they get to market look solid, and the baskets are nice and full and will sell at sight.

I don't like the idea of pouring the peaches out upon the bench to pack. You can not help but bruise them more by rolling them over and over again and sorting them to get the right size to put into a certain place in the baskets.

IN THE MARKET.

We now have our fruit well packed and we want to market it to the best possible advantage. Now right here comes in the real secret of this guaranty. Here is where we find that a little honesty is going to bring a premium. To illustrate this point, Mr. President, pardon me for just making a hypothesis: Suppose, if you please, that my neighbor, Mr. A., has been shipping peaches to the Chicago market for a number of years, and has been very careful and honest in his way of putting up and warranting his fruit, and has sent regularly to one man and built fancy prices; and the same day he sends one hundred baskets of his fruit to the commission man, Mr. B sends one hundred baskets to the same man. But Mr. B. is a new shipper and he thinks if the peaches look pretty well on top they will bring a good price. So he puts them up, culls in the bottom and culls in the middle and good ones on top, and away they go to be sold. Perhaps the commission man wants to know about what he has got for a new customer, so he opens a couple of baskets of Mr. B.'s peaches and finds them terribly poor. He sells them at fifty cents per basket, and the same day he sells Mr. A.'s for one dollar per basket. Now, when Mr. B. finds that Mr. A.'s peaches brought one dollar, and his only fifty cents, that commission man is a thief "right from the word go," and he tells every man he meets that that commission man stole fifty

cents per basket from his last shipment. Now, the point is, in the end the man who paid one dollar per basket is perfectly satisfied with his bargain, but the man who only paid fifty cents per basket, feels as though he had been swindled out of about forty cents per basket for all he got; and sure enough, he was.

So, you see, the commission man is not always to blame when he is "blessed." We must make our own reputation. Our commission man can't do it for us. We should keep on the right side of our salesman, and we can best do that by sending nice, large consignments regularly, every shipment, so he can tell his customers he will have them by every boat or train without fail, and oftentimes your fruit will be sold before it arrives.

I ship a great deal direct to consumers on orders. Selling at depot or dock is a very desirable way to deal. There is no risk at all, as you have sold your goods and got your money without any commission or freight to take out.

We need more first-class fruit and less second and third class. We can have it so if we will make it so.

WHAT OTHERS HAD TO SAY.

L. H. Wilcox of Benton Harbor remarked that there was great lack of system upon the whole lake shore in the methods of marketing fruit. We consign to strangers and have to take what they please to give us. Mr. Linderman's plan is a good one for a large shipper. A man may so build up a trade. But co-operation of the whole body of shippers is necessary to the welfare of all.

W. A. Brown: If possible, the Linderman plan is a good one, so for as individuals are concerned; but the peach interest is assuming vast proportions and some system is necessary. The great northwestern regions are tributary to us for peaches, but we can not reach them to good advantage through the Chicago market and two or three middlemen. Combination to make shipments to the far west is the best plan, but how best to do it will require much consideration.

Rev. E. Andrus: The plan of building up a reputation for honesty is an admirable one. Large shippers may do this, but the greater number of growers raise not enough to become well known. A board, or something of the kind, making a guaranty for all the members, would be beneficial to such.

C. W. Whitehead of Benton Harbor spoke of the Inter-State Society, an association of horticulturists in Illinois, Tennessee, Louisiana, and Mississippi, having headquarters at Cairo and making direct shipments to other northwestern cities besides Chicago, members being notified daily of the state of markets and directed where to send and how much. The Chicago men fought this, so as to hold northwestern markets, but the plan has been successful and something of the kind must be resorted to here.

Mr. Whitehead further remarked upon the mischievousness of sending culls and second-grade fruit to market, and even the raising of such. The first requisite to first-class prices is first-class fruit.

VARIETIES OF PEACH FOR PLANTING,

a topic upon which A. S. Dyckman was appointed to lead, was, in his absence, taken up by S. R. Lewis of Ganges. In an orchard of 1,600 trees he would set for early sorts—Alexander, a few Early Rivers, and set Lewis Seedling extensively, with Hale's Early and Crane's Early Yellow. He would set early sorts because it is to the grower's interest to have a succession of fruit through the season, and there is profit in the early kinds. For the intermediate crop he would set many Weed's Late Barnard (later and larger than regular Barnard), largely of Snow's Orange (a good peach, smoother than Early Barnard and of better quality in flesh and for shipping), and 200 Jaques. He would "be shy of both Crawfords except in extremely favorable places, using the Barber or Hinman instead of Crawford (it being hardier, better, and nearly as large), and Brunson Seedling in place of Late Crawford. Also set some of Plummer, so-called (said to be same as Gudgeon's Late), a white peach; and lastly, 200 or 250 Smock." He had unsatisfactory results from Old Mixon and Stump, the latter especially not yielding well. Ten or twelve years ago the speaker and his brother, N. W. Lewis, went to Coloma, Berrien county, to get of a Mr. Ray trees of what was called the St. Joe Sugar peach. They were seedlings of Hill's Chili, but came true to name, except one, and that was the originator of the present Lewis Seedling. It resembles Hale in appearance and quality, ripens between it and Barnard, is nearly a freestone, and is very profitable because no other sort ripens at its season.

Alexander Hamilton indorsed Mr. Lewis, except that he would substitute Louise for Rivers and plant some Early Barnard. This peach does well in Ganges though not at South Haven. So also does the yellow Honest John. He did not think well of Mountain Rose, because, being a white peach, it does not compare well with Barnard or Early Crawford.

S. M. Hamlin, of near Douglas, spoke well of Yellow Rareripe (it had given annual crops since 1869), Honest John, Switzerland, Old Mixon, Gros Mignon, and Gudgeon. He likes all these and would plant them. Switzerland is large, white, ships well, and differs from Stump chiefly in being later.

G. H. LaFleur: The Honest John or Large Early York is white, but our Honest John is yellow and is really Yellow Rareripe.

J. F. Taylor: Weed's Late Barnard is in fact Burgeon's Yellow. These local names are confusing. Snow's Orange must be well thinned or it will be very small.

D. W. Wiley: Soil must be considered. Hill's Chili is poor on light soil, as it will not stand drouth, which often comes at its time of ripening; but it is good on the heavier soils. Per contra, Robert Reid of Douglas said he got his best Chilis on light soil, having them also on heavy land. "But," said Mr. Wiley, "while Mr. Reid's soil is sandy, it is moist, dark and loamy." Walter Phillips said the Chili about Grand Haven shrivels and is woolly; and S. R. Lewis said it was not good on either sand ridges or heavy clay.

CULTIVATION OF THE ORCHARD.

A. C. Merritt, of Casco, opening on the topic "Cultivation of the Orchard," said that without thorough cultivation we can have nothing good to take to market. Trees are so anxious for cultivation that their roots will reach out to tilled ground when many feet away from it. As well never set trees as not

to cultivate intelligently and thoroughly. The season for cultivation is not long, so the work must needs be thorough. If continued too late we may get the result now visible—dead trees, especially young ones. If we have thoroughly ripened wood it will withstand extreme cold. This has been a grand season for getting early growth, but many have waited too long. Cultivation is often equivalent to fertilization. Some growers keep their orchards like gardens while they may cultivate, and such have ripe wood. Even heavy clay may be made mellow and good for trees if taken at the right time. Whatever tools will well cultivate corn will do for peaches. In a dry time, on light soil, cultivate late in the day, so as to prevent excessive loss of moisture. Quit cultivating early in August. If trees are heavy with fruit it would do good if later than this, but in such case it usually is not possible. This is why I say cultivate intelligently, for there are many varying conditions, and nothing calls for so much intelligent care as the peach tree. Soil makes a great difference as to value and success of varieties. To sum it up briefly, begin early, cultivate often, quit soon enough. How early to begin depends upon dryness of soil and weather. I sometimes cultivate at or before blossoming, sometimes not. In some conditions, such as moist soil or wet season, early cultivation induces frosts and kills the blossoms. You must use your brains.

Levi Loomis thought the dead young trees this season were due to the late rains of last fall causing new growth, coming as they did after a time of drouth. He does not cultivate after the middle of July. For thirteen years he quit July 1, sowed buckwheat and always got good crops.

J. F. Taylor: Wherever, last year, cultivation was kept up through the drouth, no late growth came. Stop cultivating in a wet August, but keep it up if dry. It is safe to cultivate as long as drouth lasts, even to September. Intelligent judgment is necessary as to this. As a rule, stop earlier on trees one and two years old than on either older or younger trees, as there is most growth during those years. Last year early cultivation was bad, but this year it is beneficial. Early culture sometimes, when followed by cold and wet, promotes curled leaf.

Then followed a mass of contradictory experience in cutting back new growth late in the season. Mr. Wadsworth, Mr. Manwaring and Mr. Boyles had practiced it with good results, and it is said to be the common way in New Jersey; but Mr. Loomis and Mr. Gardiner had lost, or known of the loss of many trees on exactly this account. It seemed to be regarded as a bad practice.

Similar disagreement was expressed as to cultivation, some claiming it could easily be overdone, with bad results from production of unripe wood late in the season. Others maintained that evil results lay rather in the direction of neglect; that without thorough tillage the present magnificent orchards could never have been produced and maintained. The prevailing sentiment was well expressed by Mr. S. R. Lewis, when he said: "I believe in the most thorough cultivation, but good judgment is necessary in its practice. These differing views are due chiefly to variation of soil. We must cultivate bearing trees through dry weather until rain comes. Cultivation must be 'clean.' Every weed is a robber in time of drouth."

DISTANCE APART IN THE ORCHARD

was a signal for another difference of views. D. W. Wiley years ago thought trees should be not less than twenty feet apart. Now he believes he can do better at not more than one rod. Trees seldom crowd, even at that distance. If they do, it is better to remove some, they meanwhile having been a source of profit. They are thinned much by disease, storms, etc., and some varieties require less room than others.

S. G. Sheffer had tried 14, 16½ and 20 feet, and got best results from the latter.

J. F. Taylor: "One objection to 16½ feet is the upright growth of the trees. The fruit on the under limbs then lacks color and flavor and that above is too high for convenience in harvesting." Twenty by twenty is his preference, and to this others agreed.

LOCATION AND SOIL

Induced J. H. Wetmore, of Allegan, to remark that the first requisite is good soil, the second drainage, the third altitude. Wet roots kill more trees than any other cause. His orchard is on strong soil and much cultivation induces too much growth.

Replying to a question, W. A. Brown said in Berrien county yellows killed equally on high and dry, low and wet soil.

A. Adams, of Shelby: High, dry and rich soil is desirable. He had always believed that elevation was the first requisite, had acted upon that thought, and entertains it still; yet many locations that a few years ago were not thought desirable are now raising peaches. He preferred, in light soils, a northern slope, as southern slopes are likely to start growth too early, making the trees endangered to frost.

Clark Sheffer: This question is of slight account to us, as nearly all the available land between these two rivers (Black and Kalamazoo) is already occupied. There are cases near South Haven in which trees on western slopes bore fully, while those close by on eastern slopes, had no fruit. Most damage comes from eastern storms, the lake influence at such times not reaching eastern slopes.

S. M. Hamlin: A high ridge is best, as cold air settles into the valley. Get the highest ridge you can and as near to the lake as possible.

Thursday Afternoon Session.

The session opened with a very large attendance, the first number of the programme being the following paper by W. A. Smith, of Benton Harbor, on

FRUIT EXCHANGES.

Nearly every industry in the land has its special organization for the purpose of concentrating its efforts and labors in behalf of its peculiar interests and

well-being. We see, almost daily, both the good and the evil effects growing out of the labor strikes in our large towns and cities. These labor associations, if properly conducted by honest, intelligent men, would doubtless be the means of bestowing many benefits upon mankind; but when controlled, as they now are, in great measure, by unscrupulous, designing demagogues, the consequences are far more evil than good.

The objects of a fruit exchange should be, first, the improvement of the quality and general appearance of the fruit we send to market—some may say quality has nothing to do in the matter, appearance is everything; but I think the two should go hand in hand.

(2.) The need of more honesty in the packing and preparing of fruit for market. It is needless to say that comparatively few shippers are strictly honest in this respect. I do not wish to intimate that there is less regard for straight dealing among fruit growers than other classes of producers. Suffice to say, there is far too little among almost all classes. In the rush and hurry of the shipping season there is, unfortunately, great temptation to make a better appearance of our fruit than the general condition and quality would warrant.

(3.) Transportation. From points where fruit is shipped by rail, a combination of growers to secure rates by car-lots, would in many cases very much reduce the cost of transportation, and cartage on the other side. Our transportation on this lake shore, in the past, has been out of proportion, considering the distance, the fruit shipped to the same markets from distant points, both east and west, and coming directly into competition with our fruit. Grape growers in the lake region of western New York will ship by car lots at a much lower rate than we ship across the lake by boat. If the fourth section of the inter-state law is enforced, our shorter hauls will at least enable us to compete for customers in our own markets.

(4.) A wiser distribution of our fruits among consumers. As the business is now conducted, the great bulk of the fruits are shipped to a few large centers of distribution and there rehandled and reshipped to outside points, thus increasing largely the expense to the grower, and reducing the value of the goods rehandled and reshipped. Where car-lots can be shipped directly to outside points it would be a great economy in expense, and the fruit would arrive in much better condition, thus saving time and money.

(5.) The regulating of consignments to responsible commission houses might secure low rates of cartage and a lower rate of commission, say a reduction from ten per cent to seven, and a resident agent, selected by the growers and located in every large fruit market where heavy consignments of fruit are shipped daily, would conduce largely to a more careful and honest transaction of our business among the various commission houses to which we consign our fruit. The ultimate object of a fruit exchange should be to do away with middlemen as far and as soon as possible; but in order to do this much patience and painstaking labor must be performed. If we could build up a good market at our respective places of shipping it would reduce our expenses largely and increase our profits accordingly.

(6.) The total abrogation of the present system of drumming for commission houses should receive early and special attention from every fruit grower, whether working individually or collectively. This is a nuisance that should and must be abated sooner or later. It is virtually a tax upon every fruit grower's labor. It is a tax that we can ill afford to pay.

(7.) The regulation of packages. It is very desirable to have a more uniform package for the various fruits now sent to market. In the matter of quart boxes there are three or four different sizes, shapes and styles in use. As long as fruit growers do not give a decided preference for some one over all others, manufacturers will continue to put upon the market whatever style, size or form is demanded by the individual caprices and notions of the several growers. This diversity of packages, though varying slightly one from the other, increases the expense of manufacture, which necessarily comes out of the consumer (not of the fruit but of the package). It has also established the "snide" and forced it upon the trade.

In the "belt" growers should aim to increase the size of the packages, thus reducing very largely the cost, first of the package itself, the covering used on the same, the cost of transportation and cartage, making in the end a large percentage of the cost of getting our peaches on the market. Twenty years ago we used the half-bushel basket and many were returned. Then came the third-bushel. That was used for some years and finally superseded by the quarter-bushel. This is still in use to some extent, and perhaps exclusively in some localities; but it was too large for some growers and the fifth-bushel came into use, and I am inclined to think in many cases this is a "snide," like our "snide" berry boxes. At a glance we can hardly realize the enormous additional expense of these small packages. If we are shipping by car lots, paying by the car instead of by the package as we do on boats, the difference in cost would be less.

Delaware peaches have been shipped to our western markets for some years in half-bushel baskets, without netting or other covering except peach leaves—the same package, save the cover, we used twenty years ago. The idea that a small package of fruit will sell for as much as a larger one, everything else being equal, is a grand and fatal delusion. To satisfy ourselves upon this point, we need only to apply this rule to ourselves in the purchase of the various commodities for our own consumption.

Southern Illinois ships berries mostly in twenty-four full-quart cases, while we ship in the sixteen "snide"-quart cases. Last year many of our grape-growers shipped their entire crop in what were called ten-pound baskets, which, however, held only about eight pounds of fruit. This package, freight and cartage on the same, cost as much as the twenty-pound package used by other shippers, who got as much per pound for their fruit as those using the small package. This is especially the case when fruit is plenty and cheap; for these buyers look to quality and quantity when buying.

It is evident that in this line a general reform is needed by the best interests of all fruit growers. Increase the size of your package, reduce the cost of transportation, and add to your profits.

It is evident that peach culture is, and will be, rapidly on the increase on this lake shore, from this time until climatic or other causes render the business a general failure. That dread disease, yellows, is no longer so great a terror as it has been in the past. Our knowledge, from our experience with this malady, may enable us in the future to combat it to a successful termination. Like the dreaded pear blight, it seems, when judiciously managed, to be partially at least under human control.

It is evident the various reforms indicated in this paper never can be accomplished by individual effort. Combination and organization are the order of the day, and the sooner the rural population accept the inevitable

and go to work unitedly and harmoniously in securing a reasonable compensation for their money invested and their toil expended, the sooner will they feel encouraged to go on in their laborious efforts to supply the markets of the world with the delicious fruits of the field, the garden, and the orchard.

KEEPING UP THE FERTILITY OF THE SOIL.

Frank Linderman, considering this topic, said: We at South Haven use rye and like it. Some have experimented with rye and clover together and done well; also with plaster, salt and ashes, the latter being obtained from Chicago smoke-houses and containing salt, fat, etc. Rye is sown about the first of August and plowed in just before fully headed. Ashes are sown broadcast, probably two tons per acre, and cost $3 per ton unloaded into the wagon. [Other growers had paid $3.50 and $4 per ton.] A long discussion ensued as to the merits of rye as a fertilizer. Some contended that it was of little value, or none whatever, taking as much from the soil as it returned, rotting slowly, and not comparable to clover as a fertilizer. Others, and these were in great majority, cited actual experience favorable to rye; but many may have cut it at the wrong time and got no benefit. It should be cut just before the grain forms. It is then tender, full of juices, rots quickly, conveys moisture to the soil, and gives it the nitrogen it took from the air while growing. If plowed under later, it is woody, decays slowly, and is of slight value if any.

It is also of value as a mulch and holds the fallen leaves and the snow for protection of roots in winter. It grows during the damp season and goes under at the dry time. Some commended clover for similar use, care being taken to get it under early enough to prevent it from robbing trees of moisture. Some would grow it only between rows of young trees and not close to them, and never in a bearing orchard. It should never stand till it blooms. J. F. Taylor had practiced sowing buckwheat and had never been troubled with cutworms. This is in accord with President Phillips' experience with buckwheat in his vineyards. Many commended barnyard manure as the best fertilizer.

Mr. Wiley would not use it on young trees. Any soil will grow these fast enough unaided. Only one spoke of commercial fertilizers, and he doubted their desirability.

MICHIGAN SEEDLING PEACHES.

Mr. Alexander Hamilton, of Ganges, a peach grower and nurseryman of experience, read the following paper upon "Michigan seedling Peaches:"

Some of our most valuable peaches are Michigan seedlings and kinds about the origin and true name of which we know nothing. The most desirable of the Michigan seedlings are, I believe, Lewis Seedling, Snow's Orange, Bronson's Seedling, Corner's Seedling Barnard, Dumont, and some of the Chili seedlings. The most desirable of the kinds we are unable to name correctly are known here as Barber or Hinman, Golden Drop, Weed's Late Barnard, Crane's Early Yellow, Overhiser, Hamlin and Burrows peaches. In the townships of Saugatuck and Ganges, especially in Ganges where it originated, Lewis Seedling is the most popular of the Michigan seedlings, and, notwithstanding its rather poor quality, is being set very largely, and that too by those who have it in largest numbers in bearing. Its beautiful appearance, the desirable time at which it ripens, and the certainty of its coming each year, make it a very profitable peach to grow.

Snow's Orange is becoming, as it deserves, a great favorite with our growers. It is a good shipper, ripens after the Crawford and Barnard and before the Chili gluts, and in plentiful years goes into market at a time when peaches sell well, while in scarce years, when many of our leading varieties are destroyed by the leaf curl, it bears full crops and sells for big prices—over a dollar per basket, as it did two years ago.

Bronson's Seedling ripens with the late Chilis, is hardy and productive, and one of our very best shippers. For locations where the late Crawford is shy and the Chili shrivels I know of nothing unless it might be the Golden Drop, that is so desirable.

Corner's Seedling Barnard ripens with the old Early Barnard, which it equals in all respects, while it is less liable to rot and leaf curl, a better shipper and surer bearer.

The Dumont is of late origin but is fast coming to the front. In size it nearly equals the Crawford; flesh yellow, firm, and very sweet; pit small; ripens after the Jaques; is very hardy and productive; an excellent shipper, and considered by those who have it a great acquisition.

The Chili seedlings that have originated in Michigan are very numerous and some of them very much superior to the old New York Hill's Chili. Among the very best is the one brought here by Bradley Williams, of Kalamazoo, and known in the vicinity of Douglas as the Cass Chili. It is a sure bearer, and on suitable soil is a most excellent and beautiful peach and one that has paid the growers more money than any other. My neighbor, Mr. V. Wadsworth, of Peach Belt, sold his entire crop of this kind of Chili, in 1884 and 1885, for about one dollar per basket, and one entire shipment going for $1.25 per basket and another of 180 baskets (36 bushels) for $180.

Of the kinds we are unable to name, none have attracted more attention than has the one we call Barber or Hinman. It is as large and beautiful as the Crawford, tree hardy and a moderately good bearer.

The Golden Drop is better known at South Haven than it is here, so I shall ask some of our South Haven friends to tell us about it.

The peach we call Crane's Early Yellow is the earliest yellow-fleshed peach shipped from Fennville. It is, when well cultivated, nearly the size of a Crawford, very productive, a beautiful orange yellow with deep red cheek, and comes in just as the Hale is going out; is somewhat similar to the South Haven fruit, known in that vicinity as the Hamlin, Burns, and Overhiser peaches.

With these and a few other varieties, which are required to make a complete succession of ripening, peach growing, even on fair locations within the Michigan peach belt, which reaches far north as well as south of Douglas, can not fail to be a success.

CONTEMPORARY OPINION.

A. C. Merritt had tried the Golden Drop. At first it was golden indeed, but later, though larger than at first, it has lacked color; yet he deems it a very good peach and would plant it if he had none. The fault noted may have come from over-fertilization and peculiar seasons. It bears young, freely, and continuously. He deemed it a great acquisition.

J. J. Atherley: It is not as hardy as Chili, and ripens just after. His fruits of this sort had lost color also and were small, but he thought the former was caused by over-bearing. He would be cautious about setting it.

Replying to a question, Mr. Hamilton said the seedlings mentioned in his paper were hardy.

W. A. Brown: These new varieties should have permanent names. For instance, which is it: Barber or Hinman?

Mr. Hamilton: This is not a Michigan peach, but it would be well to find its true name or give it one that all will recognize. It was shown at the meeting of the American Pomological Society, last year, but no one could name it.

Secretary LaFleur offered the following resolution:

WHEREAS, In view of the fact that there are many new varieties of peach, as well as some of the older kinds, that are known under different local names, therefore

I move that a committee of three be appointed to correct, so far as possible, all improper names, and establish correct names; and, in the case of new seedlings, to establish some name by which they may be known.

This was adopted, and Messrs. G. H. LaFleur, W. A. Brown, and J. P. Wade were appointed and instructed to report at the society's next meeting.

WHEN AND HOW TO DESTROY THE BORER

was first responded to by Levi Loomis: Dig him out—it's the only way; or wire him out, which is practically the same thing. Do it in the spring. The borer hides in chip manure when placed about trees. Therefore don't put it there. Not so with forest leaves. Care should be taken, in digging borers, not to scratch the roots more than necessary. Better let the grub stay than to set careless men to hunt him. Never fail to cover up the roots and crown in the fall, as this prevents to some extent deposit of the eggs.

W. A. Brown: Take them out in May and September.

S. R. Lewis: The egg is deposited in August. Bandages with something offensive upon them will prevent the laying of the egg; then, if we had taken out all the grubs the previous spring, we could finish the business in one year.

THE CONTAGIOUS NATURE OF YELLOWS

brought out W. A. Smith in some terse and earnest remarks: This topic is an unprofitable one. No man knows anything about it—literally nothing. It is, like pleuro-pneumonia and pear blight, contagious, and can like them be stamped out by but one means—extermination. This costs you something. But it cost us more in Berrien county, for we had 150 yellows doctors. You learned, by our experience, not to tamper with it. Take it out—burn it up! [Cheers.] Can we tell when a tree is infected? Yes; and at once if it is in bearing; but otherwise not, in the first stages. It is fatal every time, and contagious in all stages. Some say it spreads from even the stump and roots if left in the orchard. We do not know how it is communicated.

Mr. D. W. Wiley: How about setting young trees in the places where old ones had yellows? My experience is, it can be done. I have practiced it. It may be a question if it could be done where the disease had become general.

Robert Reid: I have successfully reset, even where trees had been generally destroyed.

Mr. Wiley: When I see a tree with yellows, I stop all other work and take it out; nor do I experiment, but take it out and do other work afterward.

S. G. Sheffer: In Casco the only things we think of are the ax and spade when we learn of the existence of a yellows tree. [Applause.]

Thursday Evening Session.

To Joseph Lannin had been assigned the topic:

HOW LONG DO PEACH TREES LIVE AFTER BEING AFFECTED WITH YELLOWS?

He remarked: As Mr. Smith has said, we do not know the cause of yellows. Prof. Burril thought it was bacteria, but it is not known whether they are the cause or the effect. Prof. Miles examined with a powerful microscope the leaves, fruit, branches and roots, and found bacteria in all these when from diseased trees, but none in any portion of sound trees; but as before, whether this condition was cause or effect he could not tell. At the American society's meeting he had been shown bacteria in pear blight, and he had seen branches inoculated with it. Pear blight is believed to be certain death to stricken trees. But he (Lannin) knew better. Blight will kill affected limbs but not the whole tree, hence there is an apparant difference between blight and yellows. The bacteria are preyed upon by still more microscopic creatures than themselves, and but for this they would multiply into myriads. He had seen yellows in cultivated and uncultivated orchards, high land and low, well pruned and unpruned trees. One can hardly know, sometimes, when yellows begins. It will show in fruit three weeks before the normal time of ripening. If trees are not in bearing it shows first in leaves, their edges turn up and their points turn down. Affected trees will make a good growth of wood the first year and will blossom the second. The fruit is larger than usual the first year and smaller the next, and turns color still earlier; the third year it is smaller yet, merely a skin over the pit and the tree always dies that season. Inoculation is not accomplished by mixture of pollen, as experiments have proved. Yellows pits from trees in their first year will grow, but their product is a dying, dwindling thing that never becomes a tree. Pits of the second year will not grow. Yellows is sometimes propagated by budding. The Benton Harbor people are often scoffed at for having tried to cure yellows. But they were anxious to save their trees, not knowing that the disease was incurable. But for their mistakes and mine, you at Douglas would not be in your prosperous condition. You learned by our errors and losses that the only way to treat yellows is to dig it right out and burn it.

Mr. Whitehead ventured the opinion that yellows is caused by bacteria, as certain diseases of men are by microbes, and will eventually be curable.

Mr. LaFleur mentioned a grower who was positive he could cure yellows. He used three tons of "cure" but had to destroy 300 trees in the succeeding two years.

President Phillips then read the following paper upon

CULTIVATION AND MANAGEMENT OF GRAPES.

The first point is location. I prefer high grounds and hillsides sloping to the south or southeast, surrounded with good river drainage. The second point, quite essential to the success of the vineyardist, is the soil. It used to be said that grapes would grow on the poorest soil we had. It now takes good soil and that needs to be fed liberally from year to year. For the following three varieties, Worden, Niagara and Brighton, I prefer a sandy loam soil. I speak of only three varieties because I consider them the best three varieties to raise for money on this lake shore. All grapes succeed best on lands well cultivated and drained. Grapes do not like wet feet, nor will they try to do well with them, for wet ground is cold and unhealthy, causing the vines to decay, and soon they die with premature old age. This will not be the case on lands drained so that heat and air can penetrate to the roots.

The next important step is the preparation of the soil. As cut-worms are very troublesome on this lake shore, I would advise, on grounds to be planted with vines the coming fall or the following spring, the sowing of buckwheat the last of June. When in full bloom plow under. This is a dead-shot against cut-worms and all embryo insect life or larvæ in the ground. The poisonous gases contained in the bloom of the buckwheat does the work. Before planting, cultivate the ground thoroughly. Then roll and mark out in rows nine feet apart, and set your vines ten feet apart in the row. I prefer first-class yearling plants in preference to any other. I would trim the roots to from ten to twelve inches in length. The hole should be dug a foot deep, leaving a slight cone or elevation in the center. Set your plant and spread the roots evenly and well. Cover the roots four inches or more with fresh surface soil, well pressed around them. Now add, if you have it, some well-rotted manure or fertilizer, a handful or two mixed with unleached ashes. Then fill up, pressing in the dirt compactly.

Cultivate well the first year, and in the fall cut back to three buds. Mulch the vines and do it well. The second year cultivate thoroughly. Give the vines an early start and keep them growing, and do not let them become stunted. If you do they will never get over it. For the first three or four years, until the vineyard is thoroughly established and able to resist the attack of the cut-worm, I would cultivate well till the first of July. Then sow to buckwheat and plow under when in full bloom.

It has been said one of the greatest faults in the management of a vineyard is in not strengthening the vine by trimming. It seems to me it is very important that we have a thorough knowledge of the strength of the vines in our vineyards, and then trim in proportion to their strength. Then again, do not let young vines bear too heavily; and even old established vineyards must be guarded in this respect. Let us grow less fruit and of a better quality. Let us cultivate more evenly, trim more evenly, fertilize more evenly, and have more even vineyards; and I believe it will be more profitable in the end.

Now as regards trimming the vines: The second year, if vines have made good growth, trim back to two feet or less. If growth is weak, cut back again to three buds, mulching well preparatory for winter. The third year train your vines to what is called the Kniffin system—first wire two and one-fourth feet from the ground; second wire two and one-half feet higher. Train your

vines to these two wires, leaving two arms on each vine. When arms have made a growth of four or five feet, pinch them back. In trimming, the coming fall or following spring, cut back each arm to five or six buds. The fourth year, the vines having now become strong, leave the arms longer—say eight or nine buds, which is sufficient wood for a full crop of fine fruit of the best quality. Let me caution all to never overload a vine, as this is one of the greatest curses of the vineyard. If at the end of the fourth year your vineyard is uneven, some vines weak, such vines should be cut back in proportion as they are weak; and manure well—do not let them bear much if any. Do this from year to year, and in a few years your vines will all be up to the same standard in strength and productiveness, and will please your eye by their beauty and gladden your heart by giving abundant proof of the success of your labors.

For vineyards, all things considered, I regard unleached ashes the best fertilizer known. A ton of hardwood ashes contains 320 lbs. of potash, worth $16, 105 pounds of phosphoric acid (insoluble) worth $5.25. Omitting all the other ash constituents, which have some value of themselves, the potash and phosphoric acid of a ton of such ashes are worth $21.25, or nearly six times the value of a ton of fresh horse dung.

Summer pruning, also the importance of handling and marketing our grapes in the best condition, so as to bring us the best returns, the length of this article will not permit me to take up fully; but I will say in a word, it is my practice to pinch back the bearing shoots to within two or three leaves of the fruit. As to marketing, pack well and send none but good fruit to market. And I wish to say, and also to impress it upon the mind and memory of every grape grower present, that there is nothing so disastrous to the grape market as the shipping of green grapes early in the season. It is sure to bring prices down to a low point, and once down it is hard to bring them up again. The consumer who has been waiting patiently for the grape season to open, buys them with the expectation of finding them ripe and delicious; but instead finds them sour and unfit to eat. The consequence is it will be some time before he will try his chance again. Thus the market becomes seriously damaged at the outset.

ON THE SAME SUBJECT.

Replying to a question by Mr. Lannin, Mr. Phillips said he pinches back the new growth as soon as the grapes begin to form; and further, to pinch off all superfluous shoots and keep this up as you would in raising peach trees.

W. A. Smith: It is noticeable that Mr. Phillips recommends but three varieties. Ten or twelve years ago there was a great boom for the Iona. I was one of its victims; for, while the Iona is one of our finest grapes, it is a failure nineteen times out of twenty. Of Mr. Phillips' three sorts there is but one I can recommend—the Worden. It has not been grown as long as the Concord, but is promising. There is at present a great boom for the Niagara and it sells for great prices. But is it safe for this society to recommend it for general culture? Its quality is not better than that of the Concord, it has not proved hardy, and it is not free from rot. I knew of a vineyard of four acres of three-year-old Niagaras that last fall were in perfect order. Now only one in ten rods is alive and the rest are dead to the ground.

A neighboring plat is in the same condition. These growers say it rots worse than Concord, when they get any at all. Location has much to do with such results, but I insist it is not safe for us to recommend it for general culture.

Mr. Phillips: I think the quality of the Niagara better than that of the Concord, and it was so considered at the meetings of the American society. It has sold very high in the market, even outselling Catawba. I not only consider it superior in quality to Concord, but prefer it above any of the California grapes. I have never before heard rot or mildew charged against it.

H. H. Hayes of Talmadge, Ottawa county: I have nothing to say against the Niagara. I set 500 vines in 1882 and got $1,650 net from them, up to date. I have had no winter-killing; they are in fine condition now; not a bud was dead this spring. The vines are on high land, a clay loam soil, and mercury went ten degrees below, last winter, on the hill. Some vines are sixty feet lower than that point, but are in perfect order now. I set 3,000 more this spring. I got ten cents per pound for last year's crop. Porous soil is not good for the Niagara. My place is twenty miles from the lake. I cut back in July, do not allow the vines to over-bear, and have always had good results.

A. C. Merritt: I have seen several vineyards of Niagaras out of condition, but always found a sufficient reason for it. I set mine five years ago, in two lots. In the location I thought the best they were a complete failure, although great pains were taken. Why they failed I do not know. It may have been the lake winds. In the other place I did not lay the vines down. I do not want vines that can not stand up and take care of themselves. But there they have been successful. They were set on ordinary soil and not cultivated as well as I would do if beginning anew. I sold $985 worth of fruit last year from less than 600 vines. They have never been protected at all. But last spring (1886) I left too much wood and permitted them to overbear. Hence all present damage to the vines I attribute to my own neglect. Mr. Merritt highly commended Mr. Woodward and other members of the Niagara Grape Co., as to their personal characters, being well acquainted with them.

L. H. Wilcox: The Niagara has some good points and some poor ones. We at Benton Harbor cannot commend it. It winter-kills and so does not yield well. But in the market is the best of all grapes.

President Phillips: We like it in Ottawa county because we can grow it; you in Berrien county dislike it only for the opposite reason.

W. A. Brown: I think if planted on high land about Benton Harbor it would be successful.

J. Lannin: The members of the Niagara Grape Co. are gentlemen, and are always more liberal than the terms of their contract. The Niagara grape is a magnificent grower and I believe it to be hardy. With me it rotted a little last year. Mercury did not go as low last winter as it did the winter preceding; yet my vines, which went through the former season unharmed, were in the latter damaged. This result is due, I think, to peculiarities of season. Last October there were two weeks of very warm weather. I had pinched back my vines early and a second time; and I think the wood was so ripe that in the late and warm weather the buds started and were killed to such an extent that I shall have but half a crop this season. But, as the opposite of this, to test the hardiness of the Niagara, I in the season of 1885 trained a

vine 17 feet long and left it six feet high; and although in the succeeding winter mercury went seventeen degrees below, every bud on that vine started and grew the following season.

Mr. Phillips: I got ten cents per pound for Niagaras last season and but three cents for Concords.

W. A. Smith: I have no antagonism to the Niagara, but I say we should not recommend it for general cultivation when it fails in some places. Its test is not yet fully made. By my own taste its flavor is inferior to that of the Concord; but quality of fruit is wholly a matter of taste. I think I shall soon try to grow the Niagara myself.

A Adams: Its quality is not better than that of the Concord. It sells high because it is a novelty. I think that by the time all the vines now set are in bearing, some new grape will "take the starch out of it."

T. W. Merritt: Some of A. C. Merritt's vines did not overbear last year and such are all right now. The Niagara is musky, but that is a flavor many people like. The fruit of the Niagara may be shipped to California and back and still be in good condition, while the Concord is a poor shipper. Set grape-vines no deeper than you can cultivate, but be sure and set them that deep. Invert the soil as deeply as possible and set at that depth.

A. C. Merritt: I do not think the Niagara's leaf will resist mildew as well as the Concord's. The fruit will rot when Concords do, but not otherwise. My vineyard's soil runs from sand to clay loam, the vines doing best on the latter. The clays are best for grapes.

Mr. Adams: What can be said of the Pocklington and Prentiss?

Mr. Lannin: I had some Pocklingtons, but got three times as much fruit from Niagaras. They are not now hurt by winters; but they will drop their fruit unless it is gathered at just the right time; its bunches are small, and although it is hardy I would not advise anyone to plant it. The American society voted on choice of white grapes and Niagara got two-thirds of the ballots.

Mr. Phillips: I set the Prentiss and it killed out quickly.

Mr. Lannin: The Empire State froze almost to the ground last winter. I have now one little bunch and am caring for it with much solicitude.

Mr. Phillips: My Brightons bore for the first time last year and were magnificent. They grow strongly and are of good quality.

Mr. Nye: In Ohio I have known the Brighton to show no mildew at a time when the Concord did show it.

Friday Morning Session.

Reports were made and adopted from the committees on flowers and fruits, following which was read the subjoined letter from J. G. Ramsdell, of South Haven, who had been appointed to read a paper on "Can the Spread of Yellows be Prevented?"

SOUTH HAVEN, May 29, 1887.

Just at the last moment I find I am unable to be present with you, June 1, on account of ill health of my family and myself. I am very sorely disappointed in not being able to be with you on this particular occasion, for I have always had a very strong interest in this association from the first, and

have become more and more confirmed in the belief that the organization of this society was a necessity to the fruit growers of this shore, supplying a long-felt want which is of so great magnitude that it is more and more apparent every year. One thing consoles me, and that is that South Haven and Casco will be well represented by others more able to entertain the meeting than I could be, thereby helping to keep up the interest so necessary to the society. If my friends Lannin or Atherly, and perhaps others, can speak on the subject allotted to me, they will do better than I could myself, for in the numberless discussions before the South Haven and Casco society, within the last seven years, we all have come to believe fully, that "prevention will prevent;" yet we do not all carry out our convictions in practice.

Here let me say that among the many facts that go to sustain the theory that we can, if we will, prevent the spread of yellows, no one is more conclusive than this: Those fruit growers who have removed all trees promptly as soon as discovered, have as a rule good orchards yet; and those who have neglected to do so, their orchards are ruined. Add to this one more fact, that there are many good paying orchards here that have cut out hundreds of trees, while every neglected orchard in the same neighborhood has been swept away by the foul disease. Of course, all who have even one tree affected must join in the work of demolition or some localities will suffer.

Time will not allow me to say what I would of what I believe to be preventives of the first inception of yellows, such as proper nourishment of the tree, the careful cultivation, thorough pruning of limbs, and the rigid thinning of the overloaded trees; also the healthiness of both pit and bud. If we neglect any of these precautions we are on unsafe grounds.

If President Phillips does not object, allow me to suggest briefly that I hope, above all things which may happen to this society, that it may be delivered from all "long drawn out" essays which have no practical value, and generally are a dead weight on the meeting.

One more suggestion: I hope the meeting will not fail to take up the fruit exchange, and not let it be passed by or crowded out for want of time, for whether Mr. Smith fails you or not (like myself) with his paper, this question should be thoroughly discussed. I see that they have found it necessary to adopt the exchange in Delaware and New Jersey for self-protection. I believe if the whole peach belt would unite and form an exchange at every shipping point on this shore we could supersede the commission man and obtain such prices as our fruit commands in the distant as well as our near markets.

Your friend,
J. G. RAMSDELL.

ONCE MORE, YELLOWS.

Resuming the topic as to prevention of spread of yellows, J. J. Atherly said nothing new was known of the matter; it is all a mystery; we thought at first that fertilization would prevent yellows, but it didn't, and no one knows how to stop it. Mr. Lannin told of its mysterious and irregular ways of spreading in his orchard, and remarked that the disease is more virulent here than at the east. Wm. Corner said one means of prevention is neglected—the uprooting of small groups of trees that die of yellows in villages and by-places in the country. We don't know how to prevent trees from having yellows, but we know if yellows are in the ash heap they are all right.

James Gardiner: I have seen at this meeting one man who shipped yellows peaches knowing them to be such; and very likely we shall hear from him how to prevent spread of yellows!

S. M. Hamlin: I know of a man who propagated good trees by buds from a tree that had yellows the next season, proving that a tree will show yellows very quickly after inoculation.

J. F. Taylor: The poorer soils show the least yellows; the promotion of great growth seems to induce the disease; but we may detect yellows quicker in well kept than in neglected orchards, unless when the latter are in fruit. An old yellows orchard stood several years at Swan Creek, in Pineplains, and I have frequently seen yellows trees in Allegan village. It is such neglect that kills our orchards.

Robert Reid: I lost 500 trees by pure neglect. I could not destroy a nice Crawford tree that was bearing 40 or 50 baskets of fruit with only one peach or one limb showing yellows. I simply cut that off. But the next year that whole tree had yellows, as did others about it. The next year yellows appeared in my other orchard, and then I had learned to take the diseased trees out at once; but I hauled them through the orchard and spread the disease that way. I now put lime about my trees and have faith in it as a preventive.

J. H. Wetmore related his experience. Yellows appeared first in one tree in one corner of his orchard, on a sandy knoll, the next year in the extreme opposite corner on heavy soil, in only one tree also. He next saw it some years later and he had to take out his whole plat; but just preceding this outbreak of the disease, his man had plowed the orchard seven inches deep, doing extensive damage to the roots. Commissioners had marked trees in his orchard whose only ailment was grubs and severe winters. Mr. Wetmore is a disbeliever in the contagion theory, but he always takes out the diseased trees promptly.

O. Beebe: Examinations with the microscope have shown that no bacteria are in the roots the first year of yellows.

A. C. Merritt: I have proved in my own experience that new trees may be successfully raised where diseased trees have been uprooted.

TRAINING TREES AND THINNING FRUIT.

Mr. Wm. Corner, of Ganges, appointed to lead on this topic, said: Many years ago, when this was a very new country, I first came into it and began a clearing. I will always recollect the trip I soon afterward made to the home of Levi Loomis. He brought into the room for my regalement, a pan of big yellow peaches, and I was so delighted with them that I determined to raise such if I could; and I went into my cabin soon afterward and began peach culture. I said to some neighbors, about this time, that this lake shore was peculiarly adapted to fruit raising, and particularly to production of the peach. They laughed at me. But now, behold! Look on the other side than that of yellows. There is no place on earth where the peach flourishes better.

Lately I saw at Fennville a man who had received a lot of peach trees. He had them lying open and dry upon the rack of his wagon. I do not do so. When I receive my new trees I cover them as carefully as I would a baby. I get them in the fall and put them into a trench, laid down, but not covered far up their trunks, as doing so makes them tender, and they come

out in the spring fresh and thrifty. Don't let the roots become dry. Many have made mistakes as to varieties. There should be more late fruit. I spread copperas about the roots of the trees and it greatly decreases the borers. Caustic lime will do the same. Trees are often ruined by overbearing, and careful, systematic thinning is one of our most important duties. This work I do chiefly by means of clipping out the little branches. As a rule our trees carry too much tender foliage. We sometimes become wearied with talking over so often these methods of growing fruit. But why should we? There are always beginners who need just these points, who come to such meetings as this to get them, and it is our duty to give them constantly the benefit of our experience.

Mr. Manwaring: I would first thin by clipping out the limbs and afterward by picking.

A. Bos: Will thinning to three inches apart do? J. H. Wetmore: I would want more, for the large sorts. Clipping is an insufficient way of thinning.

Levi Loomis: I do not find that copperas will kill the borer, nor ashes, salt nor lime. I find no difference between peaches three inches apart, and those close together, and would thin to four or more inches. The fruit of double buds will do as well together as one would if the other were taken.

Mr. Corner: For all the use of copperas I take out the grubs by digging, and leave the crown dry, as the moth which lays the egg will not so readily attack hard and dry surfaces.

D. W. Wiley: I used to dig the borer every fall and spring; but we waste time so. I would not encourage neglect, but after a tree becomes four years old, time is lost hunting borers and more harm is done than good by the ordinary man's cutting.

Mr. Hamilton: What is the rule at South Haven?

A. C. Merritt: We regard thinning as of much importance, but the tree must be right before it begins. Some trees I see need the saw first. I begin with shears. You must have first your ideal. If a twig that should be left has four fruits and is fit for but one, take off three. But take out such twigs as should not be there—give light and air to what remain. Proportion your fruit nicely. Leave the base peach if it be thrifty, otherwise leave some other. Leave apart or in pairs, as may seem best, but three inches is too close—four to six is much better.

J. J. Atherly agreed to the above, adding: Fix the limbs so that they will not rub nor whip each other nor their fruit.

Clark Sheffer: The grub is not stung into the tree. I heap dirt to the trees the middle of June and remove it the middle of August, leaving the eggs at the surface where they dry. I have but few grubs. This method involves labor but it is effectual. Usually trees have too many branches. They should be thinned to six to eight inches apart.

CAN BLIGHT IN PEAR TREES BE PREVENTED?

was a question upon which Wm. Shirley of Millgrove was to have enlightened the society from his wealth of experience; but being absent Mr. LaFleur spoke in his place, giving Mr. Shirley's method with twig blight in the pear tree. As soon as an affected tree is discovered, blighted portion is cut off and the bark of both limbs and trunk are slit to the wood, several slits

being made in each of the large limbs and the body. This stops blight every time. He does not know why; but his theory is that in certain conditions the leaves fail to elaborate all the sap furnished, and the new growth of bark following the slitting affords the needed relief.

Wm. Corner had tried this method but the trees died of blight just the same. Still he believes slitting the bark to be a good practice.

Mr. LaFleur suggested that Mr. Corner may have left his trees too long before trying to save them.

Joseph Lannin: Blight comes in hot weather, in August, when the hot sun comes after rain; and it comes upon all varieties and upon all soils. There is such a thing as trees becoming hide-bound. Slitting will relieve this. It will also promote the setting of fruit buds, but perhaps, for this end, it is not good for the tree. I have cut out blighted limbs and the trees have lived. It is not as prevalent as it was some years ago, and I have not for several years seen such weather as I described. There is no danger of over-fertilization of the pear tree.

Mr. Lannin, being asked what pears he would set for profit, said he would plant 100 each of these five sorts: Bartlett, Flemish Beauty, Bosc, Louise Bonne, Sheldon, Anjou. "But you have named six," said the reporter. "Well, you may strike out any one of them." Mr. Lannin further said he would set standards of all varieties except Duchess and Clairgeau.

President Phillips made brief but earnest and fitly spoken expression of thanks to the members for the aid and consideration shown him, and declared the pleasing and successful June meeting closed.

FOURTH ANNUAL MEETING AT PAW PAW, DEC. 7-9, 1887.

The fourth annual meeting of the society was held at Paw Paw, commencing Wednesday evening, the 7th, and continuing until Friday noon, the 9th of December. The committee on arrangements and reception had made provision for the entertainment of members and visitors in attendance at the meeting, and also secured the court-house for the society.

At 7.30 P. M. President Phillips called the meeting to order. The exercises of the evening opened with singing and instrumental music by a select choir, which added much to the pleasure of the evening and was highly appreciated by the audience. This was followed by prayer by the Rev. Pellister. O. W. Rowland, editor of the True Northerner, delivered an address of welcome, which was responded to by Secretary LaFleur, in the absence of C. L. Whitney, of Muskegon, who had been appointed to the task. Further remarks of the same order were made by Messrs. H. Dale Adams, of Galesburg, and Joseph Lannin, of South Haven.

President Phillips delivered his annual address, reviewing briefly the work of the society from the beginning, and urging perseverance in the well doing so auspiciously begun.

The remainder of the session was occupied with reports of the apple crop of 1886, which was stated to have been of average quantity and quality, or better than that.

Thursday Morning Session.

At the Thursday morning session the secretary's report was read and accepted. The president named the following committees:

Resolutions—J. G. Ramsdell of South Haven, H. E. Blackman of Allegan, C. J. Monroe of South Haven.

Fruit—W. A. Brown of Benton Harbor, H. Ray of Watervliet, A. H. Smith of Paw Paw.

Miscellaneous—H. Dale Adams of Galesburg, W. A. Smith of Benton Harbor, W. B. Andruss of Allegan.

The first topic considered was

SOIL AND LOCATION SUITABLE FOR THE APPLE ORCHARD.

W. A. Brown said he would first speak of some locations not adapted to fruit growing. Most of the western and northwestern states, especially such

states as consist largely of prairie, are not adapted to fruit growing. The low temperature during winter and the general level condition of the land is not favorable for apple growing. Thousands of dollars had been spent in the vain attempt to grow apples. The last attempt is being made by trying to grow some of the Russian apples, but they are nearly worthless and are almost a failure. In some of the eastern states the old orchards are on the decline, and in some parts of Michigan the prospect is none too flattering. Even in the states where apple growing is most successfully conducted, comparatively a small part of the land is really adapted to the successful growing of apples for market. The sandy pine land, the low, wet land, and even the clay soil, where the clay subsoil retains too much water, or when there is no natural drainage on large, level flats that will not admit of tile drainage, are all unfit for apple growing. The apple orchard should be planted on elevations having both water and air drainage. A clay loam or gravelly soil is desirable. The northern part of this state is the best at present, due to timber belts.

W. B. Andruss: I will give some facts concerning my own orchard, in regard to elevation, soil and mode of cultivation. My orchard is situated on elevated ground; although part of the ground is level, yet it is considerably higher than most of the surrounding country. The soil is sandy loam mixed with gravel, and also small and large stones, with not much clay in the subsoil. I do not prune my trees so severely as many growers do, but keep them moderately open to the sun and air. I plow the ground once in three or four years shallow. I have a large number of varieties. My orchard has paid me much better than other land in ordinary crops. I have a fair amount of apples every year, but large crops the even year.

H. Dale Adams: Plant the apple orchard on elevated, dry, strong soil, such as will grow good crops of wheat and corn.

VARIETIES FOR HOME USE.

A. Chatfield: The selection for home use is a matter of taste. Hardly any two would select exactly the same list of varieties. Some of the best for home use might not be suitable for market apples. There are so many good varieties of apple, almost anyone can find some one suited to his taste. The Northern Spy has some good qualities. I prefer it to Baldwin. I have ten Rhode Island Greening trees, and one Baldwin tree in one row. The single Baldwin tree bears more apples than the ten Greenings. The trees stand on sandy land. Near by, an orchard on clay soil has several Greening trees which are quite productive.

L. H. Bailey has a large apple orchard growing on strong soil which has been cared for and kept in good, healthy condition. The trees stand 40x40 feet each way. This is too close; should prefer 45 to 50 feet. The apples that pay best with him are Stark, Baldwin and Ben. Davis. They each bear well, keep well and sell well, provided you look after the sales and commission men yourself. He shipped to one firm thirty barrels of apples and to another eight barrels. He received returns of $1.50 per barrel from both firms. He sent his son to these commission houses, where he found the apples with his name on the barrels. He bought the apples of both the firms, paying $2 50 per barrel for both lots, and took receipts for money paid, which he handed to his father, L. H. Bailey, who called upon these two commis-

sion houses and asked for an explanation. The commission men made the matter satisfactory to him!

W. B. Andruss: I have a large number of varieties in my orchard, consisting of summer, autumn, and winter apples. They are not equally valuable for productiveness and quality. I have secured scions of the different kinds and grafted them into the tops of some of my trees, and in some instances I have three or more sorts grafted into one tree. I do this for the purpose of testing them. In this manner I have tried nearly one hundred varieties. Of course, many of them are not worthy of cultivation for market, but the quality in some cases is excellent. There is only a comparatively small percentage of this number really valuable for market. I consider the following list as embracing the really good dessert apples: Primate, Lowell, Pommewater, Gravenstein, Hawley, Melon, Belmont, Jonathan, Northern Spy, Grimes' Golden.

J. L. Hopkins: The Baldwin is a valuable apple and has perhaps paid better and been sold for more money than any other one sort; but with all this it has some defects. The tree is not hardy, and the quality cannot be said to be number one. The Stark is hardy, an immense bearer, keeps better than the Baldwin, of better quality, and equal in size and color; it is one of the best market varieties for Michigan.

GRAPES.

The president here announced that one hour would be devoted to grapes, and called upon Joseph Lannin to lead in the discussion of that topic.

Mr. Lannin said elevations having natural air and water drainage, as a rule, are better adapted to fruit than level or lower ground. Good strong soil should be always preferred. This is true with the grape. There are different methods practiced in training the vine, and each has its advocates and each has merits in a greater or less degree. More depends upon a good soil and location, with a proper care, than upon the particular method of training. Like nearly all kinds of fruit, there are comparatively few varieties of grape adapted to this section, that can be called profitable. We have black, white, red grapes, and some one of each color may be said to be superior to the others. Soil, location, and methods of cultivation might change the relative value of some of the varieties commonly grown. All things considered, the Worden for black, Brighton for red, and Niagara for white, are best. The Niagara is perhaps the best white grape. The vine is a strong grower, hardy, and productive; the quality is good. He has now 400 Niagara vines in bearing; would plant the Niagara in preference to all others. The Diamond is highly spoken of. The Woodruff has some advocates and is undoubtedly a good grape, but too late for this part of the state. It is later than the Brighton.

President Phillips agreed with Mr. Lannin in regard to Worden, Brighton and Niagara. In Ottawa and Kent counties the Niagara is free from rot and decidedly the most productive of any variety grown. No other kind yields so readily to the influence of proper care and training, or pays better in rich returns for fertilizers and culture, than the Niagara. He has forty-one varieties, but prefers the Niagara to any and all of them.

C. Engle, of Paw Paw, has grown seedling grapes for several years and is testing a large number of such at present. He said not more than one in every 100 proved to be better or even as good as the parent variety; had the

best results from the seed of Rogers' Hybrids. Mr. Engle had on exhibition eleven distinct varieties of grape grown from seed, some of which possess real merit. They had been kept in paper bags and were in an excellent state of preservation. Several grape growers who were present tasted the grapes and pronounced them all of fair quality and some of them really fine. Mr. Engle has not named these grapes and will not until he has fully tested them all and is ready to place them on the market.

Adjourned until one o'clock P. M.

Thursday Afternoon Session.

The first thing on the programme was a paper by Mr. C. Engle, of Paw Paw, on

VALUE OF PEDIGREE IN FRUITS.

It is with great diffidence that I produce for the public a paper upon this subject about which so little is generally, and I may say positively, known; and yet I am a thorough believer in pedigree for fruits, as much so as for horses, cattle, or sheep. Perhaps I could do no better than to give you my experience, that you may judge whether I have just reason for the faith that is within me. Twenty years ago I began planting pits and seeds to raise my own nursery stock. The pits (peach) were mostly from Crawford's Early peaches. When budding time came I noticed a good many of the seedlings had the general stocky growth and peculiar yellowish green foliage of the Crawford Early. Some of them, about twenty, I set in the orchard without budding. When they came to bear, every one of them bore fully as fine fruit, for aught I could see, as the budded trees, and some of them I thought a little superior. They did not ripen all at the same season. Some were a week or ten days behind, none ahead, of the true Crawford's Early, but all had the same general character of the parent fruit, large size, high color, and rich, yellow flesh. I was so well pleased with the result that I planted a lot more of the same kind to set in the orchard without budding; and also a lot of Hill's Chili and Barnard pits and some Concord and Delaware grape seed. At one year old I set in the orchard 500 of each variety of the seedling peaches. In the not very elegant but expressive vernacular of the day, I did not "get left" on a single tree of the Crawford's Early. All were good and two I thought worthy of a name, and so called them respectively President Lyon and Golden Beauty. The former was about one-fourth larger, higher colored, and in my judgment better in quality than its parent, ripening at the same time; but unfortunately it proved quite tender in the bud. The latter has only this to recommend it above its parent: it sets more buds, nearly double, and they stand more freezing.

Among the Barnards there were but few variations—three, I think; and yellow Honest John was one of them. With three exceptions all were true Barnards in appearance. And so with Hill's Chili. But few and slight variations were noticeable. A lot of Hale's Early pits planted at the same time proved equally satisfactory. All were as good in quality as the Hale, some of them much better. The greater proportion ripened with the Hale,

some a week to two weeks later. They (the fruit) varied more in general contour than any variety I had planted, some being very much elongated, like Hill's Chili, and some very much compressed. But I got no freestone—that I was looking for and am looking for yet.

My next venture was with Crawford's Late pits. These were planted five years ago the past spring and fruited the first time the past season. About one per cent were clingstone, and four trees bore oblong peaches like Hill's Chili with the same narrow, pointed pit and solid, rich, yellow flesh. I think these were fertilized with pollen from Hill's Chili, as the trees from which the pits were taken were partially surrounded by an orchard of that variety. One only was a white peach, which proved to be of superior quality. With three exceptions, all (and there were between five and six hundred trees) were true Crawford's Late, so far as habits of tree and size and general appearance of the fruit were concerned.

Five years ago I first attempted artificial fertilization by using the pollen of Hale on Crawford's Late blossoms. The result was a dozen trees, the most of which bore the past summer. Two only showed their breeding and bore white-fleshed peaches, the one the shape of Crawford's Early, with the same swollen point, and the other very nearly round, a little compressed. Both were as large as Crawford's Late, ripened a week before Crawford's, and were very good in quality, losing the extreme acidity of the parent on one side and the sometimes insipidity of the parent on the other.

Of the Barnards, Hill's Chili, and Crawford's Late, no selection was made but all dug and planted as they came up in the nursery rows. I sometimes think it would have been better to have done the same with the Crawford's Early seedlings. The chances of getting something new would have been greater. One of the rejected seedlings was budded to Crawford's Late, which, after bearing several seasons, was broken off. The sprouts which came up were left to stand and bore fruit, ripening six to eight days sooner than Crawford's Early and otherwise in every respect the rival of that famous variety.

So far as these experiments go, I think I can safely say that pedigree does favorably affect progress in securing better varieties. For who would think for a moment that the same number of good peaches would have been produced had the pits been gathered from good, bad, and indifferent varieties?

Of grapes, I first planted seeds of Concord and Delaware. There were fifty of the Concords, none of which proved of any value. The Delawares were so puny I never removed them from the nursery rows. The next planted were seed of Salem and Gœthe. The Gœthe plants proved to be weak and puny and so far have borne no fruit. The Salem were strong and robust, almost to a plant, and commenced fruiting at from three to five years old. Quite a per cent were fairly good grapes and some I thought very good. Many were white, some red, and all intermediate shades of color up to black. Some were quite early and some too late to ripen in this climate. But I did not see my ideal grape among them—one with a vine vigorous, hardy, and productive, berry as large as Wilder and as good as Duchess, with clusters weighing one, two, or more pounds each. I may not produce such a grape, but some one will, I fully believe, and at no very distant day. I have a lot of seedling Salems, Ives, Hartfords, and Marthas to plant out the coming spring. Also seeds of Salem, Niagara, Iona, Catawba, and Pocklington; seeds of Fay's and Cherry currants; of Gregg and Cuthbert raspberries;

pits of May Duke cherry, and of some of the best of the seedling peaches. With the product of some of them I hope to surprise you in the not very distant future.

The question of pollen influences is a vital one in connection with this subject. How long may the pollen be detached from the stamens or anthers, how far carried by the wind or otherwise, and still retain its vitality or fertilizing power? Does the tree or vine, whose seeds have been once impregnated by pollen from an inferior sort, forever after retain a taint of that blood in its system, as is the case in the animal kingdom?

I have no doubt, if we could isolate our trees or vines as we can our live stock, shut them up as it were, and so prevent impregnation from roadside scalawags, we could in time establish certain strains or breeds which would be just as certain to reproduce their kind as do our domestic animals, the Normans, Shorthorns, or Merinos. We can do much toward that end by planting only the best varieties and in as large and solid blocks as possible, and keeping all frost seedlings and inferior sorts at as great distance as may be. Seeds taken from such plantations would almost invariably produce good fruit, with the chance that is always before the experimenter in this line of producing a superior sort.

MORE ABOUT GRAPES.

Resuming the discussion of grapes, H. Dale Adams said he agreed with Mr. Lannin, the Worden for black, Brighton for red, and Niagara for white. Rot is the worst enemy to the grape; thinks rot more likely to apppear in vineyards than on single vines. The grape will grow and thrive on level ground provided the water does not come too near the surface. The wild grape grows on wet soil and bears annually.

W. A. Brown: The grape-vine will not do as well on low or level ground as on elevations.

Joseph Lannin: The vine on southern slopes will blossom early in spring and is sometimes injured by late spring frost. A northwest slope retards the blossoming in spring; prefers that from the fact that it is much more safe.

J. C. Gould preferred a northern slope. It retards blossoming. The grape crop had been a very large one and prices ranged low, yet he considered grape growing fully as profitable as cultivation of other fruits.

INSECT ENEMIES OF THE APPLE.

W. A. Smith, of Benton Harbor, gave a talk upon insect enemies to the apple orchard. He commenced by saying those enemies are very numerous and apparently on the increase; they commit depredations on both the tree and fruit. The borer and the codlin moth are the worst enemies with which the fruit grower has to contend, the latter doing the most damage and requiring the greatest amount of diligence to destroy. If some means is not used to destroy them or prevent their work upon the apple, they threaten to largely reduce the amount of apples grown and compel the fruit growers to suffer great loss. Every precaution should be used to prevent the ravishes of this terrible pest. The ground in the orchard should be kept free from rubbish, such as bark, boards or logs. The bark on the trunks of the trees, well up among the limbs, should be scraped off. This will destroy the hiding places

where the cocoons are spun, in which they pass the chrysalis state. Various methods have been in use to trap and destroy the worms and prevent their hatching. Within a few years experiments have been made with the use of Paris green, by spraying the trees immediately after the blossoms fall, while the apple is very small. This should be repeated in ten days. One pound of Paris green mixed with 80 gallons of water is the mixture used. A force pump is necessary to spray the trees. The saving of fruit exceeds the expense. If every fruit grower understood the effect of spraying his trees, and all joined in the work, it seems to me we might drive this pest from our orchards.

PACKING AND SHIPMENT OF APPLES.

J. C. Gould, of Paw Paw, who has been engaged in shipping apples and had large experience, was called upon to give a short talk upon picking, packing, and storing apples. He said he had had the best results by following a few simple rules. The apples should be ripe on the tree before picking. They should then be gathered before they drop or are blown off by the wind. It requires some experience and observation to know just when any one variety is ripe and ready to gather. If picked too soon they will wilt, destroying somewhat the crisp and the flavor of the apple. If left on the tree too long they drop or are blown off, causing loss. Autumn apples come into condition for picking all through the autumn season. Winter apples of different varieties do not all ripen at one time. Some varieties ripen quite early while other varieties should remain on the tree much later. Some varieties will drop off much more readily than others. Apples growing on slender twigs will hang much better than those growing on stout, short limbs. All these points the intelligent grower will understand by careful observation. He should study the habits of each kind of fruit grown by him. When any variety of apple is ripe and ready for gathering, place the fruit in barrels and put them into a dry, cool place and let them remain standing on end until ready for shipping. Then empty them on straw or hay, and sort and repack in some barrels, putting in only perfect apples. Care should be used not to mix varieties. Place only one kind in each barrel and see that they are marked on the head of each barrel the true name of the variety. In this manner you can first ship or sell the varieties that will not keep a long time, and retain the good keepers later if desired. Care should be used in handling apples, to prevent bruising. The stems should always remain on the apples. Never draw your apples to market loose in the wagon-box. They should be placed in barrels before leaving the orchard. Very much loss comes by improper handling and carelessness in picking. I ship to some special market and usually know beforehand what I am to have. Find a good market and ship only good apples. You will then get best prices.

E. G. Buel agreed with the last speaker in manner of picking, but thought September 25 to October 10 the most favorable time for such work. His method for repacking is to place the apples on a table covered with blankets, then sort and repack. I have picked, packed and shipped apples immediately, and have kept them in barrels for some time, then repacked, sometimes heading up and shipping soon; have sometimes kept them several weeks after they had been repacked. I prefer the latter method. I head them when ready to ship. The average farmer is not an adept in handling and selling

apples. Such would better sell to shippers direct. They know then exactly what they receive for them. This would be found best in the long run.

J. G. Ramsdell said the farmers that shake off their apples, pick them up without sorting, mix several varieties together, and draw them over a dusty and rough road in their wagon-boxes, six to eight miles, and then sell them for what they can get, are the men that ruin prices by throwing these cheap apples on the market. This fixes prices and then it is not so easy to raise them. There seems to be no way of reaching these men. They will not attend fruit growers' meetings, and many of them read few if any papers published in the interest of fruit growing.

N. H. Bings: I am one of those average farmers. Farmers are not all well posted in growing and handling apples, neither are they so regardless of their own interest as to handle their apples in the manner described. Some of them may not be as particular as they should. We have been advised to sell our apples direct to buyers. When buyers learn to pay a fair price for good fruit well handled and delivered in sound condition, perhaps farmers will be quite willing to take more pains and deliver their apples in good condition. The dealer buys your neighbor's apples at low figures because they are in the bad condition mentioned, then tries to force the price down to the same figures for your first-class apples. There is little encouragement for farmers to handle with care.

THE AVERAGE FARMER AS A FRUIT GROWER.

The secretary read a communication from some member of the farmers' club, asking that the society discuss the question, "How far should fruit growing enter into the business of common farming?"

D. S. Woodman: Farmers ought to grow all the garden truck and fruit of all kinds that their families need. This they should do for the comfort and health of it. Then, when the location is right and the farmer is interested in fruit growing, there is no reason why he may not grow fruit for market. He should not attempt too many things or he will fail in all.

Henry Chatfield said he had grown garden truck and small fruit in connection with common farming. With proper help to perform the work and a competent person to manage, there is no reason why any man may not make a success in growing fruit and berries. The orchard requires manure. Farmers that keep stock will find that the farm is kept in better condition by them for any crop than those that sell everything off from the farm.

J. J. Woodman: The remark was made last night that Michigan contained within its limits nearly everything necessary for the support of the people. When we consider the timber and minerals, with the varieties of grain and vegetables grown, also the fact that we grow every kind of fruit that is really necessary to supply our wants, and even many of the luxuries, we must admit that her resources are truly wonderful. There is no good reason why the farmers may not grow not only farm crops, but fruit and vegetables to supply the family. It may not be advisable for farmers to grow small fruits for market in connection with general farming. But where the soil and location are favorable, the farmer should grow apples, as no common farm crop pays better, if it does as well, as the apple orchard. Considering the amount of fruit grown in Michigan, and the uses to which it may be put, it seems to me that its real value has not been appreciated. The vast amount

of fruit grown in this State, and its great value should enter into the statistical reports as showing the resources of Michigan. The apple is king of fruits, as a general fruit for all sections. It enters into more kinds of food, in one way and another, for home use, than any other fruit grown. If you go south, among the oranges, lemons, bananas, and other tropical fruit, you will find that the people there would give more for such a collection of apples as we have here on exhibition than for all the tropical fruit they grow.

W. A. Brown: I shall not advise farmers to attempt the growing of berries and small fruits for market. Leave that to small farmers who make a business of growing for market. But every farmer should provide his family with berries for table use. This will not require much labor or expense.

W. A. Smith: Farmers should grow all the fruit necessary for home use, such as apples, pears, peaches, plums, berries and grapes. These should be grown in abundance and used freely. Cultivate a taste for fruit—it will preserve health and save doctors' bills.

A. G. Glidden: Some people claim they have no time to care for small fruits; they let the grass and weeds grow among the berries and other fruits.

If these same men would plant only one-half the amount and take proper care of that, they would derive not only pleasure but profit; good, fresh, ripe fruit saves a great amount of work in the house.

Thursday Evening Session.

The session of Thursday evening was begun by the reading of the following paper, by A. H. Smith, of Paw Paw, on

SURFACE IRRIGATION FOR FRUIT TREES.

Under ordinary circumstances the roots of a tree extend in a circle whose radius is equal to its height. This is proved in a dry season, like the past, by the absence of all vegetation within this circle. The tree, having prior possession of the ground, absorbs what moisture there is and other vegetation makes a sickly growth.

Those who contemplate surface irrigation of fruit trees should procure a rain-guage and keep a correct record of rainfall during the growing months of the year, or from April 1 to October 1. From records made at Lansing, during a period of ten years, we find the average rainfall per month during the growing season to be 3.40 inches. Taking out two extremely wet seasons—1880 and '83—and the average for the remaining eight years is only 2.77 inches per month. Even this is probably in excess of the requirements of the tree, for during the hard showers, as soon as the ground is saturated, the water runs off and its benefits are lost. Probably two inches per month would be a safe basis to work from. This would amount to 392 gallons for each tree whose roots extend in a radius of ten feet. This would be about eight oil or naphtha barrels full of water. Nature usually supplies this amount, and in some instances more than five times as much water has fallen from the clouds in a single month, or at the rate of forty barrels per tree. Is it any wonder that the fruit rots under such conditions? Taking two inches

as the requirements of the tree, our aim is to supply the deficiency, if any, as recorded by the rain-gauge. To illustrate: Suppose that up to a certain date we have more than the required two inches per month rainfall; or to be more accurate, one-half inch per week. It should be remembered that the rainfall must be well distributed, at intervals, to be effective. Now come two weeks with no rain. We give the tree two barrels of water, more or less, in proportion to its size, equal to one-half inch of rainfall. If another week passes with no rain and no prospect of any, we must repeat the application. It is expensive but I think no man ever lost a dollar in this way, provided he did the work thoroughly. Another consideration: Work is at a stand still, except with those who believe in the theory of constant cultivation, during a drouth. We have lost faith in that theory here. In looking over the reports for a series of ten years, I find but one month during the summer season when the rainfall was less than one inch. It will usually be found that a barrel or two of water, applied just at the critical period, will insure a full crop of fine specimens, while if we wait a few days, hoping for rain, and it does not come, the crop is ruined as far as size and quality go.

In Michigan we are obliged to use mechanical means for irrigation. Water must be drawn in barrels or tanks from adjoining lakes and streams, or a windmill and reservoir can be built upon the highest ground in the orchard. In using well water for irrigation, care must be taken that the temperature is not below that of the surface soil. If cold water is used direct from the pump, more harm than good will result, especially with young trees. The cost of irrigating fruit trees with windmill and tank would be expensive except in very favorable locations;but it might be used for strawberries or garden truck and made profitable. Water hauled in barrels a distance of one-half mile will cost from ten to fifteen cents per barrel of fifty gallons. In case of peaches, a barrel of water applied when the tree really needs it, that is, about ten days or two weeks before the fruit ripens, will pay from one to five times the cost of application. If the tree should be large and the ground extremely dry, several barrels might be applied with proportionately profitable results. I think it is safe to say that peaches and plums will stand any ordinary drouth if given plenty of water about two weeks before they ripen. In proof of this theory, Smock and Salway peaches withstood the long summer's drouth, and copious rains,coming just before they ripened,produced a crop fully equal to the average. Pears and apples need a reasonable supply of moisture all through the season. A few experiments may be instructive. Two Flemish Beauty pear trees standing side by side, called in the plainest language for moisture. About one-half of the foliage was gone and the half-grown pears were beginning to drop. A barrel of water was rolled to one tree and allowed to run out slowly. Twenty-four hours later the difference in foliage was noticeable. The watered tree stopped dropping its foliage and fruit, while the tree not watered continued to drop both. This tree then received a barrel of water with the same results, but the twenty-four hours' difference in time of application was never made up. The first tree watered had the largest pears and the most foliage. A Damson plum tree began to drop its fruit on account of drouth. A hole was dug about four feet from the trunk, large enough to hold a barrel of water. No fruit dropped after the application, but as the drouth continued we repeated it a week later. After this showers came to our relief and we harvested a fine crop of plums. At the first picking of Hale's

Early peaches, the fruit on several trees standing on a sandy ridge was found to be green and shriveled and about the size of hickory nuts. These trees had not been properly thinned, and carried too many peaches to ripen well except in a favorable season. It was supposed that the fruit was past recovery, but as an experiment a barrel of water was applied to each tree. This revived them perceptibly. Several days later the ground was well soaked by rains and the fruit ripened perfectly, although rather small and a week or more later than trees on heavier soil. Three Smock trees stand in sod near the house where they can not be well cultivated. Two of them received no water and bore no fruit. The third received five barrels of water, or two hundred and fifty gallons, at intervals during the summer whenever the ground seemed very dry. Notwithstanding the tree had stood in sod and had received no cultivation for two years, it bore nearly a bushel of quite large Smocks. If the tree had been cultivated, probably one-half the amount of water would have produced the same results. The experiments undoubtedly prove that surface irrigation during a drouth will enable a tree to ripen a full crop, when if neglected a crop of small, inferior, and often worthless fruit will surely result.

The time has come when we must adopt a more intensive method of cultivation. The man who thoroughly cultivates a few acres, looks after the wants of each individual tree or vine, and never tires of studying their varying characteristics, is the one who will ultimately succeed.

A. C. Glidden of Paw Paw followed with a paper on "Vitality of Apple Orchards."

PRUNING AND GENERAL CARE OF APPLE ORCHARDS.

J. G. Ramsdell of South Haven said: The decline or the bad condition of so many apple orchards, is the result of bad management and improper pruning or no pruning at all, and in some instances they have been allowed to overbear without returning to the soil the necessary amount of manure to supply the elements to produce fruit. Constant draft upon the soil will in time starve any fruit tree which bears annually. The trees should not be allowed to carry too much top. If apple trees are properly pruned and fed from year to year, and not allowed to overbear, they will, if the location and soil be what it should be, remain in healthy and thrifty condition very much longer than many of the orchards to be found in every locality.

H. Dale Adams: I don't agree with Brother Ramsdell. Don't trim the tree at all if you want to preserve its vitality. Pruning and overbearing are the causes of the decline in many cases. Near my farm stands an old apple orchard, planted by the Indians. It has never been pruned and has borne but little fruit; yet it is in apparently good condition. The old apple orchards planted by the Indians were found in good, sound condition and continued so much longer than trees planted in later years by the white settlers and cared for.

J. G. Ramsdell: The statement made by Bro. Adams is not proof that the no-pruning system was the cause of the health and longevity of the Indian orchards. At that time the soil was new, containing all the elements necessary to grow any fruit tree. The forest trees were then mostly standing, affording protection. At that time and until most of the forest trees had been destroyed, the peach grew and bore large crops of fruit; but from some cause a change has come. This may be observed in many other things

grown besides fruit. I attribute this to a want of some element in the soil which has been exhausted by constant drafts without replenishing by fertilization.

W. A. Brown: I do not believe in severe pruning. Never cut off large limbs. If we grow good fruit we must have air and sunlight, and this can be regulated by moderate pruning. There is something about the condition of the soil and climate quite different from what it was in the early history of fruit growing in Michigan. The trees planted at this time and for several years past are mostly grafted in the root; also some of the best and leading varieties are somewhat tender. While improving the quality of the fruit grown now, we may have lost some of the hardiness of the tree.

H. E. Blackman: Much depends upon the time the trees are pruned. There is considerable difference of opinion as to the best time. Every fruit grower should observe carefully the effect of pruning at different seasons of the year. This is a question worthy of investigation. We can only arrive at definite conclusions through a series of experiments at different seasons of the year and on trees growing in different soil. One well established fact, arrived at through well conducted experiments by different men, is of much more value than any amount of theory. Maple trees should not be pruned until the danger of the sap running out is past. Trim maple trees in June or last of May, but never in winter or early spring.

Norman Phillips: One cause of loss of vitality of apple trees may be traced to the bark louse. No tree can grow which is covered with lice. They are much more common than most people would believe, and it might be well for farmers to examine their trees and if they are infested with the bark lice, they may be easily destroyed by painting the bark of the tree with a mixture of pine tar and linseed oil—equal parts boiled together and applied well up on the limbs. This will destroy the lice and not injure the tree.

SOME MORE ABOUT PEACHES.

The subject of peach growing was commenced for discussion. C. Engle of Paw Paw, who has been engaged in growing peaches from the pit for several years, was called upon for a short talk. He had planted pits from many of the best varieties. Some sorts will reproduce themselves from the pit more often than others. Pits planted from the same tree will produce many different sorts, some ripening early and others late. I find the best results from planting the Crawford pits, although pits from Hill's Chili will often come true. Many good varieties have been produced from Hill's Chili pits. The Barnard will often reproduce itself from pits. He plants selected pits from the best varieties, and in this manner has produced some valuable new varieties of peach.

C. J. Monroe asked Mr. Engle if he were to plant out a new peach orchard of 1,000 trees which would he prefer, trees grown from pits or trees grown in nursery and budded. Mr. Engle said he should prefer the trees grown from pits.

C. J. Monroe: Will you give the method you would adopt in growing these trees from the pits and your method of selecting?

Mr. Engle: I should first select the pits from the best varieties and plant. When ready for planting I should select the most promising trees. The tree is an indication of what the fruit will be. By long experience and careful

observation I am enabled to judge quite accurately by the tree. I am so well satisfied with my experiments that I will continue them in the future.

H. Dale Adams had visited Mr. Engle and examined some of the trees grown from pits; thinks Mr. Engle is doing much for the benefit of fruit growers, who will receive the benefit of such experiments. Mr. Adams once received a peck of pits of the Hill's Chili. They were planted and nearly all produced Hill's Chili of fine quality.

W. A. Brown said there are trees grown from Hill's Chili pits, some of which are an improvement on the budded trees commonly sold.

Friday Morning Session.

The secretary and treasurer made reports which were accepted and adopted. The following officers were then elected:

President—Walter Phillips of Grand Haven.

Vice-Presidents—W. A. Brown of Benton Harbor, J. G. Ramsdell of South Haven, H. H. Holt of Muskegon, H. Linderman of Casco, Benton Gebhardt of Mears, Oceana county.

Executive Board—Joseph Lannin of South Haven, W. A. Brown of Benton Harbor, H. Dale Adams, Galesburg, A. C. Glidden of Paw Paw, William B. Andruss of Allegan.

Secretary—G. H. LaFleur of Allegan.

Treasurer—W. A. Smith of Benton Harbor.

FRUIT EXCHANGES.

A. C. Glidden, who had met the secretary of the Delaware Fruit Exchange, and received from him an explanation of the working of the exchange in that state, was called upon. He explained the working plan and the results of the past year, which had been very satisfactory, both to fruit growers and buyers. He hoped that steps to organize a fruit exchange in this state would be taken soon. This should be commenced at once, that we may receive the benefit the coming year. Michigan produces a large amount of fruit, commencing with the strawberry in June and continuing until the close of the year. Our present system of selling subjects the shipper to much loss and in some instances to entire loss. Combination is necessary to systematizing or regulating the methods for the sale of fruit. Mr. Glidden read from a California paper an article explaining the method adopted and the results of the past year's experience in that state.

W. A. Brown: The tendency is toward combination for self-protection against the imperfect methods in practice both among commission men and the fruit growers themselves in the handling and sale of all kinds of fruit. We have a great diversity of fruit in Michigan. The question is, how and where can we place it on the market to the best advantage?

G. H. LaFleur: Soon after the organization of this society, A. S. Kedzie, of Grand Haven, urged the importance of some combination by which fruit-growers could adopt better methods for placing their fruit in the hands of consumers. That the importance of this question is fully realized by many,

if not every member, may be inferred from the fact that the matter has come up at almost every meeting of this society in the past. But no definite action has been taken to unite in the formation or adoption of plans that could be put into general practice. This society is composed of members coming from different parts of the State. This fact renders it the more difficult for us to adopt any plan which can be entered into by all the members. The time has arrived when some definite action should be taken, looking to the formation of a fruit exchange for the benefit of the fruit growers of western Michigan. I think if anything of the kind is accomplished it must be through interested fruit growers who shall organize and elect officers and act independently of other organizations. I would recommend that the president appoint a committee of three, for the purpose of organizing a fruit exchange, and I will ask W. A. Smith, of Benton Harbor, to offer some such resolution. Mr. Smith then offered a resolution to that effect, which was adopted. The chair appointed as such committee W. A. Smith, A. C. Glidden, and J. G. Ramsdell.

The committee met immediately and decided to issue a call for a meeting of fruit growers at South Haven, some time in January, for the purpose of organizing a fruit exchange.

The customary resolutions of thanks were adopted, and an invitation accepted to meet in Benton Harbor the ensuing summer.

REPORT OF COMMITTEE ON FRUITS.

Your committee on fruits would respectfully report as follows:

The exhibit of apples made by W. B. Andruss of Allegan is exceedingly fine, and being composed largely of new and comparatively rare varieties is worthy of special commendation. Included in this exhibit we find perfect specimens of Wealthy, Melon, Shiawassee, Stark, Hubbardston, Mother, Ostend Greening, and other varieties. The thanks of the society are due Mr. Andruss for his exhibit, also for his remarks regarding the qualities and characteristics of new apples exhibited.

Mr. Hopkins of South Haven exhibited specimens of a new and rare apple known as "Richard's Graft." This apple is grown by B. S. Williams of Saugatuck, who has several trees in full bearing. The apple is very large, is striped with deep red on a yellow surface, and is of the best mild sub-acid flavor. The season is late autumn, going to market soon after Maiden Blush and it sells at a better price than other apples of its season.

H. Ray of Watervliet placed some fine specimens of the Mann and Jonathan.

C. Engle of Paw Paw exhibited sixteen varieties of grape, thirteen of which are seedlings originated by him. These grapes are all remarkably well preserved, and comprise all the colors and many of the qualities and characteristics of the new and best seedling grapes. We find one white, one red, and one or two black varieties, which are of excellent appearance and good quality.

Mr. Engle informs us that some early varieties are more promising than the varieties on exhibition. He has produced all these grapes from seeds of the Salem and they are selections from a very large number of seedlings grown by him. The thanks of the fruit growers of western Michigan are due to Mr. Engle for his intelligent and persevering efforts in propagating new and valuable grapes and peaches, as manifested in his orchards, and as will appear in the records of this meeting.

FIFTH ANNUAL MEETING, AT FENNVILLE, DEC. 18-20 1888.

One of the most valuable meetings ever held by Michigan pomologists was that of the West Michigan Fruit Growers' Association, which opened in Fennville the evening of Dec. 18. Its value consisted chiefly in the practical character of most of the papers and discussions; but aside from this, there was begun a movement to secure cheaper and better transportation by rail to Chicago of the fruit crop of this section of the state, which has good promise of success. Its establishment would revolutionize that branch of the fruit growing business and save annually thousands of dollars to the producers.

There was a fair attendance when President Phillips called to order and announced music by the Fennville band, and then introduced State Senator McCormick for the address of welcome.

Mr. McCormick alluded to the many glorious advantages and resources of our country and specially extolled Michigan and her famous fruit belt, defining the latter as "a narrow strip from Grand Traverse to Berrien." Declaring his pride in the work of the horticultural societies of the state, for their aid in advancing and enlightening the fruit growers, he paid deserved compliments to "the Lyons, the Garfields, the Phillipses, and the LaFleurs." He praised the pioneers of our state and the wives who so bravely shared their labors; thanked the Fennville business men's association for their complete provision for entertainment of the visitors, and extended to the latter a cordial welcome.

To this Mrs. N. H. Bangs, of Paw Paw, thus fitly responded:

We have come to a period in our history when anything that savors of antiquity has an interest and charm for us. Pictures and pottery dug from the ruins of Pompeii bring fabulous sums. Even an article of common stone-china, if it has reached the age of one century, outranks its more modern sisterhood, takes upon itself airs, graduates from the dining-room to the parlor, and, smiling down upon us from the mantel, seems to tell us stories of our ancestors and the long ago. If by reason of great strength or careful usage its age is lengthened, its value is correspondingly increased.

Freemasonry asserts for itself an early beginning in the chronicles of the world. I may not be well versed in their theories, but I think some writers say the order antedates the flood—at least the building of Solomon's temple—which, upon the theory of the "survival of the fittest," gives them great respectability and a claim upon us for veneration for the organization.

Agriculture, for the last century or more, has been demanding greater prominence among the professions as her due, basing the same upon her early origin and the dignity of her work, and now it stands as the peer of any, recognized by all as a power to be courted by those aspiring to high places.

Agriculturists, with their twin companions, horticulturists, have an established claim to being the oldest known workers.

Tonight you have welcomed to your midst a branch of this great body. Fruits have been brought by different members and placed upon the stands. Prominent there, as everywhere, is the apple. Daily upon our tables and hourly in the hands of the children, it seems to be the most important, standing in the same relation to all fruit that bread does to all food. The word comes to us from the old Anglo-Saxon, its orthography from the Danes, and to them it signified "all fruit," but in our later years, fruit without a stone. Among the Greeks there were twenty-two varieties known, among them the custard apple which was sold upon the street by mongers called custard-mongers; and now we have costermongers, the word remaining to us, although this variety of apple is lost.

The apple of Sodom, of which Chateaubriand and Josephus speak, travelers tell us, still grows by the Dead sea, still fair to look upon but bitter to the taste.

From the Narrows to the Golden Gate, Michigan fruit is sought for. Traveling in the south, Michigan apples are found upon the bill of fare. So popular is this fruit that it has come to be one of the tricks of trade to give this name to any thing of the species of apple.

Tonight, in well-chosen words, you have given greeting to the fruit growers of western Michigan, and extended to them the hospitalities of your village and your homes, which we accept as an earnest of your good will and faith in the brotherhood—a brotherhood made honorable not only by lapse of time, but as well by the character of the employment and its beneficent influence upon those employed, thus being akin to the culture of flowers and music in the family.

If he be "a benefactor who causes two blades of grass to grow where but one grew before," what shall be said of him who propagates, raises, and even introduces new varieties of fruit, as well as studies to make the most of each tree and plant?

The consumption of good, ripe fruit is health-giving, and in some instances life-giving, and in all cases reduces the doctor's bills.

We come to you for another interchange of experiences, to give and to receive, together to hear the lessons of the past recited, to tell of our hopes and plans, and to peer into the future, as far as we may, with a vision born of the failure and success of the past.

For the association I have great expectations; for, if such be LaFleur, what must the fruiting be?

I hope neither at this meeting nor any other will a careless or designing hand toss the apple of discord into your midst, but that all may remain, as now, contented and harmonious; and I should be very glad if at some time in the not distant future, Mr. McCormick, your position and mine might be reversed, and that I might welcome to my own village of Paw Paw the fruit growers of western Michigan.

After another selection by the band, President Phillips read his annual message, as follows:

LADIES AND GENTLEMEN—According to an established usage of this and other societies, it becomes my duty at this our fifth annual meeting to deliver an address. Just what the character of this address shall be is not so clearly defined. I will remark first, that we meet this evening under

different circumstances than we did four years ago, at our first annual meeting, held at this place. At that time we were in our infancy, few in number —on trial before the people—engaged in solving the problem whether the fruit interest of western Michigan demanded the existence of our society or not; and as I reflect upon that meeting and recall some of its discouraging features I am led to thank God that there were then a few brave hearts that stood firm under the banner of pomology, until today finds this organization doing a noble work, occupying a place in the front ranks with similar societies engaged in developing fruit culture to its highest standard. And while we are thus encouraged, let us remember our mission is still before us. The love of home is dear everywhere, but nowhere more so than in Michigan. Here we have all the natural elements to adorn and beautify our homes. But it is left to pomology and horticulture to furnish instruction and teach us how to use these elements to the best advantage. Nothing has done more to place our state in the front ranks of the leading states of this Union, than horticulture and pomology. Our exalted mission can only be fulfilled by much and faithful labor. Our mission is to give knowledge and infuse enthusiasm into each other, and to sympathize with and help each other in our labors in this high calling. This alone would pay us for coming together in these annual gatherings, even if we had no set speeches or papers.

Let us also remember that theory and philosophy can not do much for us. If ever pomology and horticulture become great arts, it must be by the experiments and efforts of fruit growers themselves. To-day there is much confusion in the art and practice of fruit growing—such as the different varieties of fruit to raise for profit; the manner of cultivating the same; best modes for handling and packing; also the best form and style of packages to be used for the different varieties of fruit—all these questions are more or less involved in doubt, and on many of these points two parties could be arrayed, nearly equal in numbers. These things ought not to be. As those who are interested, it is our duty to clear up these doubts and to render more certain every process of fruit growing. We should, by practice and not by theory, prove all things and hold fast to that which is good.

Let us also cultivate social intercourse. Especially should we as fruit growers take this matter into consideration, and now, as the long winter evenings are with us, let each one see what can be done in his own vicinity, among his neighbors, to secure some of the advantages of meeting our friends for social enjoyment and improvement. It is thus we are here today. The natural result of this social intercourse is to produce certain qualities of character.

Some one has said, the true way to be a gentleman or lady is to cultivate the heart. Kindness of heart is the crowning grace of social life, and produces within us charity and love for others. What blessings follow from such a charity! The kind-hearted and benevolent live beloved, they die lamented. Their memory, like the summer twilight after the sun has gone down, remains calm and pleasant in our hearts forever.

As regards the crop of fruit on this lake shore the past season, it has been an abundant crop, at least of most kinds. Especially the crop of peaches was a large one. Fruits of all kinds were late in ripening, owing to cool weather during summer and early fall. In consequence of late ripening, early frosts, and the large amount of fruit thrown on the market, prices were low. Particularly was this the case with peaches, large growers of this favor-

ite fruit, in many instances, not being able more than to pay expenses. And this fact gives rise to a question which this society ought to consider and determine, viz: Is it not better, instead of making peaches an entire specialty, to plant more pears, apples and grapes, and so, as the farmer says, have mixed husbandry?

And now it becomes my painful duty to note the fact that death in the past year has entered our ranks and taken one of our honored and leading members to his reward and rest. I refer to the death of the Hon. Harvey Campbell Sherwood, of Watervliet; he was, at the time of his death, first vice-president of this society, and has held that position since its first organization. Mr. Sherwood was a true gentleman in the full meaning of the word; was a man of high social and intellectual qualities, and one of sterling integrity of character. In 1870 he left his friends and a pleasant home in central New York, and with his wife and son came to Watervleit, Berrien county, and took an unimproved tract of 400 acres within two miles of Watervliet station and made what is now known as Lakeview farm, one of the finest fruit and grain farms in western Michigan. His presence will be much missed in our councils and his conservative advice in matters of importance to this society will never again be given. But let us ever strive to emulate his example and cherish his memory.

I am pleased to note the fact that our worthy secretary has gathered and compiled for publication, and forwarded to the proper officials, to be published in the coming state reports, all of the main proceedings of our society since its first organization. This has involved an immense amount of labor on his part, and I would recommend that this society devise some means whereby the secretary may be compensated for his labor. In conclusion let me say, let us work on united. Let harmony prevail in all our councils; let us have no divisions or dissensions; let us all work for the best good of the society, having forbearance and charity one for the other, and God will bless our labors and reward them bountifully.

Following this, reports as to the results of the past season were called for, the chair designating reporters for the several localities.

THE RECORD OF A VERY POOR SEASON.

R. Morrill, Benton Harbor: Strawberries were injured by frost, May 22, and the vines had been harmed by two preceding dry seasons. There was a light crop of good berries which sold at a higher average price than in any season for fifteen years. There were about 50,000 cases as against three or four times as many in preceding seasons. There was an average crop of raspberries; a good crop of blackberries, of fine quality and satisfactory price. There was nearly a failure of the apple crop. The bloom was sufficient, but injury was done by succeeding cold weather. Pears were very good. We have no peaches of any account, as yet, but 300,000 trees have been set the past three years. No yellows has yet appeared and we had a few good peaches this season. Melons are a crop peculiar to us. Shipments aggregated 70,000 cases and prices were low because of overproduction. The first bloom of the grapes was killed by frost and the secondary buds made a crop of inferior quality.

W. A. Smith, Benton Harbor: Mr. Morrill has fully covered the ground. We had no good grapes after the Delaware, because of cold weather. Such

seasons we are likely to have every three or four years. The two preceding seasons ripened our grapes to perfection.

O. Beebe, South Haven: Strawberries did not yield well, because the vines were few, but we had good fruit and prices; raspberries and blackberries were a fair crop; apples, a third of a crop and not good; pear trees were loaded with fruit which brought paying prices; peaches were many, but undersize, of bad quality, and brought poor prices. Some vineyards gave excellent fruit, but in many, because of the cold autumn, the grapes did not ripen—in some they even were not harvested.

S. G. Sheffer, Casco: What Mr. Beebe said is true also of my vicinity. Some men had pretty fair crops but most of them had quite the opposite. Apples were very poor, as a rule, though a few were fine. One vineyardist left his vines flat on the ground, with neither stakes nor trellises, and got very fine, ripe grapes of good size. Small fruits, what few we raise, were good enough.

This statement as to grapes caused a brief discussion, in which Mr. Beebe explained that in this exceptional case the grapes were ripened by the extra heat they received from reflection of the sun's rays from the earth. While it was cool it was also very dry, so that they did not rot. Usually, with such treatment, there would not have been one ripe grape.

H. H. Hayes, Talmadge, Ottawa county: We had good grapes, apples and peaches in my vicinity.

H. H. Ray of Watervliet stated substantially the same as Messrs. Morrill and Beebe.

R. Morrill: There are many grapes at Berrien Springs, fifteen miles back from the lake, on high ground, and there the Concords were this year perfect, and it is always so. They are away from the chill of the lake.

W. B. Andruss, Allegan: Apples were pretty good—fairer and better than last year, at least; grapes ripened well and pears were extra; peaches were good in some places and in others quite poor, and good prices were paid for all that were of fair quality; of quinces there was a very large crop but low prices; cherries were a good crop.

It was asked why there were good prices for peaches in Allegan when quite the opposite was reported from the lake shore. Mr. LaFleur explained that the reasons were two. The crop is not as large as here, though there are some growers of 3,000 bushels or so; and nearly all of it was sent east, southeast, and south (to Indiana), mainly reaching points not supplied from Chicago.

Geo. W. Chubb, Lisbon, Ottawa county: Our peaches were few, not as good as those of last year, and were marketed in Grand Rapids at paying prices—$1.25 to $2 per bushel, except on one day when they went down to 75 cents. Grapes ripened fully in some vineyards but not in others; and he asked why this was so.

President Phillips said the difference in this case was doubtless due to the variation in pruning and thinning.

Levi Loomis, Ganges: Peaches were in number large; in size, quality, and price, quite unsatisfactory. All the orchards suffered from drouth and afforded no profit. There were but few good apples. Grapes were a failure, except that near Fennville some Niagaras matured.

President Phillips: Moore's Early, Worden, Brighton, Massasoit, and Niagara ripened and were harvested. The Concord did not mature with me,

nor generally in my vicinity. I practice pinching back bearing canes to the second or third leaf from the fruit.

B. Gebhardt, Mears, Oceana county: Plums and pears were fair and brought good prices; early peaches the same, but later ones did not do as well; plums were not a large crop, through better than the year before, and brought good prices; grapes were almost a failure. Our area of peach trees about equals that of plums now, but we are setting four peaches to one plum. As many fruit trees will be set next spring as the whole setting of four or five preceding years. Some large farms will be wholly set to fruit. Our peaches sold at 90 cents to $1 per bushel, plums $2 to $3 net. We sell our plums in Milwaukee and Chicago, sending by boat from Ludington. They are a sure crop, though some varieties are not full each year unless thinned and fertilized.

A. C. Glidden, Paw Paw: I have but little to report, for not much fruit is grown in my locality. The strawberry crop was cut short by the previous year's drouth. Apples were hurt when small by a hot wind which blasted the leaves, causing many to afterward turn yellow and fall; and were further harmed by drouth. The same wind damaged other trees and oats as well. I sprayed my apple trees twice, and, whether by that cause or some mere coincidence, I had better apples than my neighbors.

A. Bartholomew, of Keelersville, Van Buren county, reported the same as Mr. Glidden, as to strawberries, cherries and apples; and agreed with him as to occurrence of a hot wind and its effects.

Wednesday Morning Session.

The Wednesday morning session was opened with prayer by the Rev. Dunsmore of Fennville—a proceeding quite unusual to meetings of fruit growers. But the prayer could not have been considered greatly out of place by even the most skeptical, for it was quite as much to the point, in a horticultural sense, as a good deal of the other talk of such occasions.

President Phillips announced the following committees:

Resolutions—A. C. Glidden, R. Morrill, Benton Gebhardt.

Fruit—Alexander Hamilton, Geo. S. Chubb, J. W. Humphrey.

Miscellaneous Business—Wm. Corner, William B. Andruss, D. W. Hinman.

To the latter committee was referred President Phillips' message.

Mr. A. C. Glidden of Paw Paw began the practical work of the session by reading the following paper on

THE ROOTS OF TREES AND PLANTS.

It is not my purpose on this occasion to give a scientific treatise on the roots of plants, even if I had the ability and qualifications necessary for it; but simply to start in your minds some inquiries—possibly by some suggestions of my own—that shall lead you to study the requirements of the tree or plant which comes through the agency and medium of the roots. We know so little of what is going on beneath an inch or two of soil, that it is not surprising if we at times work an injury to the tree or plant, through our misapplied

zeal to be doing something to promote their growth, and increase their fruitfulness.

Much of what is really known concerning the office of roots is determined by analogy. All animal creatures inspire or respire or perspire and in that act, or by it, they retain life and vigor. They also assimilate nutrition and come to perfection in the degree of its plenitude. Animal foods are various in character, to suit the wants of the various organisms demanding "daily bread." Even the sponge—that connecting link between the animal and the vegetable kingdom—is known to suck the sea water through the many channels of its substance and eject it in streams from cone-shaped mouths at its upper surface. So we know that along the roots somewhere, and possibly over their whole surface, are little mouths through which the plant receives the pabulum upon which its structure is built. As the nectar of the sea water nourishes the sponge, so the juices of the earth—in meagre supply or abundance—are sucked up and sent along the sinuous channels of the woody fiber until, strained and distilled of its earthy salts, to be given up as food, the pure, surplus waters as set free in vapor from the leaves.

THE PROCESS OF NUTRITION.

To intelligently furnish that aid to plant growth which we desire, it is necessary for us to know in what manner and under what conditions the plant receives and requires the nutrition to be presented. The roots evidently do not come up like lambs to a trough of corn and devour solid particles of food, so that dumping a pile of manure about the trunk of a tree is in no sense furnishing adequate supplies of food. If this is done the day the tree is set out, two very important principles in plant growth are subserved: The percolating juices which the rains bring down in the earth, furnish the first protruding fibers of rootlets with a rich renewal of growth, and also conserves by its cool covering the moisture already found in the soil. Every tree planter has noticed that before any evidence of life is present in the branches of the young tree he is setting, there will be little white hair-like radicles coming from under the bark where the roots have been severed, and these doubtless furnish to the tree its new life and growth. And so at every recurring period of growth new roots form first and this new formation is determined by the conditions of soil which warrant a continued supply of food within easy reach. As the tree spreads its branches wider, so the roots make constant incursions and invasions into the unexplored strata, wider and deeper and constantly asking of the soil what it can do for the parent tree. When rich deposits of food are found, there the white radicles protrude in force and the little spongioles at the ends absorb the juices, which are forwarded by little elevator tubes to the great laboratory of the leaves, where it is transmuted into fragrance, fermented into acids or fused into sweets, becoming blossom and leaf, and ending in fruitage at last.

THERE ARE TWO CLASSES OF ROOTS,

the primary or true and the secondary or adventitious. The primary root is formed by the direct elongation of the radicle. The secondary root does not proceed from any definite point, and its development depends upon favorable external circumstances. When the conditions of soil are naturally favorable

to the growth of trees or plants, or are made so by fertilizers or tillage, then these foraging parties come out from the primary roots and ravage the soil of its fertility. Some have supposed that primary roots have a sort of instinctive knowledge as to where and in what direction stores of plant food are to be found. What has given rise to this supposition is the fact that where a particular spot about a tree or plant is very rich in soluble food, there these secondary or adventitious roots are extremely numerous. It is really only a very fortunate "strike" of one of the exploring parties in the orchard, who at once set a force at work to transport the prize to the common camp to be assayed and minted and stamped as Golden Pippin apples or Gold Drop peaches. It is an open question as yet whether all the pabulum which furnishes the power of growth to the tree comes through the root from the extreme points or fibers, or whether some portion of it is absorbed all along their surfaces. I am inclined to think that only pure water is thus absorbed in the latter hypothesis, that this office is constant in its operations from year's end to year's end. A tree dug in the fall retaining only a small per cent of its fibrous growth will, if buried in damp earth, continue to send up sufficient moisture, even in winter, to preserve the life of the tree. But if for any cause the ground becomes dry the tree dries up and is dead.

TRANSIENT CHARACTER OF THE SECONDARY ROOTS.

There is a belief, which is very widespread, that all the secondary or fibrous roots should be carefully preserved at planting and that these are the life of the tree. I believe this to be a fallacy. These roots were thrown out from the primary stock to bring the tree to its present state and stature; but the new life and growth which the tree will soon take on is only stimulated by new shoots that come out from the radicles. This is true only of deciduous trees. Evergreen trees put out new shoots from the fibers very readily and their growth during the year is more constant. During June and July our fruit trees make nearly their whole growth for the season unless stimulated to an extra effort later on. During this period of active growth the roots are sending out new feeders in all directions. They come up toward the surface, and lick up the sap from decayed vegetation, and rob the green herbage of all its sustenance. Shear all these off with a sharp plow, up comes another robber horde, as voracious as the vanquished ones. Neither the height of the tree, nor its spreading branches, is any rule to govern the extent of this root foraging ground. In barren lands the roots must go further in quest of supplies to keep the parent tree in vigorous growth, while on rich soil the tree is provided for within a smaller area. After the yearly growth has ceased and the buds have refined, the roots start a new system of organic existence in the tree. They begin at once to store up in the little channels or grain of the wood, an elixir composed of starch and sugar, and indigenous gums, laid from the base of every exposed and dormant bud, along every channel, checking it with a concentrated pabulum that shall quicken the bud into life and leaf at the upflow of sap in spring and start the germinal roots for another summer's campaign. This combination of material thus stored up, is similar in composition to the several coatings around the germ in a kernel of wheat or corn; and as these need only heat and moisture in the ground to start the shoot upward and the rootlet down, and become food while the plant is seeking other sustenance, so the same elements stored up

in the tree and root, start into life the germs in opposite directions to begin another season's round, when the upflow of sap begins.

All supplies of food for tree or plant are taken up by the roots in liquid form. Every particle of dead vegetable matter hastens toward decay and decomposition when fallen to the earth, and the soluble parts are washed into the soil by the descending rains, as fast as they reach the stage when this becomes possible. About half the bulk and more than half the weight of the plant thus returns as plant food again while the woody fiber becomes humus, to give character and color to the soil, and to act as a trap to catch and hold fertility, until the fibrous root of some plant is fixed upon it to extract this fertile sap from the soil.

"The oak tree, struggling with the blast,
Devours its father tree,
And sheds its leaves and drops its mast,
That more may be."

RELATION BETWEEN ROOTS AND BRANCHES.

It is thought by some that one side of a tree is supplied by the roots on that side, or that each root supports its equivalent in the top, instead of furnishing its supply of sap to the general food for the good of all alike. I do not care to express an opinion on this point, as the examples are so contradictory that the proofs for either hypothesis are hard to obtain. That the root sustains a subordinate relation to the branch is proved by the changed character of the root to correspond with the variety in root-grafted trees. Cut a seedling root in two parts and insert a crab scion in one and a King in the other, and when they are two years old the original root which furnished the fiber to start the scion into growth, will have entirely disappeared, and the young tree will have roots identical with the parent tree from which the scions were cut, and the roots of every tree of the same variety will be exactly alike, so far as color, character, and texture are concerned.

There is a difference of opinion whether roots have the power of selecting from the earth the elements of which plants and trees are composed in the *proportions* which are always found in plants of the same order. The weight of evidence, however, bears heavily on the affirmative side of the question. Those who argue against selection assert that the surplus of each element, carried up in solution, is returned by the downward flow of sap, and is discharged again into the soil as excretory matter. There were many interesting questions hinging upon this voluntary or involuntary power of roots, which the limits of my paper will not allow me to discuss. It is sufficient, practically, for the fruit grower to know that the roots of his peach trees will always assort the juices that enter into the perfect peach, and that potatoes will still insist upon developing beneath the soil. His flowering shrubs will never exchange products with the orchard, and although, with all his philosophy, he can not tell why the same handful of earth should yield so varied a bounty, yet his faith will look unquestioningly for this ever recurring miracle.

"Strange that this lifeless soil gives vine, flower, tree,
Color and shape and character, fragrance too;
That the timber that builds the house, the ship for the sea,
Up through this root its strength and its toughness drew.
That the cocoa among the palms should suck its milk
From the dry dust, while dates from the self-same soil

Summon their sweet rich fruit; that our shining silk
The mulberry leaves should yield to the worm's slow toil.
How should the poppy steal sleep from the very source
That grants to the grape vine juice that can madden or cheer?
How does the weed find food for its fabric coarse
Where the lilies proud their blossoms pure uprear?"

SOME WOULD NOT HAVE IT SO.

Exception was promptly taken to Mr. Glidden's reference to the uselessness of fibrous roots at the end of each growing season, etc., one speaker citing the importance of "smaller roots" to the successful transplanting of nursery stock.

Mr. Glidden explained that what are termed fibrous roots are secondary roots, which serve their purpose each season and die. After the transplanting of a tree a new set start. One can not tell the difference, always, in small trees, between radicles and secondaries. The former are likely to be very small on nursery stock, but the more there are of them the better.

O. Beebe of South Haven came to the aid of Mr. Glidden, saying: If all these secondary or fibrous roots lived and continued in growth, what sort of tree would we have? There are thousands of them to every tree or plant. Some of what may in certain cases appear to be secondaries were in fact radicles from the start. Broken radicles start out new at the ends.

R. Morrill: I am aware that Mr. Glidden is perfectly right, but he thrust us ordinary men into deep fog. A little discussion was necessary to clear it up.

Mr. Glidden: When a tree is taken up, only a slight proportion of the secondary roots come with it. The cutting off of feeders, in transplanting, is what makes necessary the cutting back of the top.

Mr. Morrill told how he was amazed to find, after a severe rainstorm had washed out a lot of tomato plants, that in five days the roots had grown so fast as to meet and pass in a four-foot row.

S. G. Sheffer of Casco read the appended paper on

SUCCESSFUL PEACH GROWING.

The topic assigned me, "Successful Peach Growing," is a wide subject, yet it will hardly interest the peach growers unless they obtain better prices for their peaches than many did last season. But as there are many who raise peaches, or attempt to raise them, who fail, perhaps for the want of information, I will give my experience and observations for thirty years; and here let me say that I was the first peach grower at South Haven.

LOCATION FOR AN ORCHARD.

Great care should be taken in selecting the ground for a peach orchard. It should be on elevated land and natural drainage should be had if possible; but if such land cannot be obtained, then land selected for an orchard should be thoroughly under-drained, so that no stagnant water may stand on the surface, for one of the great difficulties to be avoided is wet feet for a peach tree. If peach trees are exposed to a wet soil, it soon shows in the color of the leaf (also the bark), and if it does not have proper drainage it soon meets premature decay and death.

PLANTING TREES.

No orchard, in my judgment, should be planted less than twenty feet apart, for several reasons. First, to allow a good chance to work the trees. Second, the tree should have the benefit of the soil for ten feet each way, to mature the fruit properly; and third, to admit the sunlight to color the fruit and have it fully developed; and fourth, for the free circulation of air. Holes for setting trees should be at least three feet across, and the top soil should be used around the roots. After setting the trees should be well mulched.

SOIL.

Great care should be taken in selecting soil for an orchard. My observation and experience show that sandy loam is the best. The nicest peaches I ever saw were grown on sandy loam, though I have seen very fine peaches grown on sandy soil and also on clay, but such soils need more application of that class of matter that goes to fertilize the peach, and care should be taken to give the tree, while growing, proper nutriment, which should consist of well-rotted barn-yard manure.

PRUNING.

The tree should be pruned so as to leave no crotches, but limbs extending from the trunk from four to twelve inches apart, and in my judgment the top of the tree should commence three feet from the ground; and care should be taken, in pruning, to give the tree an upright position and to prevent it from arming out so as to hinder successful cultivation.

SOILING.

It has become a matter of much study among the peach growers, what should be used for soiling purposes. With us, on clay soil, we use rye—some use clover with rye, which is very good; but in my opinion, rye, if continued for a number of years, does not furnish sufficient material for the pit of the peach, and would recommend that wood ashes be used once in about three or four years—or potash, which is the same—for material for pit growth, or well-rotted barn-yard manure will supply the place.

THINNING.

One of the greatest cares in peach raising is to thin properly, as quality is wanted rather than quantity. When the grower sees the tree loaded with nice fruit, he commences at once to estimate the baskets on the tree and the amount per basket, and it is difficult for him to thin properly; but he should remember that a few less baskets of fine fruit are worth more than a great amount of inferior peaches; and again, over-bearing hastens the death of the tree by exhausting its vitality in a worthless crop.

CULTIVATION.

There is such a diversity of opinion as to the manner of cultivating trees, that we scarcely find two of the same views as regards the matter. Different

soils need to be treated differently, but I believe that most pomologists agree that peach trees should be worked in the spring, as soon as the ground settles and is fit for work, and continue at intervals till the last of July. If worked later, it has a tendency to keep the tree growing, and it does not mature the wood, so that severe cold weather is likely to kill the tree.

I have but very slightly alluded to some of the main points of successful peach growing, and yet I think if the few hints that are given are acted upon, good orchards and good peaches may be raised.

ILLINOIS METHODS WITH PEACHES.

T. E. Goodrich of Cobden, Ills., was called for, and responded, saying he understood there had been in western Michigan fourteen consecutive crops of peaches, a thing never heard of in "Egypt," where we only get one crop in three or four years. "We are too far south and have too cold weather. Were we farther north, where it is warmer, we could do better," said Mr. Goodrich, in a tone that was appreciated. "When we do get a crop we receive no price for it, but think all the money comes here. We have all the difficulties you experience in growing peaches, and one other—every morning we have to 'bug' all of our peach trees for curculio; yet we can raise as fine peaches as grow anywhere in the universe. California peaches are not at all equal to ours in juiciness and flavor, yet the peach is the best of their fruits except the grape. We do not have yellows—never have had it. We plant twenty feet apart, cultivate in spring with plow and follow that with harrows and cultivators to keep the ground clean; we sow rye and turn under, and each alternate season turn under two crops of cow-peas. Our trees or buds are killed by cold in both winter and spring; the buds will not survive eighty degrees below zero, and seldom eight below. In 'bugging' we use sheets in inverted umbrella shape, on frames, and use also the trap system. We have but one kind of soil, and that is poor soil. Originally it was leaf mold but would now be called a light loam." Mr. Goodrich was asked about the Ele peach, and replied: "I did not intend to say anything about that. We like it and would prefer to keep it at home. It is of very fine quality, a heavy bearer, hardy so far, but we have only grown it four years. It is yellow, ripening at the time of Crawford's Early. We have the disease known as curl-leaf. Cultivation of the peach declined for eight or nine years, then revived and is now increasing. We had an Alden fruit drying establishment which ran awhile and failed; a cannery shared the same fate, and now the surplus is only dried by families. We have no fruit exchange nor anything of the kind except the granger system of shipment. What do we consider fair prices? Well, we used to think $12 per bushel pretty good! One dollar per third bushel box is a good rate, and that is about what we average for good fruit."

HANDLING AND PACKING PEACHES.

Following this, Mr. Alexander Hamilton, of Ganges, read a paper on "Handling and packing peaches for market, to secure the largest profit." He said:

In order to obtain better profits from large crops, such as we have had the present season, the peach growers of western Allegan county will, I think, have to use at home, by drying or otherwise, their windfalls and all such

fruit as they would not purchase themselves if they were the buyers instead of the sellers.

Of the fruit that is good enough to ship, a large portion should be sent to other markets than Chicago, for we cannot get good prices anywhere if we first glut the market which in a measure fixes the price in all markets within our reach.

I think, too, our profits might be largely increased if we could deal more nearly direct with the consumer, the railroads, and the package manufacturers. I find no fault with the middlemen. As a rule, those of them we have to deal with are fine fellows, but our business can no longer afford to pay a Chicago dealer cartage both ways and a commission of ten per cent for simply forwarding our fruit to be sold to the consumer by a Marshall, Jackson or Lansing dealer who must also be paid his ten per cent. If the package manufacturer can afford to pay a dealer ten per cent for selling his goods, he can sell them to the grower for that much less; and if the railroads can carry a car-load of peaches for the American express company from this place to Chicago for $30 or $40, they can do the same service in a like manner for the peach growers or a fruit growers' express company for the same price, and save the shippers of peaches about one-half they are now paying the American Express Company, which, with the other savings suggested, would leave the growers of peaches a larger profit than they can get from any other crop.

OTHER FACTS AND THEORIES.

G. Richards of Ganges spoke of the great success Angus Dean, of Indiana, has in marketing his peaches (known as the Otto peach, not from its kind but from the town where grown) in Chicago. Mr. Dean goes to Chicago and there supervises the sale of both his own crop and those grown in his vicinity. We should likewise have men in the great trade centers selling our crop for us. Quite unlike ourselves, Mr. Dean sends no culls to market. Were we equally careful we could make just such a reputation.

R. Morrill: Parker Earle does the same way; and the secret of their success is that every man knows exactly what he is getting when he buys Earle's or Dean's fruit.

J. W. Humphrey: I was in California last winter and met a man from Decorah, Iowa. We talked of peaches and he asked me (he was a dealer) to send him some the following season. When that time came he wrote me, quoting the prices he had to pay in Chicago. I sent him peaches and nearly doubled my receipts; and I did the same in some Wisconsin towns.

Joseph Lannin: One trouble is, too many peaches are raised here—the supply somewhat exceeds the demand. If, instead of putting out more, we should take out half of what we have (the poorer sorts), and raise large fruit, we would get large prices. There are combinations among basket-makers, boatmen, railways, express companies, and the commission merchants. Each combination will have its price; and then, if anything is left, Lannin may have it. In sending elsewhere, I have not got better net prices than those of Chicago. Transportation charges and so-reported "spoiled" packages made up the difference. Mr. Lannin drew a vivid picture of the average "runner" for commission merchants, and declared he should be done away with. "We have to pay for his fine clothes, his livery, his jewels, and his drinks." Mr.

Dean has, or controls, a large quantity of fruit, and the case of no one of us is a parallel to his. The speaker was doubtful of the utility of combinations among fruit growers, and said the California union is a corporation buying all the fruit that was offered—that was quite another scheme and one which may work well.

R. Morrill was of different opinion, advocating the principle of fruit exchanges or unions. The trouble is, in the plan of individual shipments, we do not average honest enough. [Applause.] Men inclined to be "straight" come to these meetings—those likely to be scored keep away. Angus Dean guarantees the quality of every package, and so holds his trade.

G. Richards: We pay too much for transportation of peaches. We pay fifty cents per 100 pounds to Chicago, while for twenty cents they will carry the same distance a barrel of apples weighing 150 to 175 pounds. Why more for one than the other? We pay too much for pickers and for other work in the orchard. There is no reason why we should pay more than for ordinary farm work.

ATTITUDE OF THE RAILWAY COMPANY.

Mr. Morrill: Would not the interstate commerce law require the railways to take freight in car lots at the same price and in the same time they do for express companies?

John P. Wade: I once went to Mr. Rose of the Chicago & West Michigan railway company about this matter, and he promised to make us the same rates on car lots. But he did not, and he afterward wrote that their contract with the express company prevented them from handling fruit except as freight. I then wrote the Hon. Thos. M. Cooley, chairman of the interstate commerce commission, about the matter, and from him received the following reply:

AUGUST 16, 1888.

J. P. Wade, Esq., Fennville, Mich:

DEAR SIR—Replying to yours of the 13th inst., I fear the commission will not be able to be of service to you in the matter about which you write.

The supreme court of the United States decided some time ago that it was competent for railway companies to make with an express company a contract to give it exclusive privileges. If therefore you want to be allowed to send your fruit as express matter, I am afraid you cannot secure the right; though you undoubtedly have the right to send it as ordinary freight.

Very truly yours,

T. M. COOLEY.

Wm. W. Iddings, Fennville: I do not agree with those who contend that there is an over production of fruit. The market has developed as the crop has increased, and there are consumers for all the fruit we can grow. Overplus of good fruit is wholly a result of failure in distribution.

W. A. Smith: The railway is dependent upon this community for its business and can be brought to terms on this question of rates to shippers and express companies. The manager of the road has often said that if the shippers would combine and take charge of the business they could have the desired rates, but there is the difficulty. We distrust one another and refuse to act in the only way by which we may get what we want.

Wednesday Afternoon Session.

Wednesday afternoon, Dec. 19, was held the liveliest and perhaps most important of the sessions, for a subject was taken up that is at present the nearest to the pocket of every west Michigan fruit grower who sends his product to Chicago by rail. It began with the subjoined able paper by R. Morrill of Benton Harbor on

PACKING AND MARKETING FRUIT.

If we should write a text-book on the science of commercial fruit growing, we would divide it into five chapters, as follows: (1) Selection of soil and location; (2) selection of varieties; (3) planting, fertilization, and cultivation; (4) packing; (5) marketing. We should do this to impress on the mind of the reader the importance of each operation, as it is a fact that if a mistake be made in any of the departments of our work it will surely follow us through to the end and finally rest on our pocket-book, not in it. If a mistake be made in either the first or second division of our work, it will follow us as long as the tree or plant lives—say from three to twenty-five years. If a mistake be made in our third division it can sometimes be remedied; and the mistakes in four and five can always be rectified if we only will do it, although it will take time and perseverance to overcome the effects of wrong methods practiced in these departments; and this brings us to our subject of packing and marketing, which, I think, is a question in which the general public should have a voice—in fact, so important has it been deemed that legislatures have taken the matter in hand and said to a certain class of fruit growers, "so far shalt thou go and no further," and it certainly seems as if a large class of fruit growers do place themselves within the legal term of "obtaining money under false pretenses."

Now, brother fruit growers, I said this was public business, and I will try to demonstrate it. First, we will all acknowledge that the proper way to improve any business is to search out its defects and eradicate them. Next, let us see what right my neighbor has to dictate how I shall do my business. In order to do this I will claim that we have no right to do anything that shall destroy the reputation of his fruit, thereby causing him to receive much less money than he would if I were not in the business. Now, this is just what has been already done by a certain class of men in this lake shore region.

THREE GRADES OF FRUIT GROWERS.

Right here let me say, the Michigan fruit growers can be very properly divided into three classes. The first is a class who pack everything strictly "straight," from bottom to top, using a full regular package, put their name on all their good fruit, and if they ship any of low grade, "which all growers must at times," perhaps they put a numbered stencil on as they do not want to build a reputation on inferior fruit; but they do put up this fruit of even goodness throughout, "no stuffing or deceit practiced on any grade." Now this is all right, as there is a very large class of cheap custom in all our cities, and while this class, in common with all other buyers of fruit, expect to be cheated more or less, when one of them strikes a line of this kind of

fruit he comes again. The stencil number is fixed in his mind; and when he finds the fruit, prices can be held firm, and all concerned realize a substantial benefit from the transaction.

Now, let us see how the best grades of this man's fruit fares. The commission merchant receives it, and if you have succeeded in making him believe that you are honest, or if you have a good reputation already established on the street, he will place your fruit in the hands of some good customer, perhaps having to guarantee it and take a moderate price for it. It proves all right and this customer tries this brand again and again; and if, after a long acquaintance, the fruit has proved perfect, you have gained a customer who will not let your fruit go begging. This class of growers, I am sorry to say, is quite small, but there are a few of them scattered all over this fruit belt. Each of us can name a few. If you are acquainted with such a man you will find his general reputation and credit is good. He is said to be making money; you find him at meetings like this; his eyes and ears are open, and in slang phrase, he "catches on" to every item that can be used to improve his business. You seldom hear him call commission men "thieves." He finds them his friends, anxious to do his business, ready to accommodate, willing to suggest improvements, interested in his welfare, and on the whole a very satisfactory and indispensable partner in the business.

Our second class is a very large one, composed of fairly honest men who do not mean to defraud anybody unless it pays; who, if they owe you a dollar will pay it, but when it comes to packing fruit you will find that their finest apples, peaches or berries are always in sight and the poorest is somewhere in the same package. If one of these men should have his deception pointed out to him by a swindled purchaser, he would probably lay it to the boys or the hired man. If you or I should argue with him, he would claim that it was all right, as others do so; also that the purchaser expects to find the best on top, and I suppose he would not like to disappoint the buyer. These are the most common arguments used in defense of this plan. This class of men will often tell you that their commission man has instructed them that it is the best course to pursue. Now don't you believe a word of it. I have a quite large acquaintance with the leading firms on South Water street, and I never heard one of them recommend such a course. On the contrary, they plead for straight packing, full size packages, and regular shipments. From this class of shippers we can hope for better things, as there is a pretty good element among them, and they will respond fairly to a request or demand for better work, especially if they can be convinced that it pays; but few of them have patience enough to give a better method a fair trial. I have in my mind a few men who have tried a few shipments and condemned the plan because it did not advance prices as rapidly as they desired, forgetting, perhaps, that they had been years building up a rather bad reputation for their fruit, and expect to remedy all that in a few shipments. Here let us urge upon all shippers that a steady determination to get to the front by honest packing and honest packages will get you there as sure as the sun shines.

Now, we will call attention to the third class of growers, with whom I claim all honest fruit growers as well as the general public have a right to interfere, not by law but by force of public opinion, and compel them to quit their disreputable methods or abandon their business in disgrace. This is the thoroughly dishonest portion of the lake shore fruit growers. Let me

describe one of them and his methods, and no doubt you can name him, as he flourishes in every neighborhood. You can not detect him by his general appearance or practices, as he sometimes stands among you in the disguise of a good citizen, or even as a Christian, and I have heard of him in the pulpit. This man we will characterize as a fraud and a rascal, and we should treat him as such, for he is slowly but surely destroying the reputation of one of the finest fruit regions on the face of the earth. Let us see what he is doing now. He is probably planning how he can get a smaller barrel or a smaller quart box, or how to get the bottom of his pint boxes a little nearer the top; or how to make his "topper" berries go a little further, or how to fill his boxes nearly full of Crescents and top out with Sharpless; or he may have his eye on a fine patch of wild blackberries from which, in the spring, he will fill numerous orders for Wilson Jr., Erie, etc. He also may have on hand an old strawberry patch from which he will supply a lot of new beginners with any variety they want. He has probably secured a stock of the largest quart boxes in which poor women and children will pick his berries, and he will put them into the smaller "snides" for his customers. He has a large number of stencils, and he ships today to one house, tomorrow to another, and so on, skirmishing up one side of South Water street, and down the other in a vain endeavor to get away from his reputation, each day adding from one to several new names to those he has swindled; and all the information the injured buyer can get is that the fruit came from across the lake, and this whole fruit belt must bear his consequent bad reputation. And it is no wonder, for I presume fully one-third of the fruit shipped from our lake ports has passed through his hands, and he seems to be handling all kinds. His peaches are always very tempting, and strangers buy them—old buyers know better. The buyer opens them, expecting a feast, and gets along very well on the top layer; but somewhow the worms have got in and stung all that were large enough to sting. In his apple barrels you will find some nice fruit on each end, and, probably thinking that his patrons like cider, he has put in a bushel of cider apples; or, if apples are scarce, may have put in a few turnips, and I have heard of his being so generous as to put a pumpkin in each barrel, which saves the customer from buying any pie timber for some time. If he is shipping berries and has a thoughtful streak on, he may turn two or three boxes upside down, so his customer shall not overeat.

Seriously, friends, these things are of frequent occurrence, and fully one-third of the fruit from this region is badly "stuffed," and it is no use to disguise the fact. The question for us is, can not we check this fraud? If not, we must accept a bad reputation in a body, and a consequent loss of patronage which will go in other directions. These facts have more to do with our markets than most men would believe. If our reputation was first-class, as good as the Barnesville, Ohio, folk have made theirs, there would be no further trouble in marketing fruit; but until we can get rid of this rank swindling class, our only hope seems to be in individual reputation, which, in a city like Chicago, can always be built up profitably.

THE RIGHT WAY TO PACK FRUIT.

It seems superfluous to detail to this society what I consider proper methods for packing and marketing fruit, but as there are often new beginners in our

meetings a few suggestions, together with the discussion which usually follows, may do some good, and all profit more or less from an exchange of ideas. First, I will lay down a few principles which I know are right as well as profitable and should be stamped indelibly on the brain of every fruit grower. First, use nothing but a well made standard package; if a barrel, get the full, legal size; if a quart or pint case, see that it is full-size; if a peach package, it is more difficult. The bushel and half-bushel basket are very good packages, if properly made, but as they are made with the sharp-edged rims, rough projections and nails poorly clinched, they are hardly fit to pick up corn in, let alone a lot of choice peaches, which in twenty-four hours will have an outside layer of bruised, cut and rotting trash which will cost you more than you can afford. If you do use them they should be lined with some very heavy brown paper or light cardboard, to protect the fruit. It will pay. Probably the best small package is a full peck Climax handled basket, made with open-work sides and slatted rest cover, dispensing with the deceptive tarletan, which, if not a fraud, certainly comes very near it. Another very desirable package, just now, is the lath box, holding a peck; nail two of them together. Did you notice last summer how the Kentucky and southern Indiana growers skimmed the cream off the peach market with this package and some good, straight-packed fruit? If this package is not demoralized by this suicidal stuffing process, it can be placed on the market, with good fruit in it, to advantage. Buyers have come to look for a certain style of package from certain localities, and in passing along the street will inspect or pass by fruit accordingly. But one thing we should insist on. The manufacturer should give us a smoother package inside, and when we fill it we should be careful to fill it just as we should want to buy it.

If we are packing apples we all know how to pack an honest barrel, and if we don't do it we should be prosecuted in the interest of the swindled people. If we are packing berries, the case becomes more difficult, as pickers do not average very careful and some are not honest. Consequently there is no safety short of rehandling the fruit in the packing sheds, which is best done by smart girls, who should be able to pack properly at a cost not exceeding ten cents per case of sixteen quarts. Then you know your reputation will not suffer. Some will say that tender fruit, like the red raspberry, can not be rehandled in this manner. To such I will say that it has been done for years by several growers. I believe the first man to make a success of it was Parker Earle, whose good sound sense has been the means of leading a great many fruit growers into advanced and more profitable methods. In order to rehandle successfully, a few picking directions are needed. Red raspberries should be picked, in ordinary ripening weather, every second day; in very hot or showery weather, or the last of the crop, they may need picking every day. Strawberries should be picked as soon as fully colored, and it is best to make two grades if the fruit is choice. Blackberries are variable in ripening. The Wilson or Early Harvest should not be picked oftener than every third day, as, while they will color well in ordinary weather in two days, they will nearly double in size in the next twenty-four hours, while the Snyder only requires two days. The time can be varied, either way, one day, if the weather is very hot or very cool. If these conditions are complied with, there is no trouble in the operation. If heavy rains should interfere, the ripe fruit will be poor anyway, so we consider it best to put on all the help we can and pick and ship without packing, using a numbered stencil; but, for the sake of

your conscience, watch your pickers and do not let them put in any sandy or injured fruit. I forgot to say that in packing we throw out all imperfect or over-ripe fruit, as well as all trash, in fact putting it in prime order for the table. By this means I have succeeded in getting much larger prices for berries than I could otherwise.

It does not seem necessary to suggest anything further in regard to packages and packing, to this audience, except to say that in all our packing we should always put our fruit up in just exactly such manner as we would like to purchase it, and it will surprise some of us to find out how easy the marketing problem becomes after following such a course for a year or two. Gluts in the market will have no terror for you, and no human influence will work you a loss, as it stands solidly in your favor at every stage of your business. Always remember that there is plenty of room at the top of the ladder for those who are willing to climb, and know how, while the man who is crushed is always in the crowd on the ground.

THE TRANSPORTATION PUZZLE.

As for marketing, a great deal might be said and done to improve our present facilities. If you are well toward the top of the ladder it need not worry you, as Chicago will always pay more for a prime or fancy article than the citizens of any other city accessible to us can afford to do; but for the great bulk of our poor to fair fruit, it is well to plan for a better system of distribution and sale, as there are hundreds of cities with from 5,000 to 20,000 inhabitants, which are as yet poorly supplied with fruit, and in which reasonable prices can be obtained; and numerous other larger cities which are supplied with our products from Chicago, to whom we have to pay tribute in the way of commissions and buyers' profits. This might be avoided to a certain extent by a fair co-operation of fruit growers and railroad companies, but as it now stands these expenses are counterbalanced by the excessive rates and poor service rendered us to all points west of the lake, except Minneapolis and St. Paul, which, for the past two years, have been a great dumping ground for New York, Ohio, Illinois, and Michigan, resulting sometimes in a fair profit and often in a serious loss. There still remains to us all our interior towns, as well as our northern cities, northern and central Indiana, and it would surprise some of us to know how good some of these markets are; and if proper influence can be brought to bear on our express companies we should be able to supply them profitably. I hope some day to see the Michigan fruit exchange so well organized that it can successfully manage these things for us.

In the meantime, our main reliance must be in Chicago. So let us see what can be done there. Our worst trouble there is our standard. It is not high enough. Other fruit regions are pressing us hard and may drive us to the wall, unless we wake up and demand a reform in our methods all along the line. I recollect that a few years ago a movement was on foot to black-list certain commission men; but it did not take long to discover that the shippers loudest in favor of it were the best candidates for such a list. It is simply ridiculous to attack our salesmen in a body until we have done our part honestly, and in a body. My acquaintance with them has shown me that as a class they are as bright and shrewd a lot of men as can be found in the city, the very nature of their business compelling them to be honest if they expect

to remain in business or make any money from it. Of course there are rascals among them, as well as among us, but when we expect them to protect us against our own rascality it is asking too much. They can not do it if they would. But be honest and any of the best houses will get your crop through in grand shape.

How can we accomplish any reform in our work? This society has a member, or several members, at every fruit shipping point. Now, let us go from here with the determination to set an excellent example for our neighbors, on every occasion. Let us preach that honesty in this business is the best policy, "because it pays;" do not hesitate to condemn the slightest fraud even if your best friend commits it. Do everything you can to make the practice contemptible in every neighborhood. Your commission man will point out improvements if you ask him to. Watch your neighbor's fruit. If it is not right, let him know it. To all who practice fraud in packing, let me suggest that your help notice all your tricks and your name goes abroad, as they are very likely to review your practice when they get to a place where honesty is the rule.

Now, brother fruit growers, let us all keep this matter in mind during our shipping season, using all our influence for improvement, and at our next annual meeting see if we can not report some progress. It is a matter of self-preservation, and let us so consider it and work accordingly.

THE ILLINOIS "GRANGER" SYSTEM OF SHIPMENT.

T. E. Goodrich, Cobden, Ills.: Immediately after the war we had to pay $2.50 per hundred for freight from Cobden to Chicago, while now we pay but 22 cents. This change has been brought about by our persistent efforts and the "granger" system of shipment. In this method we (the growers) load and unload the cars, two agents doing all the business with the railway company. One at Cobden receipts for freight, loads it, makes the manifest, and telegraphs necessary instructions to the agent in Chicago, who notifies the consignees of what is coming, unloads the fruit, and collects the freight and his own charges. The trains carry nothing but freight, make nearly passenger time, and are very seldom behind time. On these trains we pay $90 per car of ten tons, and by the ton for excess. Other sorts of cars and trains are used for "truck" (vegetables, etc.), making thirty-six hours' time, and the contents arrive in good order. Rates for such cars are $50, $42, and $35 per car, according to time. At first these night freights were not received with favor, but they are now, even for berries. The agent in charge of our fruit now works for us instead of for the express company; then, bad care or no care was given; now, the best of care. So well is our freight handled, merchants get us to take their eggs and other such goods. We use refrigerator cars also, paying a higher price for distant markets, such as New York and Boston. Chicago objected to "refrigerator fruit" at first, but that prejudice has nearly passed away. At first the fruit was made too cold, but now it is kept at about fifty degrees, being put directly into the cars and not first in a refrigerator as in the beginning. At first we had great difficulty in getting the railway company to put down prices, but we have fully succeeded and the railway still has a satisfactory profit. I see no reason why the Chicago & West Michigan Company can not be induced to do as well. To secure such conditions as ours all you have to do is to combine and make a beginning.

The agent at Chicago attends to all details of the business there. He adds up the freight, cost of loading and unloading, etc., and assesses it *pro rata* on each package; and makes a daily report of this to the shippers, so that they may compare with it the statement of returns made by the commission merchant. Each town on the line, of course, has an agent, but one agent in Chicago does business there for the whole, keeping each town's affairs separate, although in the association, if such it may be called, are included towns in the extreme south of Illinois, in Tennessee, and even further south. But the fruit trains proper originate at Cairo. We carry upon our plan freight of any sort, for anybody, and in collecting take only enough for expenses.

R. Morrill: Some Benton Harbor parties went to Supt. Mulliken, of the C. & W. M. road, about these matters, and were told by him that his company would haul cars for the fruit growers as cheaply as for the express company if they would care for them in the same way. Mr. Cooley's letter, however, seems to settle against us the question of our right to require this of the railway company. The interview I speak of was held in February, 1888. I learn that the existing contract between the railway and express companies will soon expire.

N. Goodrich, of Chicago (agent there for the "granger" system): In order to have fruit reach the market in best order, it is necessary to watch it all the way to the merchants' hands. We have found the granger system the best to that end. The Illinois Central railway furnishes good cars, well ventilated. The growers about each station meet yearly and elect a president, secretary, treasurer and executive committee to do the business. The total expense of a car on the night freight line is $52.50, being $45 for the car, $2.50 for loading and $5 for unloading, the latter including expense of laborers, clerks, collecting, etc. The commission merchants send their own teams for their goods. Once in a while a package is lost somehow, but usually every one is accounted for in good order. I have unloaded fifteen cars of strawberries (15,000 crates) and had them on the way to the merchants in thirty-five minutes. On our plan, ten-pound baskets of grapes are carried from Villa Ridge to Chicago, 300 miles, for two and one-half cents per basket. Here you put 1,000 to 1,200 baskets of fruit into a car; but at Villa Ridge 1,500 to 2,000 are put in. The greatest advantage, however, is in getting into market early and having careful handling. For twenty-pound boxes of tomatoes our average price has been five cents as against the railways' charge of twelve cents as ordinary freight. With us the package used for peaches, early apples and tomatoes is the third-bushel box.

Wm. Corner: We should no be discouraged at our prospects, for we are beginning to see the light. The handling of our fruit is especially bad, and all our pains go to naught by such work at the last.

R. Morrill: The gentleman is correct; it is not so much in the difference of two or three cents per basket as in the handling. I send my fruit mostly by boat, not by express, for I don't dare to. I have seen fruit pitched about by expressmen when every throw cost the owner twenty-five to thirty cents. The boat service from Benton Harbor is very good. Complaints have been made to the express managers, but if they have paid any attention to them they have not succeeded in making their employés do as they should. Every preceding effort on our part is lost by such inexcusable abuses in transportation.

A TUSSLE WITH THE AMERICAN EXPRESS COMPANY.

During the preceding half-hour's talk there was an interested listener of whose presence very few were aware. He was a man of dark complexion and darker looks; of grizzled hair and even more grisly mien. He entered and glanced about as might an angered lion upon a group of chattering and unsuspecting monkeys whose presumption in disturbing his nap had at once roused his ire and whetted his appetite. He was Crawford Angell of Grand Rapids, manager at that point of the American Express Company's affairs in western Michigan. He had been telegraphed to by the agent at Fennville, who thought he scented danger. By the time he was through with the "subsequent proceedings" he was as angry as in the beginning, but a great deal less arrogant. Following Mr. Morrill, Mr. Angell rose and thus remarked: In many cases these speakers have drawn on their imaginations for their facts. The growers are often at fault for being late and so compelling rapid, and therefore careless, handling of their fruit. Whenever a real grievance has come to our notice we have given it attention. The express company is doing business to make money, and not merely for the sake of doing it. We have tried to furnish convenient cars, with shelves, so that baskets do not rest upon one another. We can do unloading as well and as quickly as anyone. (To Mr. Goodrich.) Do you pretend to say you can deliver to the merchants the contents of fifteen cars in thirty-five minutes? No one can do that.

Mr. Goodrich denied having said he could "deliver" fifteen carloads in that time, but that he had unloaded that number and had the contents "on the way" to the merchants in thirty-five minutes from the time of beginning. Mr. Angell denied that such were Mr. Goodrich's words, but was overcome by the recollection of several gentlemen and by the reporter's notes. Mr. Goodrich continued: I do not deliver upon South Water street, but to expressmen on the platform. I have unloaded from twenty-five to thirty cars by 9 o'clock, when it took the American Express Company till the next day to do the same amount of work.

D. W. Hinman related experience he had at Grand Haven, where he saw grapes from Allegan piled out of the car into a heap, the expressman kicking the baskets occasionally to get them into place. He tried to make complaint to Mr. Angell's son, but he refused to give the matter any attention, on the ground that they were not Mr. Hinman's grapes.

R. Morrill, to Mr. Angell: If you will start an investigation you will find an abundance of unquestionable evidence of such abuses as those of which we complain. The case of which I spoke was at the end of the route, so there can be no excuse of unavoidable haste. I reported this case to agent George Thayer, but never learned that anything was done about it.

Mr. Angell: He never reported it to me.

Mr. Morrill: If the express company can not handle our fruit better, can not carry it to and from the cars without pitching it, it should give way to some company or agents who can. [Cheers.]

Mr. Angell: We expect to—when we have to.

Mr. Morrill, continuing, urged the need of lower express rates to interior towns of this and other states.

Mr. Angell: Our point is to please the shippers, and when fault is found we do our best to remedy the evil, even to dischage of employés if necessary. We do not like to handle fruit roughly, but sometimes have to. We remedied

the trouble of which Mr. Hinman spoke, by sending a car through without change at Holland. (But Mr. Hinman observed the fault at Grand Haven, the fruit not being bound to or through Holland). We try to have all the help necessary and make constant efforts to prevent bad handling, but sometimes the rush of fruit is too great and unexpected. I know of no delays in forwarding fruit when loaded.

This was a luckless expression on Mr. Angell's part, for it brought John P. Wade to his feet with a declaration that he knew of a shipment of peaches made from Fennville by the American Express Company, on a certain Wednesday, which did not get upon South Water street till the following Friday.

"I deny it! I deny it!" angrily retorted Mr. Angell.

But Mr. Willard Wade arose and quietly but with firmness said the fruit referred to was his own, and that he saw it come upon the street at two o'clock in the afternoon of Friday.

Mr. Angell had nothing further to say.

W. A. Smith: Under any system some such complaints as these are sure to come. The express company probably does the best it can. We have no quarrel with it. We must organize and arrange with the railway company for rates that we can afford to pay and yet the railway have the margin of profit which is its due. We of Benton Harbor have secured rates by rail to Minneapolis and St. Paul which were but little more than we have to pay merely for carriage by boat across the lake to Chicago. Only organize and you will get from the railway managers the same rates of the express company. Joseph Lannin read a constitution and by-laws prepared for a Fennville fruit shippers' association.

R. Morrill moved for appointment of a committee of three to consider this matter and report at the evening session.

The motion prevailing, the committe was composed of Messrs. J. P. Wade, John H. Crane and Alexander Hamilton.

Resuming attention to the programme after discussion of the transportation question, the society listened to reading of the following paper, by W. A. Smith of Benton Harbor, on

TRUSTS AND THEIR RELATION TO HORTICULTURE.

A trust may be denominated as an ingenious device by which the rich are made richer and the poor are made poorer. The ultimate aim and object of the whole trust business is to enhance the cost of the necessaries and comforts of life to the consumer.

The first effort of a trust is to limit production; the next, to break down competition. When these two efforts are attained, it has the monopoly of the market, and the consumer is at the mercy of a greedy and unscrupulous combination of money sharks.

The consumer stands at the bottom and "pays the freight" on everything, whether put upon the market by a trust or syndicate, or in a legitimate commercial traffic.

To limit production, whether of the necessaries or comforts of life, simply means to increase their cost to the consumer and enhance the profit to the dealer.

Corporations, it is said, have no souls, and some men, without the aid of corporate influence, have no souls. Money always is power, and the greater

the combination of capital the more power it exerts for good or evil. Give almost any set of men the exclusive control of the market, and there is hardly any limit to their selfish and indecent greed. Take, for instance, the jute trust in the cotton states. Jute is a foreign production, largely used in bagging cotton. This trust got its work in well, controlled nearly all the jute bagging in the market, and then applied the lever to squeeze the "brine" out of the toiling millions. Up, up, up it went, until it became absolutely oppressive to the cotton industry; and other materials for bagging cotton had to be substituted.

Coming home to every household in the land, take the sugar trust. Under its manipulations the sugar we use in our households has advanced one and a half cents per pound, or more than twenty per cent. The consumption of sugar in this country, annually, amounts to about 3,000,000,000 pounds, or fifty pounds per capita. This adds $35,000,000 additional cost to the consumer; and, as the bulk of this article passes through the hands of the trust, we can readily see what an enormous margin it swallows up. The trust buys the imported raw sugar, refines it under strict regulations as to supply, and thus controls the market and the price. They also have in a great measure the control of raw sugar, since it is not sold for consumption, to any extent, in that state. The sugar trust has the control of nearly all the sugar refineries of the country, and when it suits their purpose they will close up a certain number of these establishments, and thus limit the supply on the market.

The millers are arranging a trust to limit the production of the staff of life, and thus to enhance its value to them and its cost to the bread eater. This they aim to do regardless of the cost or supply of wheat. If they can limit the output, the market they have, and the terms will be theirs. But, says one, this can not be. Nearly every bread-eating community in the land has its own mill or mills to fall back upon. This was so in days gone by, but it is so no longer. The big fish have swallowed up the little ones, and they will not allow any more small fry to breed. The large milling establishments, by this plan, will in a great measure control the markets of this country at least, and those who are too small, financially, to gain admittance into the trust, will be only too anxious and willing to reap a part of the benefits growing out of it. How this trust will benefit the wheat-grower is not so plain. Last year one of the large Minneapolis mills, managed on the mutual benefit principle, divided $40,000 profits among its employes, the mill still holding the lion's share. How many of the 138,000 farms in Michigan would be required, growing wheat at eighty-nine cents per bushel, as last year, to divide $40,000 profits among the employes? Yet millers say milling don't pay.

Michigan has salt enough stowed away in its bosom to supply the whole nation for untold generations, and yet the salt rings have, or are trying to get up, a trust to limit its production and its consequent cost to the consumer.

Would these trust sharks hesitate a moment to get up a trust on fresh water and air, if it were in their power to do so?

But the cry is, monopolies can not work in this land of free competition. Ah, but free competition is first destroyed, and then the evil is apparent to all.

As a people, we are rapidly falling into the power of the money-bags. Almost everything we eat and drink, except our home productions, are doctored and adulterated. The hog, the ox, and the cotton fields, in a great measure, supply our tables with butter and our pantries with lard. The four-

legged hog, as well as the two-legged one, is becoming altogether too ambitious. The time was when the former was content to supply us with good clean lard. Now he must put his nose into nearly every man's butter dish.

The fruit growers of Michigan, as well as elsewhere, are always anxious for full crops and good fruit. Not only are the growers thus anxious, but every one also who is dependent upon them for supply. They all want good fruit, and plenty of it, for then the market will be full and the price low. It is said there can be no surplus of good fruit. There may be none left when every one is supplied on his own terms, but whether this would recompense the grower for his labor or not may be a question.

This year I shipped grapes, in stands got up in good style. The package was worth more than the fruit, yet the fruit was sold for less than the package cost and the latter thrown in. Fruit growing is becoming a fine art. The bugs and other insects are after everything that is worth growing. To be successful one must put on the armor of insect warfare and do battle continuously. If we could form a trust with these little marauders, and have them in full years take, say, one-half, and leave us the remainder uninjured, thus reducing the supply one-half, we might advance the price and make it pay. But give them a moiety and they'll take the whole. Commercial fruit growing is mainly in the hands of persons of small means, and is likely to remain there.

Not only is the *growing* of good fruit becoming a fine art, but the looking after paying markets is a finer one. On the lake shore we ship our perishable fruits mainly to Chicago, consigned to commission houses, and trust to luck; and luck is often against us. When the fruit crop of the country, in a general way, is full, the supply is larger than the demand. It is only when nature forms a partial trust with the more favored localities, and by frosts or drouths or floods cuts off, so as to reduce the general supply, that the business assumes a healthy financial condition.

Transportation, where competition exists, is becoming lower year by year, and the service more rapid and systematic. Hence, all the principal outlying markets can be reached from almost any fruit growing center in the country. Many of these outlying markets, however, are being rapidly supplied by home-grown products, as it is about as easy to grow them at one point as another, and thus save the transportation and package, and in many cases the commission; all of which added together will in many cases amount to more than one-half.

So rapid and cheap is transportation, that except for the more perishable products it makes but little difference whether a good market is near at hand or far off. Last year we shipped fruits by car lots to St. Paul and Minneapolis, a distance of about 500 miles, as cheap as our rates across the lake by boat, about fifty miles. As fruit growers we can never combine to limit the production of fruit, neither can we organize to establish a uniform price for any of our perishable products. The goods when upon the market must be disposed of without delay. The demand for good fruit is generally equal to the supply, at some price. Inferior goods must often be sold at an actual loss to the shipper. Where a business runs in so many channels, and is divided up among so many growers, it is a difficult matter to control it in any way. If every fruit center could make arrangements with evaporating and canning houses to consume a certain part of the crop, when the supply is large, it would relieve the market from glut and thus save loss to the shipper.

Where fruit is carried by rail it should be shipped in car lots, direct to the consumer, instead of to a distributing point and reshipped. This requires extra time and double toll to the shipper. To do this would require a union and concert of action on the part of the growers. It would be necessary for some one or more, at each fruit center, to have the general management, not only at the starting point but also at the terminal point. In this way better rates could be procured, the cost of delivery at the terminal point cut down forty or fifty per cent, and the leading markets relieved by shipping to outside points. These arrangements have been successfully made in other localities and under circumstances similar to ours. I think the time is coming when concert of action among growers, in the shape of a shipping organization, at least, will be an indispensable necessity.

We are having a monthly crop and weather report, issued by the secretary of state, which gives in detail valuable information not only of the crops harvested and secured, but also the acreage and condition of the growing crops generally. There is no reason why we should not have equally full reports, through that medium, of the fruit crops, both prospective and otherwise, from every fruit center in the state. This information is in the hands of Michigan fruit growers, and they should see to it that these reports are duly forwarded to the secretary of state and in due time.

G. Richards: Every business has a trust or combination except that of the farmers, and it seems impossible to get them to organize. Why are they so slow to see the benefits of organization? I see no way but to make a beginning among the few who are now ready, then to pack honestly and secure an agent who will handle the organization's fruit and no other. Do this and let the unwilling ones go. They are bound to be nothing anyhow.

A. C. Glidden: "A boycott is a conspiracy, say the courts. Are not trusts conspiracies also?" Mr. Glidden made strong argument in support of this view and said he believed that this would be the ultimate solution of the whole difficulty. Organization is entirely feasible, he continued, and its good results are already apparent; for at even this beginning, this mere talk about these affairs, you have brought the enemy before you, while at no other time has he given your complaints the least attention. Hold your ground and you can readily gain more.

Wednesday Evening Session.

After an introductory piece of music by the band, the first order of the programme was a paper by Benton Gebhardt of Mears, on

THE PLUM ORCHARD.

The original parent of the cultivated plum of our gardens and orchards, is a native of Asia and southern parts of Europe; but it has become fully acclimated to our climate and soils, as a great many of our very choicest varieties have originated in this country and many parts have produced fruit in abundance. That the soil and climate of the middle and southern States are admirably adapted to this fruit is sufficiently proved by the almost spontaneous production of such varieties as the Washington, Jefferson, Coe's Golden Drop,

etc., sorts which equal or surpass in beauty and flavor the most celebrated plums of France or England.

VARIETIES.

In regard to the best varieties to plant for profit, I find the following list the best, named in the order of ripening:

Bradshaw—Fruit very large, dark violet bloom, with a slight neck; tree an upright and vigorous grower and productive; ripens middle of August.

Duane's Purple—Fruit large size, roundish, inclined to be swollen on one side; color, a reddish purple, very handsome; tree an upright and rapid grower and bears annual crops. Ripens last of August.

Lombard—Fruit medium, oval, violet red, juicy, and good; tree hardy and immensely productive; a valuable market variety; ripens September first.

Pond's Seedling—Fruit very large, sometimes of immense size, form of Magnum Bonum; color a light red with a beautiful lilac bloom; one of the most attractive in cultivation; tree a good, upright grower, and fair bearer; inclined to rot in some seasons; ripens from the 10th to 15th of September.

Quackenboss—Fruit large, oblong oval, deep purple; valuable for market; tree a vigorous and spreading grower, hardy and productive; ripens middle of September.

Bavay's Green Gage—Fruit medium to large, roundish, oval, pale yellow marked with red in the sun; hangs long on the tree and is a market fruit of great value; tree moderately vigorous and remarkably productive; ripens last of September.

Shorpshire Damson—Fruit small to medium, but larger than the common Damson, roundish oblong; color dark blue; on account of its lateness it commands high prices in market; tree a moderate grower but very productive; ripens Oct. 1.

Of the late novelties, or new varieties, I will mention only two, not having fruited these to any extent as yet.

Shipper's Pride—Fruit medium, round, oval, color dark purple, with a heavy bloom and handsome appearance; tree a very strong and upright grower, hardy and early bearer; ripens Sept. 15.

Stanton—Fruit nearly round, medium to large; color a dark bluish purple, and on account of its late ripening, said to be one of the most valuable for market; tree a strong grower, hardy and prolific; season of ripening, Oct. 1 to 10.

MANAGEMENT.

Open standard culture is the universal mode in America, as the plum is one of the hardiest of fruit trees; and being as it is, an annual and heavy bearer. it naturally requires a good soil or a great quantity of fertilizer applied annually to bearing orchards. As the plum is so very productive, do not let the trees overbear or break down with their fruit. But trim the fruit properly, so as to have it perfect and not injure the vitality of the tree. The best mode of culture is to plow the ground early in the spring, each season, and cultivate thoroughly during the time of fruiting. It requires but very little pruning, beyond that of thinning out a crowded head or taking away decayed or broken branches, also heading back young trees when making too luxuriant growth of wood in one season. The plum will grow vigorously in almost every part of the State; but is longer lived, and bears its most abun-

dant crops, in heavy loams or in soils in which there is a considerable mixture of clay. It also does most excellently in good, sandy soils, mixed with gravel, if properly fertilized, bearing immense crops of perfect, highly colored, and well developed fruit; and, too, it is more exempt from rot than on heavy, damp soils.

Marketing the fruit is a very important matter to consider, especially if we have to deal with or deliver it to express companies to handle and dump about. Fruit of this class should be handled with the utmost care, as much so as you would handle a package of eggs, and not dumped around as farm produce or lumber.

To reach its best condition, the plum must be ripened upon the tree, but when shipped a long distance, and for market, it cannot be allowed to ripen on the tree, but must be picked while yet hard. Pick the fruit with care, to retain the bloom on it as much as possible. Put up for market in neat and attractive packages, either one-fifth or bushel baskets, always covered with a fine quality of tarletan, and not mosquito netting as some are accustomed to use, and you will have fruit you need not fear to offer in any market.

Of insects we have the curculio, black aphis, and leaf slug; but of all the curculio is the most destructive insect we have to combat with. Never having the experience, or believing it to be effectual, in the use of spraying the trees with water containing Paris green or London purple, I would simply refer to the mode of jarring the trees with the sheet and mallet for destroying this troublesome pest. For the aphis, use strong soap suds or kerosene emulsion, and for the leaf slug I find air-slaked lime or dry dust to prove effectual. Fight the insects with vengeance and keep all fallen fruit picked up and destroyed, and you will meet with success.

Replying to questions, Mr. Gebhardt said the bearing age of plum trees varies from three to five and even eight years; how long they live I cannot say; they are hardy enough, so far, in western Michigan at least, but seem to do better on plum roots than on those of the peach; my trees have borne full crops when peaches failed.

Mr. Lannin said he knew of bearing trees thirty years old.

Mr. Hamilton had understood that some varieties of plum do best on peach roots.

Mr. Gebhardt: I admit it is so claimed, but I speak of my own experience. I have the same kind of trees on both kinds of root, and those on plum do much the better.

G. Richards: I have some Wild Goose plums that have never borne much. [A voice: "They never will."] But I have read that the Miner grafted into Wild Goose tops will fertilize them.

R. Morrill knew of some old trees which are every year a bank of bloom but never bear a plum.

D. R. Crane of Fennville stated that he had a number of Chickasaw plum trees which bear fully every year, but he has four sorts, including Wild Goose, growing near each other.

Mr. Lannin had read that the Miner and Wild Goose bloom together, while the European sorts are a few days later and hence will not fertilize the Chickasaws.

It was agreed by several that the plan of grafting Miner into Wild Goose tops was an excellent one, likely to fully provide for fertilization.

Mr. Crane, replying to a question, said the Miner looks like the Wild Goose, only it is a dark purplish red—and good, too, when fully ripe.

PREFERRED SORTS OF GRAPE AND PEAR.

Joseph Lannin, of South Haven, was on the programme for a paper on "Best Varieties of Fruit to Grow," but he chose to talk instead. Excusing himself from saying anything about apples or peaches, on the ground of unfamiliarity with them, he addressed himself first to grapes.

If any are intending to plant the grape they should beware of putting out two many sorts. One, two, or at most three are sufficient for commercial purposes. It is bad policy to have many kinds, for comparatively few are profitable. The grape needs a certain kind of soil and situation for its best development. It should be placed on high locations and the soil should be clay or loam with gravel subsoil. Of varieties, the Delaware is the standard of red grapes, as to quality, yet it is not profitable except in rare instances. The Brighton pays better. It has a bunch three times as large as the Delaware; the quality of the two is nearly equal; it is a strong grower and a magnificent grape in every way. Among black grapes the Concord, when well grown, is hard to beat; but the Worden, all in all, is preferable. The Niagara is the best of all the many white grapes; yet three others are well known, Pocklington, Empire State, and Moore's Diamond, a new one. None of these compare with Niagara. It requires the best of locations, qecause of its habit of strong growth. While what has been said of commercial grape growing is true, an amateur grower will find it well to have a vine or two of each of the better sorts, for purpose of observation, experiment, or comparison. The very best soil for grapes is that sort of clay which has lime in it. Preference should be given a northren slope, to a southern one, the latter being most undesirable of all.

Of pears, 400 or more varieties are known and catalogued, but many are worthless in Michigan. The best of these for market are also the best for dessert, as is the case with peaches also. I have now 400 pear trees. The slugs killed 100—they will kill a tree in three years. If now about to plant an orchard, I would set, for one sort, Clapp's Favorite. It is a handsome pear, of fair quality, and will not rot at the core unless allowed to ripen on the tree, which should not be permitted. The Bartlett is well known and popular (many Goodales are sold for Bartletts on the Chicago market). Louise Bonne is handsome, scarcely medium in size, an early bearer, and sells well. Sheldon is russet till ripe and then a beautiful golden yellow, very rich, fine, hardy, sells well, and not much attacked by the slug. There are two sorts of pear leaves, hard and soft. The slug prefers the latter, and Bartlett most of all. Finest of all pears, but not much cultivated, is the Bosc. It grows slowly, not bearing till the eighth year, but enormously every year afterward. It has magnificent leaves which hold on late to the tree and so facilitate formation of fruit buds. It needs good ground, and when well grown it sells high. I would advise the setting of a few in each orchard. The Frederick Clapp and the Anjou are very fine, though in the market the green color of the latter is somewhat against it—still, it sells pretty well. Clairgeau is very coarse and grainy. The Bosc may be top-grafted into any other sort. The Duchess is a very large pear and pretty good if grown as a dwarf and properly trimmed, but worthless as a standard. The dwarf Duchess will

bear but few fruits unless set so deeply that roots will be thrown out from the scion above the quince stock.

Mr. Iddings asked what he should do with some pear trees which bore when four years old but have since made great annual growths with no fruit. He was told to let them alone except to run a knife around them about the middle of June (they will then form fruit buds), and give them clean culture.

Mr. Lannin said he has had but little blight; that this disease comes under a hot sun after showers. Cut out the blighted twigs below sound wood. Set standard pears twenty feet apart.

ADVICE FROM AN ABSENT FRIEND.

The following is a portion of a letter from W. A. Brown, of Benton Harbor, whose illness prevented his attendance. It was read by the secretary but discussion was cut off by lack of time:

An effective organization will require much disinterested labor by the committee having the matter in charge, and meetings of fruit growers must be held at all large shipping points, where the plans and objects of the association must be fully explained. I can not, at this writing, offer any well considered plan of co-operation but think the Delaware Fruit Exchange and their means of information and distribution will be found best adapted to conditions in western Michigan, with such modifications and alterations as different localities may require. I would advise all rail freighting from practicable points to all points beyond Chicago, and the appointment of our own agents to look after our interests at all points where our fruits are wanted; also, that when a responsible organization is effected we make proposals to the C. & W. M. railway to run fruit trains over their road on conditions of mutual benefit. As a member of your executive committee I would suggest that your society make overtures to the West Michigan Agricultural and Industrial Fair Association for an exhibition of fruits at their annual fair in Grand Rapids, through their fruit superintendent, and that in addition to regular premiums offered, liberal premiums be given for small collections of the best and also of the newest varieties of the different fruits, with all notes appended to all premiums in such collections, giving full history and characteristics, such exhibits to be placed where those interested can have free access to them and the notes connected therewith. Failing in making an arrangement of mutual benefit to the West Michigan Agricultural and Industrial and this society, I would recommend the holding of an independent pomological and horticultural fair at the proper season and at some point best accessible to the fruit growers of western Michigan, and would invite the co-operation of the State Horticultural Society in holding such independent fairs. Since agriculture and the mechanical arts have thrown over horticulture and pomology, the State Horticultural Society appears to be without adequate means to compile the annual reports. Now, if present at your meeting, I would move that the proceedings of this and former meetings of your society be tendered to the secretary of the State Horticultural Society for publication in the state reports. I would also urge the re-adjustment of the relations of the two societies in such manner as to become of permanent advantage to the many and great interests which depend upon horticulture or pomology in this state. The labor of compiling matter for the annual

reports might be made less onerous by a division of the several subjects pertaining to horticulture and all kindred subjects, as suggested by Mr. Lyon in his last annual report. Among these subjects the experimental work now being done at the Agricultural College and outlying stations will demand much space; and your society should be given all subjects pertaining to practical commercial pomology, which include a comprehensive system of compiling annual statistics of the amount and value of the pomological products of the state. But I cannot write full details of what might be considered irrelevant by your meeting.

BEST PEACHES FOR PRESENT PLANTING.

R. Morrill asked what are the best peaches to plant, to be named in the order of ripening. Harrison Hutchins had thought of discarding the Crawfords but the crops of the past two years has changed his mind, and he has concluded it is hard to get better sorts. Wheatland is an excellent peach but a shy bearer. Of the earliest kinds, Champion, Shoemaker, Amsden, Waterloo, and Alexander, he prefers Waterloo. Then come in order, Rivers, Louise, Hale, Crane's Early, Early Rareripe, and Lewis Seedling. After these the kinds are so many it is hard to tell which are best. If he were to select six he would take Waterloo, Rivers, Hale, Early Crawford, Golden Drop, and Smock. Stranahan and Juno are both good; Wagar is good in quality, hardy, prolific, but this year small; the Chilis have been very small for two years; Switzerland is very prolific and ripens about with Late Crawford; he would not plant the Mountain Rose, for though it is good it ripens with the Early Crawford and so is not salable. Stump is a fair peach, about like Mixon; the latter is a tender tree but a better fruit than Crawford.

William Corner gave as his choice of six for market, Hale, Waterloo, the true Jacques Rareripe (there are different sorts under this name), large Barnard (there are several Barnards), Corner's Seedling, Chili and Smock.

Thursday Morning Session.

The following report from the committee on miscellaneous business was received and adopted:

The committee on miscellaneous business, to whom was referred the president's message, would respectfully report that they have considered his recommendations and would recommend that the sum of $25 be paid the secretary for his services. The committee would further recommend that our society, at this meeting, fix the salary of the secretary at $25 per year.

The committee would also recommend that the society appoint a committee to draft resolutions, expressive of our sorrow in the death of our honored vice president, Harvey C. Sherwood, and that a copy of said resolutions be forwarded to the bereaved family by the president.

The committee would further recommend that the president's annual message be printed along with the proceedings of the society.

WM. CORNER.
WM. B. ANDRUSS.
D. W. HINMAN.

The chair appointed as committee on memorial of Mr. Sherwood, Messrs. A. C. Glidden, E. C. Reid, and R. Morrill.

Proceeding with the annual election of officers, the society made choice as follows:

Secretary—G. H. LaFleur, Allegan.

President—Walter Phillips, of Grand Haven.

Vice Presidents—R. A. Morrill, of Benton Harbor; O. Beebe, of South Haven; Geo. S. Chubb, of Lisbon; Benton Gebhardt, of Mears; Harrison Hutchins, of Ganges.

Treasurer—W. A. Smith, of Benton Harbor.

Executive Board—J. Lannin, of South Haven; A. C. Glidden, of Paw Paw; Wm. Corner, of Saugatuck; W. B. Andruss, of Allegan; R. Morrill, of Benton Harbor.

Mr. Phillips cordially expressed his thanks for the honor of re-election, but said he accepted only on the condition that a new man shall be selected at the next annual meeting.

REPORT OF COMMITTEE ON FRUITS.

Your committee found on the fruit table forty plates of apples, thirty of which were furnished by Wm. B. Andruss of Allegan, six by H. J. Ray, of Watervliet, and four by J. F. Blair of this place. The fruit is very fine, in excellent condition, and correctly named. All of which is respectfully submitted.

A. Hamilton.
J. W. Humphrey.
Geo. S. Chubb.

REPORT OF COMMITTEE ON RESOLUTIONS.

Whereas, A body like this, gathered to promote individual interest, is necessarily dependent in a measure upon the bounty of the community; and

Whereas, The benefit to be derived is largely due to the efforts of the people locally interested: therefore,

Resolved, That we, the members of the West Michigan Fruit Growers' Society, tender hearty thanks for the unbounded hospitality of the citizens of Fennville, and the fruit growers of the vicinity, for their attention to the wants of the strangers now in their midst.

Resolved, That to the local committee and to the business men of the town, this meeting is largely indebted for the very satisfactory arrangements provided for the meeting.

Resolved, That we appreciate the attendance and the interest manifested by the ladies of Fennville, their untiring attention, and the bountiful and elegant repast furnished the members in this hall.

Resolved, That to all who in any way have added to the interest of this meeting, by their practical suggestions, their essays, or their efforts in any direction, the membership offers hearty thanks.

A. C. Glidden.
R. Morrill.
Benton Gebhardt.

The society accepted, from President Lannin, of South Haven and Casco Society, a pressing invitation to hold the summer meeting in the former town, that society to set the dates.

After brief remarks by the president, thanking the members for the great interest in the meeting and their courtesy to the chair, the society finally adjourned.

ALBERT J. COOK, M. S.

MEETINGS OF KINDRED SOCIETIES

HELD IN MICHIGAN

DURING THE YEAR 1888.

AMERICAN ASSOCIATION OF NURSERYMEN, AT DETROIT, JUNE 20 AND 21.

THIRTEENTH ANNUAL MEETING.

The opening session, Wednesday morning, President C. L. Watrous in the chair, was devoted to appointment and reports of committees and discussion of various matters not of interest to others than the members.

Upon re-assembling in the afternoon the first proceeding was the annual address of the president. After noting the success of the association in securing a change of freight classification of trees in boxes from first to third class, and the favorable prospect of reduction of the postage rate for seeds, bulbs, and cuttings, Mr. Watrous discussed "Hardy Varieties of Fruits," among other things saying that, in regions where fruit trees have suffered from extreme cold, "it has been observed that varieties of trees and plants indigenous to that region, or descended from such indigenous forms, have suffered least, if at all. In regions where all fruits descended from foreign ancestors have been severely crippled, the native forms and their derived varieties have suffered comparatively little."

Mr. Watrous thus continued:

"Among fruits the apple, most important of all, and wholly of foreign ancestry, has suffered most grievously, the cherry and plum, also of foreign ancestry, suffering the next heaviest losses. Our grapes, east of the Rocky mountains and outside of greenhouses, being largely of native ancestry, are still ready for business or pleasure. The raspberries, blackberries, strawberries and gooseberries, all of native stock, are ready for use. Happily for the country, all these last-named fruits have been so thoroughly emancipated from their taint of foreign ancestry as to be reliable throughout all the regions indigenous to their wild relatives.

"It only needs that painstaking and conscientious men shall originate new and better adapted forms, in every locality whose conditions render such labor necessary, and shall seek out and propagate such promising chance seedlings as may from time to time appear, in order that each and every botanical region may have an abundance of varieties well adapted to its needs.

"Throughout all of the great empire known as the Northwest, native forms of the plum have now almost or quite supplanted the foreign stock. The cherry and the apple still remain to be carried through the same course of evolution, by seedling variation that has already been passed through by the grape, the raspberry, the blackberry, the strawberry and the gooseberry.

"A glance into the list of the venerable American Pomological Society will show how very few years have been spent in changing the lists of approved sorts from foreign to native names, and the different native species into what

now supply so large a share of the most pleasure-giving and health-sustaining part of our national diet.

"The same broad road to improvement is open in case of the cherry and especially of the apple. At the risk of seeming extreme in this regard, I am willing to go on record before you all, as saying that I believe sufficient progress has been made to justify a confident expectation that within the lives of young men who hear my voice today, the common and universally propagated varieties of the apple throughout the great Northwest will be the descendents of the native crab apples, indigenous to the glades and thickets of the prairies, which have through ages unmeasured, by variation and natural selection, adapted their race to every vicissitude of their climate and soil, as none of foreign ancestry ever can, except by the same measureless course of adaptation through seedling variation. This is not all as visionary as it might appear.

"Already have been exhibited two different varieties of apple bearing unmistakable proofs of legitimate descent from native thickets, which have excited favorable attention.

"In many different places careful and zealous experimenters are developing these by cross fertilization and otherwise, with high hopes for the future.

"There is no reason why the cherry should not tread the same king's highway toward perfect adaptation. I hold that a perfectly adapted grape or apple should bear its fruit and, with proper care, be as long lived as its wild brethren in the thicket. Why should not this be so, as well as that the civilized brain worker should, by proper living and care, not only live as long in useful activity, but far outlive, the days allotted to the savage roaming the forests and prairies of the same region? And no man can answer why not.

"The considerations here urged regarding the superiority of native forms of fruit-bearing trees and plants, apply with no less force to trees and plants for ornament, shade, shelter and timber. The best authorities now agree that American trees are the best for America. The foreign trees, with which so many of the older parks and pleasure grounds of the east were planted, from lack of suitable and cheap trees of our own native varieties, are steadily failing, when their days of greatest use and beauty should be just upon them.

"One of the most eminent authorities in America, in considering these failures, has lately said in bitterness of heart, that if these losses and failures will only teach men the folly of proclaiming the worthiness and adaptability of any foreign tree or plant, before it has had a trial of a time extending at least through a period equal to the natural life of a single individual of the species, these losses and their lessons will not have been too dearly bought.

"Every nurseryman in the nation should feel his responsibility to himself and to his generation, not only to do what he can toward originating new and more perfectly adapted varieties of fruits and plants, but also to be on the watch for new and promising forms of chance origin, and to see that each has adequate trial and honest judgment in at least its own botanical region.

"I fear most of us have very inadequate ideas of the strain put upon the vitality of trees and plants by transplanting them to different conditions of climate and soil. In a late most admirable report of the state geologist of Indiana is the statement and proofs of the fact that there exist within the boundaries of that one state no less than seven distinct and well defined botanical regions, each marked by a preponderance of certain native plants, and the absence or scarcity of others, as shown by the lists submitted. This

should be a lesson to each of our fraternity, teaching him to test the favorites of distant regions with no more than hopeful distrust, and to prove them well before proclaiming them to his friends, his customers, as worthy of confidence and the investment of money. Many of us might have saved, and may yet save, ourselves grief and humiliation by observing this simple rule.

"By allowing the glamour of a foreign name and the deceptive haze of distance to cloud their judgment, many honest men have had more prophesies to 'take back' than have added to their reputations. Careful and intelligent experimentation is the daily duty of the nurseryman.

"If ever any calling, whereby men ate honest bread, deserved the name of profession, instead of merely business, that of the true nurseryman is most deserving. No science which touches upon the lives of plants or of men is outside his field of legitimate and necessary study. No matter how profound a student he may be, he has need of all his gathered wisdom to guide his steps into new and unexplored fields of research. It can not be doubted that this association has done and has yet to do a great work in stimulating the minds of its members to new and more extended studies."

After a good word for experiment stations, Mr. Watrous had this to say, in praise and blame, of that pest of pomologists, the tree peddler: "When this association has settled the transportation problem and the postage problem, and done its utmost to secure and propagate only the very best varieties of trees and plants for each region of our broad land, there will yet remain one great and heavy labor, the labor of discovering how to place their products in the hands of planters under their correct names without misrepresentation. The day may never come when the zealous tree missionary will wholly refrain from describing a fruit or flower in rose-tinted language when seeking an order. Neither is it at all certain that the public would be better served by tree sellers wholly without imagination and without extreme hopefulness.

"Thousands of mothers and children now luxuriate upon fruit and feel their souls expand under the influence of trees and flowers which would not have been bought and planted except through the unflagging efforts of the tree missionary who had need that day of all his imagination and all his rose-tinted descriptions, to induce the planter to divert a few dollars from the broad and beaten path of more corn and hogs, into the pathway of fruit, and shade and flowers. These blessed means of grace, following the path of the tree missionary, may atone for all his sanguine promises as to size and sweetness of fruit and flower, but they can not be expected to wipe away the sin of deliberately filling orders with things quite different in name and nature from the thing described and sold.

"If members of this association would resolve to sell no stock to any dealer suspected to be guilty of fraud in filling orders, similar dealers would be forced out of the trade or to more honest and careful methods.

"Legally no man is bound to follow his property after he has sold it. In fact he cannot do so. Yet reproach is heaped upon our fraternity because other men attach dishonest labels to our honestly grown and honestly sold trees. This is a grievous burden to bear, and one that I am confident will be largely mitigated in the near future. It can be done by no few men, but our association may hopefully look to this as one of its fields of labor."

Then followed a long report from the committee on freight classification, the gist of which has herein been given; some remarks by W. C. Barry, of

New York, upon "Higher Aims of This Association," and other debate about business affairs.

Thomas Mehan, of Philadelphia, unable to attend, sent a paper on "Suggestions for the Improvement of Fruits," from which is subjoined these extracts:

"They need improvement. There has been an advance in some respects, but the general movement has been retrograde. Take the strawberry. Thousands enjoy it now, where but a hundred could years ago. But for this, thanks to the culturist. The fruit has not improved. No variety is better or yields more abundantly, than any that was popular a quarter of a century ago. I know it is customary to smile at the retrospective fancies of elder folk. They are told that distance lends enchantment to the view, but I know that we could go to the strawberry bed without regretting that we did not bring a pound of sugar with us. We now have for the table sugar flavored with strawberry. We had in those days strawberries for their own dear sakes. Is it not the same with most fruits? I say most, for in some lines, especially the grape, there has been a genuine advance, though even here we have not done much better for ourselves than the Catawba did for us in the days of which I write.

"This reference to the grape brings me to Mr. Watrous' point, how best to improve our fruits? Shall it be by hybridizing, or by selection? And if by selection, what are we to select?

"We can get new races by hybridizing or crossing, but it is of little value as an improving element. Hybridization or crossing is the foe of evolution. It is a conservative power, the deadly enemy of progress. It seems a natural law that everything should vary. Philosophy has shown us the reason for this, and it has come to be generally accepted as a truth that the present order of nature could not possibly exist had not providence implanted the tendency to vary, when the great machine of life was first set going. But every movement of nature is rythmic; there are opposing forces at every step. Continuous advance and rest mark almost every node on the branch. All these rythmic movements come from opposing forces, and in the evolution of opposing forces hybridism is one. A plant with comparatively sour fruit has a seedling with sweet fruit. Insects, or the wind, carry the pollen of the parent, or of those like the parent, to the new departure, and the next generation produces fruit neither sweet nor sour. The adventurous youngster is brought back again toward the ranks. It is next to impossible to make any good use of hybridizing or crossing in improving fruits.

"In the origination of new races it is, however, invaluable. There was a time when people believed that hybrids were sterile. They saw that the poor mule was sterile, and jumped at the conclusion that there was a law in all such things. Truly, some hybrids are sterile; but then, there are numerous cases of sterility among individuals not hybrids. American horticulturists surely know that hybrids are not necessarily sterile. Rogers of Salem, over a quarter of a century ago, produced a new race of grapes between two species. We all know this race is not sterile. The race having been once established, has given, as by natural variation, a great advance. This is the only case where we know of a certainty that the founders of new races were hybrid. Various raspberries and gooseberries have been hybridized, but no new race has sprung from them. But there are races from supposed hybrids; supposed hybrids with good reason. There can be but little doubt

that the Kieffer pear and its kindred originated as a hybrid between two good species. The race of raspberries, of which the purple cane is the type, is evidently between two good species; as also is the type of blackberry of which the Wilson is the representative. It is believed that the Siberian crab and the common apple have given us a hybrid race, and there may be some others. Once we have the new race we must look to the selection of seedlings for the improvements we desire. It is by no means clear that environment has anything to do with directing new forms; but, the forms having once sprouted into existence, from the original providential germs,if one may so speak, environment has a great deal to do with the preservation of the sprouting being. If the variation be in the direction of tenderness, a severe climate will kill it; if it prefer a moist atmosphere and finds itself in a dry one, it becomes uneasy; or, if it be one demanding higher nutrition than usual, and it finds itself where poverty reigns, it will do little good. We can only tell from experience whether the variation is in the line of what we want, and from that we must select seed, and again from that as it approaches the type we have set up for ourselves.

"The introduction of new species for hybridization, or the importation of new varieties from abroad, all have their uses as giving us new lines for starting on; but selection must be the chief weapon in our war against rough nature.

"I think the want of real progress, noted in the beginning of this essay, comes from too much attention to crossing by the more intelligent among us; and the chapter of accidents which has left often to ignoramuses the introduction of new fruits. Once advertised extensively, the best of nurserymen has to keep them. His business is to supply what the public has been taught by the advertisements to demand. A variety found in the meadow, pronounced superb at the corner grocery, and endorsed as the best in the world by the respectable justice of the peace, or the truthful village clergyman, is enough to bring fame and fortune to the introducer, if he will only venture his cash on printer's ink.

"We can do better than this. It seems to me the duty of nurserymen to take into their own hands, more than they have done, the improvement of fruits, intelligently keeping in view desirable points, and ultimately selecting from seedlings till they accomplish their ends. It will surely pay."

The Thursday morning session began with an entertaining paper on "French Nurseries," by Mr. Irving Rouse, of Rochester, N. Y., who said:

"One can scarcely imagine a greater contrast than exists between an American and a French nursery. The first thing that strikes an observer in France is the lack of implements considered necessary on this side of the Atlantic. No cultivators, no harrows, no plows, and no horses to work them with. Not one nurseryman in ten owns a horse, or has any use for one.

"The ground, as the Irishman said, is plowed with a spade, is cultivated with a spade, assisted by mattocks, and the stock is dug with a spade. No use there for tree or seedling diggers. It is delivered on the packing yards on wheelbarrows and handcarts, and is taken to the railway station by teams owned or employed by the railway company, and the cost of hauling is considered part of the freight bills. It seems hardly credible, but the proprietor of a nursery of over 200 acres assured me that a plow had not touched the ground in over fifty years. As horses are not used, the ground can all be utilized; no headlands or fence corners left untilled.

"The seed of apple and pear are sprouted in beds after receiving much the same treatment during the winter that we in America give them. After they have made a little growth, the young plants are taken up and transplanted about an inch apart each way, in beds about four feet wide. The beds have narrow paths between, just wide enough to stand and walk in. After this transplanting, if the season is dry, the beds are irrigated by means of water from deep wells, raised by wind-mills or horse-power. The weeds are pulled out, but no cultivation of course is possible.

"In the plantations of larger stock, the forest and shade trees are usually planted in the same manner, except that the trees are a foot or more apart each way and the paths are left out. Our system of deep cultivation is of course not possible, and the only thing that can be done is to keep the ground clean by hoeing, and the surface loosened up. The ground is manured heavily and at great expense, the fertilizers being all carried from the compost heap in baskets on the backs of workmen. If some of our people, who think they have a hard time, could see women backing out manure at forty cents per day for twelve hours' work, they would conclude that there are people worse off than they, and a worse country to live in than the United States. A first-class workman receives from four to five francs, eighty cents to one dollar, per day of twelve hours, and is then competent to take care of a gang of men. The bulk of the workmen receive three francs, or sixty cents a day of twelve hours. In the districts near Paris they get rather more, while in the Cologne districts they average but two and a half francs or 50 cents per day. Land, on the contrary, is exceedingly high, $1,000 per acre being the average price given me of some eight or ten concerns near the larger towns. The dearness of land and the cheapness of labor account for the absence of labor saving machinery and the cheapness with which stock is produced.

"First-class standard apples in France must have stems at least six feet without limbs, and they are frequently ten and twelve feet high. Cherries and pears are grown in the same way. They are of necessity older, rougher, and not so bright as our trees. The green moss must, as a rule, be scraped off the bodies before being delivered. The extra age and size makes the price high, the ruling figures being thirty cents for standard pears, twenty to twenty-five cents for standard apples, and twenty-five to thirty for cherries. The tree agent and dealer is not known in that country, most of the orders coming direct to the nursery. A good deal of stock, however, is sold at the fall fairs. The peasants come in from the surrounding country with a cart load of trees, and the nurserymen say that the peasant seller always has on hand any sort the customer may ask for.

"My own impression is that the temptation to substitute, under the whole system, is greater than under the agent and dealer plan, and I can assure you that certain concerns have as bad a reputation for that sort of thing as any one can well have, and the presumption is that they deserve it, as under their system of business the seller has all the responsibility, there being no middleman, agent or dealer.

"The conditions of climate are quite different from ours. The winters are not so cold as ours in the north, nor the summers so hot, tender plants like the camelia flourishing on the west coast, while 100 miles inland they cannot be grown at all, indicating a difference equal to that between New York and Georgia. Their climate and soil produce fine trees and fine fruit, and we

are indebted to the French people for many of our finest sorts, but neither the Frenchman, nor the Englishman, nor the German know what it is to use fruit as we use it. In no city in Europe can you buy such a great variety of fine fruit as in New York, and in no country in Europe is fruit within the means of the working classes as it is in our country.

"We, as nurserymen and fruit growers, can congratulate ourselves that owing to our efforts there is produced in no other country in the civilized world fruit of such fine quality, such immense quantities, and so wonderfully cheap as in our own."

Mr. Barry, of New York: The reference made to the fruit we enjoy here is certainly correct. The American who visits Europe is greatly surprised at the poor quality of the fruit that he finds in that country, and the high prices that he pays for it, and it makes us, who live in this country, feel that we enjoy a great privilege in living in this progressive region. I think that the people who live in this country, generally, do not appreciate the advantage that they have in enjoying fine fruits—for instance, the apple. The low price at which it can be obtained enables everybody, the poorest in the land, to enjoy the fruit in the same degree that those on the other side, who are the richest of the land, can enjoy. That is to say, the poorest on this side can enjoy the fruit as well as the richest on the other side of the water. We, as a people, do not appreciate this fact. If apples cost us $10 or $12 per barrel, as they do on the other side, we would think a great deal more of them. We would appreciate them more and eat them more freely than we do. I think the time is coming when the people who go abroad will see this thing, and they will come home and appreciate it more than they now do. Think of the variety we have of apples, pears, peaches, plums, cherries, etc., and all the small fruits and grapes. Why, certainly, gentlemen, we do not appreciate what we have to delight the eye and palate. If we had to live here without meat and all those things, we could live on our fruit alone, and we ought to be thankful that we live in such a country and such a fertile region.

"The Work of the Association" was the title of a paper by Mr. Herbert Myrick, of Springfield, Mass., in which, besides allusion to various affairs of the association, Mr. Myrick made this defense of the tree agent:

"The system of selling nursery stock by traveling agents has long been assailed by the agricultural press. That it has been abused is beyond a doubt, but no well informed person can deny that this system has carried horticulture where otherwise it would still be unknown. Many a farmer has bought a bill of nursery stock in sheer desperation to get rid of the agent, and in future years has realized that that agent was his best friend after all. In other words, a large number of men whose orders can only be obtained through agents, would never set large or small fruits unless urged, or even forced to do so by the pertinacity of a modest 'nurseryman on wheels.' In this way the traveling agent has been a blessing in disguise—very much disguised in the judgment of some people, but nevertheless a blessing.

"The question to be solved is, how can this agency system be protected against fraud? It is about time that the press ceased its sweeping denunciations of nursery salesmen, because the good should not suffer for the misdeeds of the bad. No editor expects people are going to rush to buy his paper, but he has got to make something that they must have and bring it to their attention, either through agents or otherwise, to secure their pat-

ronage. If the editor or publisher fails to do this, he fails to achieve success. Just so the nurseryman who thinks the public is going to rush into his office to buy nursery stock will find himself wofully mistaken, unless he make some effort to secure its patronage. We have passed the times when men can sit down and get rich, and even to make a living most men have to 'hustle' pretty lively now-a-days, especially in the nursery and newspaper business.

"It ought to be possible for this association to perfect a black list of traveling agents. For instance, let every member report to the secretary the name of any traveling salesman who is caught defrauding the public by selling them stock untrue to name, or lying to them about the merits and hardiness of varieties.

"Announce in the agricultural press that farmers are invited to send to the secretary of the association full particulars about any agents by whom they claim to have been swindled. A system of inquiry to verify the facts could be easily inaugurated without great expense. Inform the newspapers of this work, and ask that all complaints from their readers of swindling salesmen be investigated by the secretary before publication, so that the full name and address of the offending party may be published to the world."

Then followed a committee report and a discussion upon reduction of postage on seeds, etc., but as such reduction has been accomplished the matter is of no further interest.

The annual election of officers was effected by report of a committee on nominations, with this result:

President—Geo. A. Sweet.
Vice-President—G. J. Carpenter.
Secretary—Chas. A. Green.
Treasurer—A. R. Whitney.
Executive Committee—Leo Weltz, S. D. Willard, S. M. Emery.

STATE FORESTRY CONVENTION AT GRAND RAPIDS, JANUARY 26-27.

In pursuance of the scheme of purposes as outlined by the commission soon after its organization, and in acceptance of a cordial invitation extended by the Grand Rapids Board of Trade, a Forestry convention was held in the city of Grand Rapids on the 26th and 27th of January, 1888. This meeting was convened with the objects in view of comparing opinions, gathering facts, and recording current thoughts in our state upon questions that would naturally present themselves to the commission in pursuance of the work indicated by the law creating it.

Hon. N. A. Beecher, of Genesee county, recited to the convention the reasons why a bill was drawn and the law enacted which provided for the Forestry Commission in Michigan. He found a number of leading thoughtful men in the state who were discussing the best means of staying the great waste of timber in the state by fire and careless cutting, and how best to conserve the forest wealth of the northern part of the state so that it could be most wisely utilized, and how, by encouraging new plantations in the southern part of the state, to restore the conditions needful to the most successful agriculture, which had been swept away with the thoughtless destruction of nearly all the forest growth.

He stated as an admitted fact that where one-fourth to one-third of the total area of timber is allowed to grow, we can raise more products of all kinds than where the country is denuded of the same. The humidity of the atmosphere, six per cent greater in forest than in field, assists in producing rain and is more healthful.

The annual waste or consumption of forest timber in one year in the United States is, according to the last census, estimated at $700,000,000, more than double the amount of the National Bank currency.

There are 1,000 mills engaged in manufacturing lumber and shingles in Michigan, with an invested capital of $48,000,000, and the value of the annual product approximates $60,000,000. The owners of these mills employ 35,000 persons, who receive annually an aggregate of over $7,000,000. The total product of Michigan for 1886 is almost 3,000,000,000 feet; shingles 283,838,000.

Mr. Beecher quoted Geo. S. Frost, an extensive dealer in Michigan pine lands, as saying: "The whole timbered area of Michigan is 'cornered' and will not last more than fifteen years."

The amount of timber used by railways in operation in this state for the year 1885 was 3,750,000 ties; allowing thirty-five feet to each tie, gives 131,250,000 feet. Then comes piling, bridge timbers, etc., which equal one-third

of the above. In addition to this there are at least 1,500,000 railroad ties shipped from this state to other localities.

It needs no argument to prove the commercial value of pine and hard woods, but the cheaper woods, those that have been considered nearly worthless, are becoming valuable. Extensive pulp factories are springing up in different parts of the State and utilizing the cheaper woods, such as spruce, balsam, small Norway, jack pine and poplar. The demand for these species is increasing rapidly.

It was these facts, and the experience Mr. Beecher had had in growing plantations of trees that led to the enactment of the law creating a commission to open the way for such legislation and education as seemed wise in the premises.

A paper was presented by Prof. James Satterlee on

NUT BEARING TREES,

deprecating the practice of figuring out grand results from planting nut trees in quantity upon the outcome of a single specimen favorably located. He related his own experience briefly as follows:

"In an orchard in Montcalm county of one hundred chestnut, walnut and butternut trees, planted twenty-five years ago, from twenty-five to forty feet apart, on ordinary sandy loam 'oak openings' soil, the trees now average from nine to twelve inches in diameter below the branches, have handsome symmetrical heads, and are from thirty to forty feet in hight. One, a walnut, at one corner of the field, in the richest, moistest soil, has reached a diameter of fifteen inches below the branches, which spring from the trunk at about five feet from the ground. These trees were kept well cultivated for the first twelve or fifteen years, since which time they have been kept in grass, and closely pastured by sheep. The trees increase in productiveness each year, and now bear ten or fifteen dollars' worth of nuts each year.

"But counted from a money standpoint, this little orchard has been a failure. As a timber supply it would not be a success. The potatoes that were raised on an equal area of land by the side of this little orchard during the past year, would buy more stovewood than the whole plantation would make to-day."

The professor, however, counted the investment a valuable one as contributory to the satisfaction resultant upon ownership of an attractive rural home.

VALUABLE TIMBER REMAINING IN MICHIGAN.

G. W. Hotchkiss, of the Chicago Lumbermen's Exchange, estimates that Michigan originally had about 150,000,000,000 of feet, board measure, of pine, but now has only from 12,000,000,000 to 20,000,000,000. During the last five years there has been an average cut of 4,500,000,000.

Arthur Hill, of Saginaw, thought Michigan now had about 30,000,000,000 standing pine.

Perry Hannah said the hard wood of northern Michigan was worth more than all the pine the State had ever produced.

E. W. Barber, of Jackson, presented some gleanings from the census:

Of the 36,755,200 acres representing the area of Michigan, but 13,807,240

acres are in farms, of which 4,452,206 acres, or thirty-two per cent are woodlands.

Competent authorities state that, for the best agricultural results in a country where the average rainfall is even more than it is in Michigan, at least one-third of the farm lands should be covered with trees.

UTILIZING THE BARREN KNOLLS.

L. D. Watkins, of Manchester, Michigan, advocated the planting of barren and waste places to rapid growing trees, as a matter of farm economy. He said the common locust was a rapid growing tree, and there was no reason why the poor spots on farms could not be made fairly profitable by planting to trees and at the same time the earth rendered more attractive.

J. Austin Scott, of Ann Arbor, a veteran tree planter, gave valuable illustrations of the rapidity of tree growth under proper management. Trees that he planted in his boyhood in Connecticut and in early manhood in Ohio are now two feet in diameter. Twenty years ago he purchased a place in Ann Arbor covered with saplings, and now many of them are eighteen and twenty inches in diameter. He advocated the American elm as a tree for street planting.

Benjamin Hathaway related his experience in making and managing a farm wood lot. He set maples in 1859 in considerable quantity that are now a foot in diameter, and have been utilized for five years in the manufacture of syrup and sugar. White pines set the same year have grown to the same height as the maples, but do not average quite so great a diameter. His reserve wood lot was planted with small maples—say an inch in diameter, white pine, blue and white ash, spruce, cedar and other evergreens. These trees were grown in the nursery four years along with rows of chestnut, walnut, butternut and hickory grown from the seed. These trees, when planted in the wood lot, were set thirty feet apart and well planted, with abundant root, and well formed top. Not more than one per cent of the plantation failed. The pine and spruce have made the largest growth. He described minutely the management of an eight acre and twelve acre plantation, mentioning, incidentally, that one of these he had cultivated continuously since planting, and in it were now growing raspberries and blackberries which thrive in the shade of the trees. Mr. Hathaway described his method of planting trees along his fences and highways to be utilized for posts upon which to string wire. Wagener apple trees planted seven years ago and headed high are already large enough to support such a fence.

He strongly advocated that each farm should have a half acre devoted to growing forest trees to be used in planting where and when they were needed. Mr. Hathaway was of the opinion that from a money point of view the investment in trees on his farm had been a valuable one; that his farm today, if put on the market, would bear him out in the opinion.

Arthur Hill, of Saginaw, presented a paper on

FOREST FIRES—PREVENTIVE LEGISLATION.

From the U, S. census for 1880 he quoted the record of a specimen year in which 267 forest fires were reported, originating as follows:

From clearing land	161
Locomotives	43
Hunters	59
Smokers	3
Indians	1

We have stringent laws for game protection, yet our forests which shelter the animals are of far greater moment. Mr. Hill's suggestions concerning needed legislation succinctly stated are:

First, A provision making the supervisor of each township fire warden of his township, and defining his powers and duties and fixing a fair rate of compensation for his services;

Second, A provision substantially the same as section 1, chapter 328, Compiled Laws, which provides that every person who shall willfully or negligently set fire to any woods, prairies or grounds not his own property, or willfully or negligently permit any fire to pass from his own woods, prairies or grounds to the injury or destruction of the property of any other person shall be deemed guilty of a misdemeanor punishable with fine or imprisonment, or both, the party injured to have double damages for the injuries sustained;

Third, A prohibition against the building of fires by persons clearing land during the period from April first to November first in each year without the consent of the fire warden in writing, with previous notice to owners or occupants of adjoining lands;

Fourth, Provisions as to railroad companies, requiring them to keep their right of way clean of dead herbage and other combustible material, and compelling any railroad company, upon the written request of any fire warden through whose jurisdiction its road passes, in time of danger, to burn coal instead of wood for locomotive fuel, and to employ a corps of men to be known and to act as a "fire patrol," whose special duty it shall be to prevent fires in and along the right of way, and to suppress fires originating in the right of way, and compelling the companies at all times to use extreme diligence in preventing and suppressing fires kindled by the companies, their agents and employes.

Upon this general subject B. E. Fernow, of Washington, D. C., presented his views. To dispel ignorance should be the first object of legislation. Hence the necessity of a careful canvass of forest resources provided for by the State, and development of the lines of manufacture which demand timber of certain kinds. The disastrous results of ruthless forest destruction in other lands ought to have its influence upon us in framing laws which should either prevent a like destruction, or create in place of that which is elided, a growth which in itself would modify the results of man's destructive work, when looking simply to immediate accumulation of property.

Mr. Fernow said that special legislation, then, which is the strong expression of the interests of the community, is needed for forests and forest property, can admit of no doubt. The forest legislation which is needed in Michigan, as well as most other States, must be directed, first, to a better protection of the forest property as long as it may last, which we have from nature's kind hands; secondly, protection of the future crop, as far as nature has kindly restored it, or man has planted it; thirdly, it is to provide and make accessible such information as will enable the people to utilize their forest growth to better advantage, will enable them to see the necessity for reforestation in certain places, and the desirability in others, furnish the

basis of a rational system of forest management, just such as we attempt to introduce into agriculture; fourthly, legislation may go so far as to recognize a temporary need of directly encouraging a private activity in planting and caring for forest property by means of temporary financial assistance or other aids, reduction of taxes, etc.

He advocated provision for an energetic forest commissioner, charged with the forestry interests of the State in all their bearings, who would procure and digest for you the statistics, who should interest himself in seeing fire and forestry laws executed, who should furnish such information as is needed by forest planters, legislators, manufacturers, etc.

Last year $10,000,000 worth of property was destroyed by forest fires in Michigan. The State can well afford to spend at least the interest on this annual destruction of property in an attempt to curtail and control it.

With regard to encouragement of forest preservation and planting, Mr. Fernow said:

"A State law which will encourage the holding of forest areas by townships or counties, and their administration under direction of the forestry commission or commissioners, is highly desirable. There is no reason why a township or county should not own and manage a forest, when it is in the interest of the community to so own forest property, just as they own and build roads, bridges and schoolhouses, or as a city owns its municipal buildings and other property. The community is not only richer than the private man, but it is longer-lived, and can more conveniently wait for returns. Let, then, where public interest should demand afforestation, the community step in and plant the forest, charging the outlay in the form of a lien or mortgage upon the growing forest, with all the rights and liabilities that usually pertain to such investments, except that the interest may accumulate until the crop is ripe and ready to be marketed, when the loan with accumulated interest, must first be repaid before the owner reaps any benefit. Any such forest planting, now begun, will at the time when the crop becomes useful prove such a satisfactory investment that no further encouragement for careful forest management will be required by the harvester."

Dr. W. J. Beal quoted losses by forest fires from the last census as follows:

	Acres Burned.	Prop. Destroyed.
California	356,800	$440,000
Colorado	113,800	935,500
Michigan	238,000	985,980
Minnesota	250,000	1,398,000
Montana	88,00	1,128,000
Pennsylvania	685,700	3,643,000
Tennessee	985,000	5,253,900
Wyoming	83,000	3,255,000

The loss by fire in the United States is about one-twelfth the value of fuel consumed, and one-seventh the value of timber cut for lumber, ties, posts and bridges. But the greatest loss is in the destruction of young growing trees, seeds, etc., which are ready to do the most of reforesting when the mature timber is removed.

In a general discussion upon forest fires, it was generally conceded that the State should take hold of the matter, and from the experience of older States which had enacted laws, draw up a plan that will at least mitigate the present enormous destruction of property from this cause.

Mr. Fernow advised in general the adoption of a combination of the Penn-

sylvania plan of fire wardens appointed by the county commissioners of each county, and the Canadian plan, where the lumbermen and the State combine, half and half, during the dangerous season, and employ a fire patrol to extinguish and warn against fires. It was optional with the Canadian lumbermen to have the system or not, and it has worked so well that it is extremely popular.

PROFITS IN TIMBER CULTURE.

Under this title Hon. Martin Conrad, of Chicago, foreman of the largest wagon works of that city, said:

Five sorts of timber are foremost in the construction of wagons.

First, White oak (including swamp white oak), maturing for wagon work in eighty years or less;

Second, Shell-bark hickory, maturing or fit for use in thirty to fifty years;

Third, White ash, now becoming very scarce, but very valuable, fit to use in thirty years;

Fourth, The tulip tree, or whitewood, superior for carriage bodies, wagon boxes, requiring sixty years or more to get fit to use;

Fifth, Red or Norway pine, requiring at least sixty years before it is profitable to cut for the bottoms of wagon boxes.

In growing trees men forget that an acre of well grown timber, artificially grown, is worth five times as much as one that has grown in a natural way.

Mr. Conrad, after studying what has been done in a limited scale, estimates that one good tree would grow to the rod, 160 to the acre, say 110 to the acre after eighty years.

We start with 2,700 to the acre, and thin them as they grow; when eighty years old each should make 500 feet of lumber, or 55,000 feet to the acre, worth in Chicago now, $1,430, and in eighty years, no doubt, it will be worth $50 per 1,000, or $2,750.

The cost of raising is much reduced by thinning, the tan bark, etc.

A man need not wait eighty years to realize money on the timber, as young timber can be sold with the land. It has a prospective value, as a pig, a colt or calf. Young timber is on the line of a permanent improvement.

Prof. Satterlee in discussing further the subject, spoke of the growing of hoop-poles, saying that bitternut sprouts grow with surprising rapidity, making a crop once in six years of considerable profit.

The quality of timber as affected by rapidity of growth was illustrated by Mr. E. R. Lake, clerk of the forestry commission. Second growth pine of Massachusetts was very inferior to virgin forest pine of Michigan; while second growth hickory of rapid development was far superior to that of slow growth, thus making the point that slow growth in cone bearing trees is desirable, while in deciduous trees we should stimulate rapid production of wood.

Dr. Beal showed the reason for this in the growth of cells.

Dr. R. C. Kedzie, of the Agricultural College, gave an address, taking for his text

A WORD ABOUT WATER,

in which he gave an account of a recent journey across the continent, and a resumé of his impressions concerning the relationship of rainfall to the development of a region and the importance of employing every means in the

power of man to secure a sufficient fall of rain to grow a full round of crops for human sustenance. He said there was a suspicion spreading widely that throughout the older parts of our country the climatic conditions which control the seasonable rainfall are so changing as to produce greater extremes of drouth and flood; that the water level in many regions is lowering; and that there is a relationship between the elision of the timber and the irregularity of the rainfall.

Researches have been made abroad with reference to these questions, but he questioned if these were applicable to our own country with sufficient exactness to be of very great value. He compared the physical geography of the eastern continents to our own, showing that there was the greatest contrasts in the characteristics which are generally conceded to modify climate.

With regard to our peninsula he remarked:

"But when we turn our attention to the position and surroundings of our peninsula, we are satisfied that nature chose this spot for some peculiar manifestation of her favors, and when she threw the arms of her encircling lakes in a loving hug about our peninsula she meant business. Looking at the unique position of our State, no thoughtful person will doubt that the meteorological conditions here demand a separate and careful study irrespective of the general climatal conditions prevailing elsewhere. No generalized discussion will meet our condition as a State. * * * What are the relations of forests to rainfall? to soil-water? to crops? to the public health? What will be the influence of deforesting in these various particulars? We can gather a large harvest of opinions, guesses, suggestions and views on all these subjects. But what do we absolutely know about any of them?

"In these questions about the relation of forests to climate we want facts, not fancies—facts strong as granite and changeless as the sun, so that when we build up our theory, and call it a science, we shall not have to 'lay again the foundation of repentance from dead works.' With fancies we may inflate a beautiful cloud that will soon fade into thin air, but with facts we may build a pyramid that will bide for aye. Have we now such facts on this subject? Who can tell us for certain the real difference between the air in a forest and that in an open field on a summer day?"

The address closed with the following words relating to original investigation in this State: "Permit me to say that the whole subject of the relation of forests to meteorology is one of great interest, and would seem to be one of vast importance to our people. If there is a casual relation between forest area and climate, and if there is danger that we may ignorantly disturb the harmonious relation of field to forest, it is time to pause and inquire before the time of safety is overpast. It may seem that the thermometer, the psychrometer and the rain gauge are feeble instrumentalities by which to fix the line of policy of a great State, yet the fall of an apple revealed the law of gravitation and turned human thought into new channels.

"It seems that we are now in just the position to take up and investigate these questions of overshadowing importance to our people. Thanks to our far-seeing State government, we have a Forestry Commission and a State Weather Service, the very organizations to carry forward such an investigation, and, by singular good fortune, both organizations are under the direction

of the same board. And Michigan is just the one to lead the van of States in this, as she has in so many other new lines of work."

A paper was presented by Eugene Davenport of Woodland, Mich., on

THE SUGAR MAPLE,

in its relation to the forestry question. He opened with the following announcement:

"It will be the purpose of this paper to show, that, within the maple belt, no other tree lays equal claims to the attention of those interested in the preservation of our forests, nor offers so good and economical means for the accomplishment of that purpose. To this end I shall endeavor to show: First, that the sugar maple fills all desirable conditions for forestry purposes better than does any other tree; second, that, everything considered, the maple sugar industry pays a better profit than does any other ordinary farm enterprise; third, that it may be considered in the light of a permanent investment, and that by virtue of this tree our forests within the maple belt may be rendered sources of revenue for all time—the most certain means to their preservation."

He called attention to the fact that timber trees declare dividends only at death and that nut-bearing trees and sugar-yielding trees make annual dividends, the trees still surviving. Of the two latter the sugar trees have the advantage, because, from their limited habitat, there can never be an overproduction.

To illustrate the profits that may accrue from a "sugar bush" Mr. Davenport gave the record of his own business briefly as follows:

We tap one thousand trees which are scattered over forty acres of land. It is by no means a choice piece of timber, as the same number might, and often do, stand on twenty acres. Besides the land our cash investment is about $750.00, divided as follows:

1000 tin pails @ 25 cts	$250 00
2000 Post's spiles @ 3½ cts	70 00
Sugar house with tank	150 00
2 evaporators	250 00
Miscellaneous	30 00
Total	$750 00

Our annual product sells for from $350.00 to $500.00, with an average of about $400.00, from which we deduct expenses, as follows:

Labor, fuel, etc	$100 00
Wear of apparatus	15 00
Interest on $750.00 @ 6 per cent	45 00
Total cost of manufacture	$160 00

This leaves an average annual net profit of $240.00. I make no deduction for taxes, as I consider them offset by the value of the land for pasture and of the timber for fire-wood. As all expenses have been deducted, the $240.00 may be considered as the income from an investment in forty acres of maple timber, which is six per cent on the value of the land at $100.00 per acre. This is above its market value. If the money value of the land be $50.00 per acre, the investment yields a dividend of twelve per cent. This is a net profit of twenty-four cents for each tree, and every maple tree thus repre-

sents a money value of $4.00 for sugar purposes. This is reckoned on the basis of syrup at one dollar per gallon.

Mr. Davenport, by statistics, showed that the market for the product would always be good, and illustrated by facts within his own observation that sugar orchards could be as permanently valuable investments as any other property in which the farmer could invest. There must be the same regard for succession that the successful orchardist manifests when he has a young orchard in its prime at the time the old one enters a decline. A maple tree that has reached its maturity should be used for lumber and fuel, and the sapling that sprang up not far away should have been nurtured to take its place. By proper management a grove of maples may be continually renewed and the young trees will be more valuable than the older ones, because grown under conditions that are to be constant; while the cutting away of large areas of timber has left the older trees open to changes to which they have never been accustomed.

With reference to the discouragement in planting, produced by the length of time before returns may be expected, Mr. Davenport remarked:

"True it does take time, but do as our old friend Josh Billings used to say, and 'set them out a good while ago.' It takes time to raise an orchard of fruit trees. Nature has favored us; let us provide for posterity. Neither does it take so long a time as we might suppose. Groves of maple that within my recollection were small trees are now tapped. I knew one tree by the roadside that forty years ago was a little switch preserved by one of the early settlers. It is now eighteen inches in diameter, and has a beautiful top forty feet across. Trees along our place, set twenty years ago, are nearly large enough for tapping, and they have been all the time in a June grass sod. Thirty-eight years ago, in a township adjoining my own, ten acres of oak were girdled and left to fall down and rot upon the ground. From that day to this nature has had her way in that old slashing. She set about covering the disgrace. The winds scattered those little winged seeds among the rotten logs, and to-day the ground is covered with a dense grove of maples with scarcely a tree of any other species. It is said that over three thousand thrifty maples now stand on that ten acres, many of them large enough for tapping. I would rather have that ten acres of maple grove than any twenty acres of farm land in Barry county. These instances show what maple trees will do without care, and under circumstances when even apple trees would make but a sickly growth or none at all."

Mr. A. C. Glidden, of Paw Paw, gave a short paper on

MANAGEMENT OF THE RESERVE WOOD LOT.

After stating the proposition that all the management necessary was to take out the mature timber and give the growing trees the best opportunity to develop, he discussed the question of economy in having any reserve wood lot at all.

He questioned if the farmer should be influenced by any theories of scientific gentlemen with reference to the climatic influence of reserved timber areas, when he has the fact staring him in the face that this land has a definite value to him for the production of crops above its worth in furnishing him wood and timber. He argued that the farm wood lot and the reserve timber lot will stand or fall from considerations of evidence more

palpable than these. If the wisdom of the few is to control the action of the many, the argument for replanting must be predicted upon a more substantial basis. It must be shown that present or prospective profit will certainly attend the enterprise, or the whole matter must be relegated to the management of experiment stations, to test the expediency of the project.

Prof. L. H. Bailey talked to the convention about

WINDBREAKS FOR THE FRUIT GROWER,

making the point that there is greater difficulty in the growing of fruit in Michigan now than formerly, owing, in large measure, to the deforestation or large areas. Forests aids the fruit grown in two important respects:

1. It prevents the disastrous effects of sweeping winds. 2. It conserves and regulates atmospheric moisture. It is very doubtful if the extremes of temperature or fluctuations in annual means are most intense in Michigan in recent years from the effects of forest removal. It may not even be true that there are more high winds now than formerly, but it is true that winds sweep over the farm with greater force. Winds sweep the surface and bear away the moisture of the soil at the same time that they come in contact with the trees and bushes themselves. The effect of the windbreaks is to check the force of winds in prescribed areas. It has a local influence.

Prof. Bailey made the following practical suggestions with regard to the making of windbreaks:

1. The windbreaks should not obstruct atmospheric drainage.

2. The windbreak should never be dense enough to force the buds on fruit trees in those localities which are subject to late spring frosts.

3. As a rule, in localities where atmospheric drainage will not be seriously checked, the windbreak should have a comparatively dense bottom, formed by undergrowth or low branching trees.

4. So far as practicable, the windbreak should be planted at a distance of six rods or more from the fruit plantation.

5. Native trees are preferable for windbreaks.

C. W. Garfield remarked:

Since the organization of the commission, I have felt that if it could crystalize but just one thing, and that, to set aside and preserve from vandalism an area of native forest, it would have justified its existence.

A generation ago, forest areas could have been reserved at the head waters of the Grand, Raisin, Kalamazoo and Huron rivers which would have afforded an object lesson of the greatest value to our people.

The more we cultivate out the vegetable matter from the soil, that serves as a sponge, the more suddenly the waters of a rainfall are lost to the land.

Had such reserves been kept, the presence of perpetual reservoirs in the southern part of our State would be a manifold blessing.

It can still be done at the head waters of the Muskegon and Au Sable rivers.

The advantage of such a reserve to science is no small item. There the native flora and fauna would be preserved for future study.

The United States government has reserved the Yellowstone Park for these same purposes, and if we ever wish to do this, the present is the only time.

In 1883 or 1884, Wisconsin reserved twenty-one townships. It was railed

at as being a scheme to further the purposes of a few speculators. But the reserve being at the head waters of some of her main rivers, it is not difficult now to estimate somewhat the immense value it is becoming to the State.

Such a reservation would give us data as to facts of tree culture and forest influence that we could not otherwise get. It would enable the State to test these questions on a scale of such magnitude as to be of great value.

A letter was read from Mr. A. J. Daniels, concerning

ECONOMY IN THE USE OF TIMBER,

in which he took the ground that true economy lay in using mature timber as rapidly as there was a demand for it. He was sorry to see so much valuable wood burned in clearing, when so many were in need of it in our large towns, and if some economist would show some fairly profitable method of utilizing it, none would more quickly adopt it than the men who do the burning, for they need the money.

In conclusion he said: "It seems to me to be true economy to cut all that is necessary to supply the demand, to make that demand as great as possible by inventing methods of using at a profit much of that which is now burned as refuse, and—shall I dare to say?—to cut off and burn it when it cannot be profitably marketed, if the soil is needed for farming purposes."

After passing a hearty vote of thanks to the Grand Rapids Board of Trade for courtesies rendered the convention, the deliberations were closed.

An evening was devoted to an ideal Arbor Day exercise under the management of teachers in the city schools, in which a large number of children participated. This exercise was so delightful that it was published by the State Agricultural College as a bulletin, for which there was a great demand, and afterward republished by the agricultural press of the country. This bulletin appears in the volume of the Michigan Board of Agriculture for 1888. This first convention in the interest of forestry in Michigan has seemed to give an impetus to thought and discussion upon forestry topics very profitable to our State, and is perhaps more effective than legislative enactment in educating the people towards a truer economy in the management of our tree wealth, but it must be remembered that legislative enactment really provided for this convention.

A FARMERS' INSTITUTE AT SOUTH HAVEN JANUARY 24-25.

The meeting of the State Farmers' Institute, January 24 and 25, was held at the opera house which was tastefully decorated with evergreens, while a large anchor over the stage was copiously studded with splendid specimens of the apple, seeming to say, "The apple is the sheet-anchor of horticulture," while two large tables loaded with fruits and flowers made as fine a showing, considering the season, as at many county fairs when the fruits are at their best. L. H. Bailey, the apple king, had 28 varieties of apple, J. G. Ramsdell 9, G. W. Law 8, H. J. Linderman 6, and Messrs. Bixby, Chatfield, Williams, and others smaller displays. D. C. Hodge, C. H. Emerson, and others had displays of corn and other products, M. H. Bixby wheat, while M. D. Merrill crowned and finished the whole by a fine display of flowers.

The exercises of the evening were opened by music by the South Haven cornet band, followed by prayer by the Rev. M. A. Bullock, and then by the address of welcome by Hon. C. I. Monroe, president of the South Haven and Casco Pomological Society, who said:

LADIES AND GENTLEMEN—It is my pleasant duty to say a few words of welcome to those who have come to conduct this institute, as well as to those who are gathered for instruction.

It was thought best that I should give some facts and figures about this locality and its productions. My excuse to the conductors of the institute for imposing these figures is that I do it in compliance with a request from Prof. Bailey, who had special charge of the arrangements for this institute. My excuse to the audience is that this is one of the few institutes held in a locality devoted in the main to pomological and horticultural pursuits; hence it seemed desirable to call attention to the extent and magnitude of these growing interests of our State, especially that those who are instructors and managers of the Agricultural College might get a more comprehensive view of the importance of the pomological and horticultural interest, in order that said interest may receive from the college a larger share in its course of studies, investigations and experiments.

Before presenting the figures I wish to say a few words of personal welcome. President Willits, I believe, is here for the first time. While he comes from the Agricultural College, his old home was at Monroe, on Lake Erie. We welcome him across the State to Lake Michigan, and trust that he will find much here to remind him of his old home, which is one of the oldest fruit producing sections of our commonwealth.

To my old classmate, Prof. Cook, I give hearty welcome, and know that I utter the sentiments of this community in saying we are glad to have him

come here, notwithstanding his intimate association with so many of our enemies of tree and fruit. We shall be glad to hear about his pets, the ticks, codling moth, curculio and others. We shall be particularly pleased to learn the kind and the preparation of the food he regards as best to have them die on.

To Prof. Bailey we extend the heartfelt welcome accorded to the child returning to his old home. In his recent visit to arrange for this meeting he reminded the pomological society, under whose auspices this institute is held, it was to his attendance at the South Haven pomological meetings he traced his love for horticultural pursuits. I voice the feelings of the society and of his former neighbors and friends in saying that we all take pride in the fact that he was once one of our active members, who has gone out from us to honor and usefulness. It is particularly pleasing to have him with us to-night.

While fruit has been our principal export, we recognize our fortunate position for market gardening, being only five to seven hours from that great market, Chicago, which is doubling about every ten years in population, and even in its ability to consume and distribute fruit and vegetables. We can load the various products which go to make up the fresh daily supply of a great city, on a boat leaving here in the evening, arriving at Chicago early in the morning and delivering its load in vastly better condition, with the easy, swinging motion of the boat, surrounded by the fresh, pure air of the lake, than those vegetables and fruits trundled into the city from eight to twenty miles over roads usually rougher than corduroy, and through a portion of the city where the air is not specially purifying. The favoring circumstances are becoming better known and truck farming is increasing; hence Prof. Tracy, who has wide renown in this department, and has a place on this programme, would be especially welcomed, but he is detained with business and may not be here.

Last, but not least, we welcome Secretary Reynolds, of the college. We regard the secretary as the heart of an organization and we deem it fortunate in having one so capable of keeping the lifeblood in regular and healthy circulation.

To our citizens and those from other towns: We are glad to welcome you to this institute. We hope you will find it such a "feast of reason and flow of soul" that each will return to his home with many items of helpful knowledge and with renewed enthusiasm.

For the purpose of giving a more intelligent idea of this section, which by common consent is styled the fruit belt, I had a map drawn showing the three great fruit belt counties of Allegan, Van Buren and Berrien. A circle with a radius of thirty miles having its focus near your present place of meeting, includes most of the territory which has been blessed for more than twenty consecutive years, except one, with annual crops of fruit, and especially of the peach and fruits of the tenderer kinds.

As further proof of its claim of being the fruit belt, I refer to the State census of 1884. The entire peach crop of the State is there given as 290,091 bushels; in Allegan, Van Buren and Berrien counties, 187,002 bushels, or about two-thirds of the entire crop. Of grapes, 1,550,702 pounds; the three counties named, 680,177 pounds, or more than three-fifths of the whole. No statistics were gathered of strawberries, blackberries and other small fruits, but careful inquiry shows the larger portion of these fruits exported was from

these three counties. Of the 4,092,806 bushels of apples raised in the State, 462,495 were in these three counties, or about one-ninth of the whole out of seventy-four counties reporting. I refer thus to the census as it was the last official report.

That I might obtain a reasonably accurate report of the crop of 1887, I sent out the following circular:

WANTED.

The statistics showing shipments and value of product for 1887, of the three great fruit counties, Allegan, Van Buren and Berrien.

Believing it important to growers, package manufacturers, transportation companies, commission men and consumers, also of public interest, I earnestly solicit answers to the following questions:

The amount dried, canned, preserved, etc. The amount shipped from your station. The average price. Value of total product. Number of trees or acres. Whether an increase or decrease in your vicinity. The fruits named are apples, pears, peaches, plums, cherries, strawberries, blackberries, raspberries, currants and gooseberries.

Several prominent papers have asked for this information, and with the local papers will give it wide circulation.

The greatest possible accuracy is desired. Those receiving this circular are requested to answer so much of it as they can from their personal knowledge, observation or special inquiry. Will be pleased to have you add any suggestion you may think of interest to fruit growers.

If possible, please return the statistics to me by December 24.

C. J. MONROE.

South Haven, December 15, 1887.

As to apples and peaches the reports were quite full, but in the main had been shipped by weight and so reported, and then were reduced to barrels, bushels or baskets. Where the number of barrels of cider are given, ten bushels is the estimate per barrel. When evaporated, six pounds to the bushel. Bushel of apples, green, fifty pounds. Pears, plums, quinces and cherries were given separate in many reports. No separate account could be obtained of the small fruits, which were mainly reported as so many cases of berries, without discriminating. In most cases the figures appear to be taken from the books of the transportation companies; in others given in round amounts.

Blanks were sent to sixty-five railroad stations and lake ports; about twenty were sent a second time with personal letters. I have received fifty-three reports by mail and some eighteen or twenty personal reports while passing about these counties. The prices I give are the average of those reported, taken, in the case of apple and peaches, from about twenty quotations. I present the circular and explanation so each person can judge of the probable accuracy of amounts and prices. This is the result:

Apples, 415,588 barrels, at $1.65	$685,720 20
Evaporated, 112,600 bushels (average cost, green, twenty cents) ready for market, including package, valued at	58,024 00
Cider, jelly, apple butter, pickled, preserved and canned, 313,200 bushels (average cost, green, ten cents), manufactured, ready for market, with package	109,620 00
Peaches, total, 1,897,338 baskets; 632,446 peck baskets at 37 cents	234,005 02
1,264,892 one-fifth bushel, at 30 cents	379,467 60
Pears, 44,730 baskets, at 45 cents	20,128 50
Grapes, 208,174 baskets, at 25 cents	52,043 50
Plums, quinces, cherries, 3,831 baskets, at 75 cents	2,648 25
Strawberries, raspberries, blackberries, gooseberries and currants, 222,408 half-bushel cases at $1	222,408 00

Onions, 58,300 bushels, at 65 cents	$37,895 00
Other vegetables valued at	100,000 00
Total *	$1,901,960 07

From the most reliable information I could get, the following is the number of acres in bearing orchards, in small fruits, and market gardening: Peach, 12,000; apples, 38,000; small fruits, 68,000; commercial gardening, 7,000; total, 63,000. Total number of acres in the three counties, 1,284,655.

Thus we have about one-twentieth of the land in orchards, small fruits, and market gardening; or for the crop of 1887 (taking out the orchards which bore little or no fruit, the loss of small fruits and vegetables by drouth) it is probably a safe estimate that the above yields came from about 40,000 acres, or one-thirtieth of the area of these three counties. This gives a hint of the possibilities of increasing our orchards and gardens, after making liberal allowance for land unfit for either.

The above values are given as the amounts realized at station or dock, as up to that point the money paid out for raising, harvesting, and for packages is mainly within the counties. The above figures do not include the home consumption of fruit of the 23,000 families within these counties, whether used fresh, dried, canned, preserved, in apple butter, jellies, or the many other forms of keeping fruit beyond its natural life.

It will be observed that the most money is realized from the apple. To emphasize the importance of the apple crop, compare it with the wheat crop, which is the principal money crop of the farmer. The State crop report for October, 1887, places the yield of these three counties at 1,563,969 bushels. Deducting 575,000 bushels for bread and seed (five bushels to each of the 115,000 of population), and we have 983,969 bushels for sale, which at 73 cents, the average price for the year, gives us $721,947.37, or $131,416.83 less than the apple crop.

For universal consumption by all classes the apple is the king of fruits. For the money invested and the time spent it gives larger returns than any other crop of orchard or farm.

I have attempted to deal only with the commercial phases of fruit growing and gardening. As already stated, few realize the magnitude of these interests or the money value to the State.

The continuous annual crop of the peach and other tender sorts of fruits, for more than a quarter of a century, has demonstrated our climatic advantages. The lake furnishes a natural thoroughfare, with the most perfect refrigerating surroundings, across which these products can be taken in a night, thus making distance of little consequence; or in other words, we are the convenient suburbs of the cities of Chicago, Racine, Milwaukee, and other ports with their network of railroads reaching out through the west and northwest to hundreds of cities and villages of growing demands. And this increasing demand is occasioned not only by doubling of populations, but through the lessening home production of tender fruits, caused in the main by the destruction of the great forests of Minnesota, Wisconsin, and Manitoba, which have been to the Mississippi valley in the past what the great lakes are for Michigan —the modifying barrier to arctic cold. Fortunately for us, man can not destroy the lakes.

*[After this paper was read Mr. Monroe received additional reports of 78,855 baskets of peaches and 21,440 barrels of apples. Market garden shipments were also increased, by personal reports made during the institute, to something over $200,000, this mainly from Benton Harbor and St. Joseph.]

Having these natural advantages, our best success hinges mainly on acquiring more knowledge in the various departments of horticultural pursuits; better and more thorough methods of preventing and destroying the many diseases and insect enemies of trees, fruits, and vegetables; enlarged facilities for handling and shipping, and a wider and more even distribution of the products. The three great factors are production, transportation, sale.

The programme of this institute was arranged with reference to obtaining instruction upon these topics. I know of no way to give more genuine welcome on an occasion like this than to show the leading industries we wish to foster; to indicate the kind of knowledge needed, and to get the benefit of others' opinions and observation and the comparison of experiences and experiments. Fruit raising requires unusual foresight. The tree must be good, its fruit desirable. We plant in the spring, not to harvest in the autumn, but years later. Thus the choice of a tree is important; the care must be good and constant; and finally, after years of waiting, the tree becomes an investment of such value that diligence and watchfulness are essential to fair returns.

The above statistics give a glimpse of the importance of the horticultural interest of the State and a flattering promise for the future if our part is intelligently performed. We appreciate the necessity of faith in our calling. The number of diseases and enemies of the tree sometimes shakes this faith; hence the need of knowledge to show that every disease and insect has its prevention, cure or destruction.

In conclusion, ladies and gentlemen, we give you most cordial and hearty welcome to the village of South Haven and to this institute.

REMARKS BY PRESIDENT WILLITS.

At the conclusion of the address of President Monroe, President Willits, of the Agricultural College, was introduced, and from his very interesting talk the following is condensed:

It affords me great pleasure to visit South Haven. I have come from Monroe, in the eastern part of the State, to South Haven, as I had a strong desire to visit the fruit growing parts of the State. Monroe once had a good reputation for raising fruit, but you have long since surpassed her. The first pear I ever ate was grown at Monroe, and the old tree is yet standing, ninety feet high and twelve feet in circumference.

We have come here to organize a State Farmers' Institute, and this is to be organized under the State Board of Agriculture. We are trying to work up the agricultural possibilities of the State. For we ask, after the timber is removed from our northern land, then what? And to-day we come to talk about the fruit industry. For if those statistics do not lie we have come to the place where this industry is shown at its best, and they say that figures will not lie, and we all know C. J. Monroe will not lie. If agriculture is the crowning industry of Michigan, then fruit raising is one of the foremost industries of the State. I am glad these three counties raise that splendid fruit, the apple. The Michigan apple is the standard of a good apple in California. It may not be out of place to say something of some other localities. Our people are looking to Florida and California. A great many have put large sums of money in Florida, but nine-tenths of these are disappointed. Just now the talk is about California. There are thousands of people now

crossing the Rocky mountains who will wish they had not. Without any doubt there are crops raised there that are perfectly marvelous. One man is stated to have raised on thirteen acres a crop of oranges selling for $6,500, or $500 per acre. But there are drawbacks which we do not see at first, and to the tenderfoot these stories are marvelous and attractive. The speaker illustrated by his own experience. When I left the bleak and snow-capped mountains and descended into the lovely Sacramento valley, only three hours' ride, and saw the fragrant orange grove filled with the luscious fruit and heard the marvelous stories, I thought the land well worth $1,000 per acre, and felt that were I a millionaire I would pay that price for all in sight. Then after investigation I fell to $800, then to $600, then $400, then $100, and finally, after seeing them cutting down some of their groves, I came away without investing a cent. A man at Monroe last year got $60 per acre for his potatoes, which cost him $18.25, and a man at Lansing once received $1,100 for five acres of Concord grapes, and when I had bought 130 acres at Monroe some advised me to put it all out to grapes, saying I could raise 2,000 pounds to the acre, which at even five cents per pound would bring $100 per acre. But I said grapes will come down to business just like wheat, for if everyone could do that then everybody would go into the grape business. They have pests in California as well as here, and they are cutting down their orange groves, for they have the scale there, as well as many other drawbacks, and fruit raising in California as well as here must come down to business. So I say we have no "soft thing" anywhere on God's green earth, and I came back and say it is no harder to get a living here than in California.

PROF. BAILEY'S TEN POINTS IN HORTICULTURE.

At the close of the remarks by President Willits, and after music from the orchestra, President Monroe presented Professor Bailey of the Agricultural College to an audience of his personal acquaintances, before whom he needed no introduction. The following is condensed from his very interesting remarks on the ten most essential points to success in horticulture:

LADIES AND GENTLEMEN—It is with great diffidence I appear before you and attempt to say anything in this place, for I remember that something has been written about a prophet in his own country. But as President Willits has well said, we are not down here to teach you but to get the benefit of what you have done. There are many points we might take up, but we wish to take up that in which you are most interested. I wish to speak of commercial horticulture. Does it pay? Now, I do not say there are only ten points, but that these are the most important, and the first is that the man must be a good observer. He must know if the effect grows out of the stated cause. A man must read, but he must read the right thing. Good brains are more important than good land. We must know something of insects in order to know how to combat them. Our insect pests are increasing, and as the forests are destroyed they come from thence into the orchard. The flat-headed apple borer has been transferred from the oak to the apple. Professor Cook will not tell you so, but he was the first to discover the way to destroy the codling moth. He saw that the blossom stands erect and the moth lays her egg in the blossom. If, now, the tree is sprayed with Paris green, it holds the poison and kills the moth, and later, as the blossom turns down, they fall out. Now, the fruit grower must be up to his business if he is to make money.

The second important consideration is the land, and we must have good cultivation, not to eradicate weeds but because the orchard requires it. Manure and lots of it, applied to the land as soon as made and left until plowed in—or, if this can not be done, the best way to save manure is to put it in broad, shallow piles and keep it moist and under cover if possible. A compost heap should also be made, into which should go all the leaves and refuse of all kinds.

Location or site: Higher lands are preferable, for they are drained of the cold air by the lower lands.

Varieties: The best varieties for your purpose. If to ship, those adapted to the market when the fruit is shipped in good honest packages. South Haven has now a good name for shipping in honest packages and, I am glad to see, prides herself on this fact.

Good marketing, which again includes the necessity of the first point, or a man with brains.

Pedigree in fruit—and I believe in pedigrees in fruit as well as in horses or cattle.

Succession of crops—and this applies particularly to vegetables and double cropping, where as many as three or four crops are taken off in a single season.

Market facilities: We must adapt ourselves to the market facilities, for they will not adapt themselves to us, and whether we make money or not on fruit depends on what we have in ourselves.

PROF. E. F. SMITH'S

REPORT ON PEACH YELLOWS

And Several Other Important Papers.

INCLUDING

PRESIDENT LYON ON RUSSIAN APPLES,
PROFESSOR BUDD ON CHERRIES.

PROF. ERWIN SMITH'S PRELIMINARY REPORT ON PEACH YELLOWS.

This important horticultural document was issued in March, 1889, as Bulletin No. 9 of the United States Department of Agriculture, botanical division. It had been expected for several months by horticulturists throughout the country, and the demand for it was so general that the edition was quickly exhausted—none was obtainable a few weeks after the first was issued. On this account, and because peach culture is so considerable a factor in Michigan pomology, it is deemed expedient to quite fully reproduce here the results of Prof. Smith's researches, which form the best, if not the only, investigation and review of the subject yet produced.

HISTORY AND DISTRIBUTION.

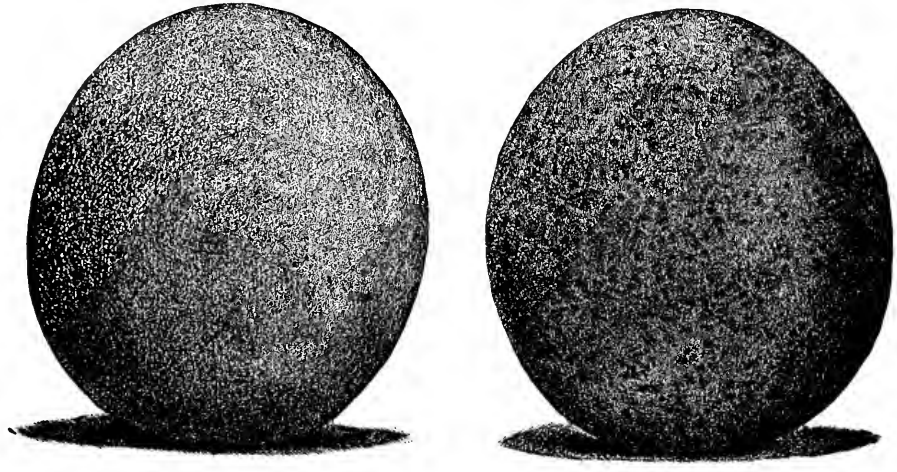
Yellows is a disease of peaches, nectarines, almonds and apricots. It does not occur in plums. I have myself seen it only in peaches, nectarines and apricots, but the evidence that it also occurs occasionally in almonds is reasonably satisfactory. In apricots it is rare. The two trees which I have seen were covered with the characteristic shoots but bore no fruit, so I cannot tell how it might affect the latter. Noyes Darling also saw it in apricots, but did not see the diseased fruit.

The peach is most inclined to this disease, and for that reason I shall confine my study to the effects on that tree.

The name yellows was first applied to this disease, near Philadelphia, at the beginning of the century, as we shall see later. The term has passed into universal acceptance, but the origin of the malady is unknown. It was much written upon in the early part of the century and has engaged the attention of horticultural writers from that time to this. Nevertheless, its nature is but little better understood to-day than it was fifty years ago.

GEOGRAPHICAL DISTRIBUTION.

Peach yellows appears to be confined exclusively to to the eastern United States. I can find no reference to its occurrence in California or anywhere west of the Rocky mountains, and it is doubtful if it occurs to any extent west of the Mississippi river. At least the peach growers of Kansas, Missouri and Texas affirm that it does not occur in their orchards. To determine positively, however, that the orchards in these states are exempt would require a careful



1 2

1.—HEALTHY PEACH. 2.—PREMATURE PEACH.

examination by some one familiar with the disease, because where orchards are small and scattering the disease might remain localized and be overlooked for many years.

Yellows is now more or less prevalent in Massachusetts, Connecticut, New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, West Virginia, Ohio, Michigan, and Ontario. Very likely it occurs to a considerable extent in Indiana and Illinois, and probably also to a limited extent in some parts of Kentucky, Tennessee, Georgia, and more southern states. I am not able to determine the exact southern limits of the disease. It should be said, however, that its presence is generally denied in all the Gulf states, where also it may be added that peach raising is not an important industry. I have myself seen the disease in Pennsylvania, Delaware, Maryland, Virginia, West Virginia, and Michigan.

This disease, so far as I can determine, does not occur anywhere in Europe. Whether it occurs in China, Japan, Algiers, Cape Colony, New Zealand, New South Wales, Argentine Republic, or other parts of the globe where peaches are extensively planted, is a matter for future inquiry, especially with reference to the origin of the disease or to its possible introduction from this country. At present the United States appears to have exclusive possession of this most insidious and destructive disease.

EARLY HISTORY OF PEACH-GROWING IN THE UNITED STATES.

Peach yellows is not a disease of recent appearance. It has been known for some time and the literature of the subject is extensive. For a better understanding of the present situation it is desirable to learn as much as possible of its early history, and also of the early history of the peach in this country.

It is uncertain exactly when peach trees were first introduced into this country, but it was prior to 1633. From two entries in the records of the governor and company of the Massachusetts bay in New England, it is probable that they were introduced into the New England region soon after the year 1629. On page 24 of the first volume of these records is an undated memorandum of things "to provide to send for New England," among which are included "stones of all sorts of fruits, as peaches, plums, filberts, cherries." Somewhat later, in a letter of April 17, 1629, from Gravesend, England, by the governor and deputy of the New England company to Capt. John Endicott, then "governor and council for London's plantation in the Massachusetts bay in New England," we read (p. 392):

> As for fruit stones and kernels, the time of year fits not to send them now, so we propose to do it pr. our next.

In 1633 the Dutch sea captain, DeVries, found peach trees in Virginia in the garden of George Minifie, on the James river, between Blue Point and Jamestown. They were the first seen by him in North America. The following is copied from the entry in his journal:

> Arrived at Littletown, where Menifit lives. He has a garden of two acres, full of primroses, apple, pear, and cherry trees. * * * Around the house were planted peach trees, which were hardly in bloom.

Minifie settled there in 1623.

In 1635 appeared the following mention of peach growing in Maryland:

Although there may not be many that do apply themselves to plant gardens and orchards, yet those that do it find much profit and pleasure thereby. They have peares, apples, and several sorts of plummes, peaches in abundance, and as good as those in Italy.

In 1656 John Hammond wrote of an earlier period, "Orchards innumerable were planted and preserved" (p. 9), and of his own time:

The country is full of gallant orchards, and the fruit generally more luscious and delightful than here. Witness the peach and quince. The latter may be eaten raw savourily; the former differs and as much exceeds ours as the best relished apple we have doth the crab, and of both most excellent and comfortable drinks are made (p. 13).

Some other early statements are as follows:

In the hot summer, rock cold water, with an eighth of peach vinegar, is the best beverage; peaches better than apricots by some doe feed hogs. One man hath ten thousand trees.

Fruits they have, strawberries, gooseberries, etc.; and for fruits brought there and planted, apples, pears, quinces, apricocks, peaches, and many more kinds excellent good, etc.

In orchards [they have] all sorts of apple trees, pear trees, quince, peach, apricocks, cherries, fig trees, and vines.

Mr. Scharf declares that:

All early travelers in and writers about Maryland have noted the fact that even before the first generation of settlers had passed, the country was thickly planted with orchards of apple and peach trees, which seemed to grow in the most flourishing way.

It is certainly remarkable that within twenty-two years after the landing at Saint Mary's [in 1634] orchards should have become a notable and even conspicuous feature in the landscape; but the evidence of the fact is conclusive.

To the effect that previous to 1683 peach trees were growing thriftily in considerable numbers in other parts of the country, there are statements by at least four persons, Thomas Campanius, 1643–48; Louis Hennepin, 1679-82; Mahlon Stacy, 1680, and William Penn, 1683.

Campanius records finding peaches in three places along the Delaware. Hennepin says:

The peaches there [in Louisiana] are like those of Europe and bear very good fruit in such abundance that the savages are often obliged to prop up the trees with forked sticks.

Du Pratz thinks it probable that peaches were introduced into Louisiana by the Indians prior to French occupation; the aborigines having obtained them from the English colony in Carolina. This is the most probable origin of those found by Hennepin, De Soto's visit to the Mississippi 150 years before having been under conditions not at all favorable either to the transportation or the planting of peach pits.

Stacy writes from New Jersey:

I have traveled through most of the places that are settled, and some that are not; and in every place I find the country very apt to answer the expectation of the diligent. I have seen orchards laden with fruit to admiration; their very limbs torn to pieces by the weight, and most delicious to the taste and lovely to behold. I have seen an apple tree from a pippin kernel yield a barrel of curious cider, and peaches in such plenty that some people took their carts a peach gathering; I could not but smile at the conceit of it; they are very delicate fruit, and hang almost like our onions that are tied on ropes.

William Penn says:

The fruits I find in the woods are white and black mulberry, chestnut, walnut, plums, strawberries, cranberries, hurtleberries, and grapes of diverse sorts. * * * Here are also peaches and very good and great in quantities, not an Indian plantation without them; but whether naturally here at first I know not. However, one may

have them by bushels for very little; they make a pleasant drink and I think not inferior to any peach you have in England, except the true Newington.

According to Robert Beverly peaches grew abundantly in Virginia at the beginning of the eighteenth century. He says:

Peaches, nectarines, and apricots, as well as plums and cherries, grow there upon standard trees. They commonly bear in three years from the stone, and thrive so exceedingly that they seem to have no need of grafting or inoculating, if anybody would be so good a husband; and truly I never heard of any that did graft either plum, nectarine, peach, or apricot in that country, before the first edition of this book [London, 1705].

Peaches and nectarines I believe to be spontaneous somewhere or other on the continent, for the Indians have, and ever had, greater variety and finer sorts of them than the English. The best sort of these cling to the stone and will not come off clear, which they call plum nectarines and plum peaches, or clingstones. Some of these are 12 or 13 inches in the girth. These sorts of fruits are raised so easily there that some good husbands plant great orchards of them, purposely for their hogs; and others make a drink of them, which they can mobby, and drink it as cider, or distil it off for brandy. This makes the best spirit next to grapes.

In 1733 peaches grew plentifully in Georgia, as indicated by the following quotation:

Mulberries, both black and white, are natives of this soil, and are found in the woods, as are many other sorts of fruit trees of excellent kinds, and the growth of them is surprisingly swift; for a peach, apricot, or nectarine tree will, from the stone, grow to be a bearing tree in four or five years' time [p. 50].

They have oranges, lemons, apples, and pears, besides the peach and apricot mentioned before. Some of these are so delicious that whoever tastes them will despise the insipid, watery taste of those we have in England; and yet such is the plenty of them that they are given to the hogs in great quantities (p. 51).

On September 18, 1740, Mr. Thomas Jones writes from Savannah to Mr. John Lyde as follows:

As to our fruit, the most common are peaches and nectarines (I believe that I had a hundred bushels of the former this year in my little garden in town); we have also apples of divers sorts, chinchopin nuts, walnut, chestnut, hickory, and ground nuts.

In 1741 Sir John Oldmixon writes of Virginia:

Here is such plenty of peaches that they give them to their hogs; some of them, called malachotoons, are as big as a lemon and resemble it a little.

Of Carolina he writes, quoting Mr. Archdale:

Everything generally grows there that will grow in any part of Europe, there being already many sorts of fruits, as apples, pears, apricots, nectarines, etc. They that once taste of them will despise the watery, washy taste of those in England. There's such plenty of them that they are given to the hogs. In four or five years they come from a stone to be bearing trees.

In 1748 the naturalist, Peter Kalm, traveled extensively in Pennsylvania, New Jersey, and other parts of eastern North America. Kalm was a shrewd and observant man. From his interesting records, which bear the stamp of truth, I quote as follows:

[September 17, 1748, at Mr. Bartram's country seat, 4 miles south of Philadelphia]: Every countryman, even a common peasant, has an orchard near his house, in which all sorts of fruits, such as peaches, apples, pears, cherries, and others are in plenty. The peaches are now almost ripe. They are rare in Europe, particularly in Sweden, for in that country hardly any people besides the rich taste them. But here every countryman had an orchard full of peach trees, which were covered with such quantities of fruit that we could scarcely walk in the orchards without treading on those which were fallen off, many of which were always left on the ground, and only part of them was sold in town and the rest was consumed by the family and strangers, for every one that passed by was at liberty to go into the orchard and to gather as many of them as they wanted. Nay, this fine fruit was frequently given to the swine (pp. 71-72).

[Here follows a paragraph telling how the fruit is dried for winter use.]

The peach trees have, as I am told, been first planted here by the Europeans. But at present they succeed very well, and require even less care than our [Swedish] apple and pear trees.

[September 26]: Mr. Bartram was of the opinion that the apple trees was brought into America by the Europeans, and that it never was there before their arrival. But he looked upon peaches as an original American fruit, and as growing wild in the greatest part of America. Others again were of the opinion that they were first brought over by the Europeans. But all the French in Canada agreed that on the banks of the Mississippi and in the country thereabouts peaches were found growing wild in great quantity (p. 127).

October the 27th. In the morning I set out [from Philadelphia] on a little journey to New York. * * *

That part where we traveled at present [*i. e.*, on the west bank of the Delaware, between Philadelphia and Trenton] was pretty well inhabited on both sides of the road by Englishmen, Germans, and other Europeans. * * * Near almost every farm was a great orchard, with peach and apple trees, some of which were yet loaded with fruit (p. 216).

Kalm crossed the Delaware at Trenton in the evening, and continued his journey on October 28, from Trenton via Princeton:

During the greater part of the day we had very extensive corn fields on both sides of the road. * * * Near almost every farm was a spacious orchard full of peach and apple trees and in some of them the fruit had fallen from the trees in such quantities as to cover nearly the whole surface. Part of it they left to rot, because they could not take it all in and consume it. Wherever we passed by we were always welcome to go into the fine orchards and gather our hats and pockets full of the choicest fruit, without the possessors so much as looking after it (pp. 222–223).

In 1758 Du Pratz speaks of peaches in Louisiana as follows:

The peaches are of the kind we call alberges; and contain so much water that they make a kind of wine of it. * * Our colonists plant the peach stones about the end of February, and suffer the trees to grow exposed to all weathers. In the third year they will gather from one tree at least two hundred peaches, and double that amount for six or seven years more, when the tree dies irrevocably. As new trees are so easily produced, the loss of the old ones is not in the least regretted.

In 1756 Israel Acrelius returned to Sweden from the Delaware region, where he had been the resident clergyman for some years. From his book, which is more trustworthy than that of Campanius, I quote as follows:

Peach trees stand within an inclosure by themselves; grow even in the stoniest places without culture. The fruit is the most delicious that the mouth can taste, and often allowable in fevers. One kind, called clingstones, are considered the best; in these the stones are not loose from the fruit as in the others. Many have peach orchards chiefly for the purpose of feeding their swine, which are not allowed to run at large. They first bloom in March, the flowers coming out before the leaves, and are often injured by the frosts; they are ripe toward the close of August. This fruit is regarded as indigenous, like maize and tobacco; for as far as any Indians have been seen in the interior of the country these plants are found to extend.

In one of his chapters on the "General state of Pennsylvania between the years 1760 and 1770," Proud says:

In some places peaches are so common and plentiful that the country people feed their hogs with them.

In 1793 Thomas Cooper spent the autumn and winter in the United States, and on his return to England published a book in which are the following statements, apparently in part, at least, gathered at first hand:

Every farm home in the middle and southern states has its peach orchard and its apple orchard, and, with all their slovenliness, abundance and content are evident in every habitation (p. 51).

At Norfolk, Va., peaches sold for 1*d.* and 2*d.* per dozen (p. 96). At Winchester, Va., the price of peaches was from 2*s.* to 4*s.* per bushel, Virginia currency (p. 100).

In Virginia and Maryland peaches and apples afford peach and apple brandy; the latter is an indifferent spirit; the former, when well made, carefully rectified and kept in a cask for some years, is as fine liquor as I have ever tasted (p. 121).

At Paxton, near Harrisburg, Mr. M'Allister had several peach trees but only recently planted. This man also had a few apricot and nectarine trees.

He gives 6*d.* a piece for apple and peach trees, about three or four years old, that is fit to plant out (page 129). Peach trees (same place) grow about the thickness of one's thumb and 4 or 5 feet high, in one year, from the stone, and bear fruit in four years, from the stone (p. 130).

In 1795 Winterbotham writes:

The apples of this state (Maryland) are large but mealy; the peaches plenty and good. From these the inhabitants distil cider and peach brandy (p. 36).

In some counties [of Virginia] they have plenty of cider, and exquisite brandy distilled from peaches, which grow in great abundance upon the numerous rivers of the Chesapeake (p. 84).

Little attention appears to have been given to the systematic cultivation of the peach even during the eighteenth century. The trees were transplanted, or grown in place from pits, and then left to themselves. Even as late as 1804 such treatment was not infrequent. Nevertheless the peach flourished.

FIRST APPEARANCE OF YELLOWS.

However, in the vicinity of Philadelphia and along the Delaware, where from past experience the climate was known to be very favorable, more attention was given to peach orchards after the Revolution; and here, prior to 1800, there began to be great complaint of the increasing degeneracy of the peach. In marked contrast with its former habit it was now declared to be very short-lived and disappointing. So general was this decay that in May, 1796, the American Philosophical society offered the following premium, one of five:

For the best method, verified by experiment, of preventing the premature decay of peach trees, a premium of $60. Papers on this subject will be received till the 1st day of January, 1798.

This premium was finally divided between John Ellis, of New Jersey, and Thomas Coulter, formerly of Delaware but then of Bedford county, Pa. Both men associated the trouble directly or indirectly with insects, and Mr. Ellis gives a rough but fairly correct account of the depredations of the borer, *Ægeria exitiosa*, Say. There is no mention in either paper of any symptoms at all like yellows.

It does not appear that the peach borer was responsible for the entire trouble, though unquestionably the habits of this insect have not changed during the last hundred years.

Ten years later, February 11, 1806, Judge Richard Peters read before the Philadelphia Society for Promoting Agriculture a paper "on peach trees," in which he says:

About fifty years ago [between 1750 and 1760], on the farm on which I now reside [Belmont, now included in Fairmount Park in the west part of Philadelphia], my father had a large peach orchard, which yielded, abundantly. Until a general catastrophe befell it, plentiful crops had been for many years produced with very little attention. The trees began nearly at once to sicken, and finally perished. Whether by the wasp [*Ægeria*], then undiscovered, or by some change in our climate, I know not. For forty years past I have observed the peach trees in my neighborhood to be short-lived. Farther south, in the western country, and, it seems, in some parts of

New Jersey [apparently not in all] they are durable and productive as they had been formerly here. * * * The worm or grub, produced by the wasp depositing its progeny in the soft bark near the surface of the ground, is the most common destroyer. * * * When trees become sickly I grub them up. I find that sickly trees often infect those in vigor near them by some morbid effluvia. Although I have had trees twenty years old, and knew some of double that age (owing probably to the induration of the bark rendering it impervious to the wasp, and the strength acquired when they had survived early misfortunes), yet in general they do not live in tolerable health after bearing four or five crops. * * * Fifteen or sixteen years ago [1790-91] I lost one hundred and fifty peach trees in full bearing in the course of two summers by a disease engendered in the first season. I attribute its origin to some morbid infection in the air. * * * The disorder being generally prevalent would, among animals, have been called an epidemic. From perfect verdure the leaves turned yellow in a few [?] days, and the bodies blackened in spots. Those distant from the point of infection gradually caught the disease. I procured young trees from a distance in high health and planted them among the least diseased. In a few [?] weeks they became sickly, and never recovered. * * * After my general defeat and most complete overthrow, in which the worm had no agency, I recruited my peaches from distant nurseries, not venturing to take any out of those in my vicinity. I have since experienced a few instances of this malady, and have promptly, on the first symptoms appearing, removed the subjects of it, deeming their cases desperate in themselves and tending to the otherwise inevitable destruction of others.

Judge Peters said he then had two hundred trees of all ages—thirty-two varieties; Mr. Coxe, of Burlington, N. J., had "double that number," and Edward Heston, a neighbor of Peters, had "seven or eight hundred trees * * * now in vigor and very productive." On page 23 Judge Peters adds, in a note of later date:

Mr. Heston begins to suffer by the disease I call the yellows, though he has fewer worms than common in other modes [of cultivation].

Nearly two years later, September, 1807, Judge Peters records in a brief note, that—

As I predicted the yellows are seen making destructive ravages in Mr. Heston's peach plantation. I have lost a great proportion of my trees [the 200] by the same malady this year, some of them young and vigorous. We have had two successive rainy seasons. I do not recollect ever to have seen more general destruction among peach trees throughout the whole of the country. It seems that excessive moisture is one of the primary causes of this irresistible disease.

Again we read:

I am pursuing my old plan of re-instating my peach trees lost last season [1806 or 1807] by my unconquerable foe, the disease I call the yellows. I obtain them from different nurseries free from this pestiferous affection. The worm or wasp [*Egeria*] I have in complete subjection. I should be perfectly disinterested in proposing that the society offer a premium for preventing the disease so fatal; for I shall never gain the reward.

Again Judge Peters writes:

I still think [November 17, 1807] that the disease so generally fatal (more so this year than any other in my memory), called the yellows, is atmospherical. * * * Compare this account [of thrifty orchards in Delaware] with the actual state of the peach in our country, and judge whether we live in a region favorable to its growth. Mr. Heston's attempt at cultivating this tree in the southern manner begins already to fail. His trees are evidently infected, and many are on the decline. The yellows are universally prevalent this season throughout the whole country [*i. e.*, around Philadelphia].

It is to be regretted that with all his writing Judge Peters left no clear account of the symptoms of the disease. There is nothing more definite than the following remark:

The shoots of the last season were remarkably injured by the excessive drought, and the extremities of many limbs are entirely dead [February 11, 1806]. Teguments of

straw or bass [placed around the trunk to keep away the borers] ma le the bark tender and it threw out under the covering sickly shoots.

This incidental mention of "sickly shoots" and dead extremities, coupled with the other statements quoted, render it likely enough that the appearances which he attributed to other causes were really due to what we now call yellows. So far as I know, Judge Peters was the first to apply the term yellows to a disease of the peach.

Dr. James Tilton, of Bellevue, near Wilmington, Del., expresses himself more explicitly and leaves no doubt that the disease which he saw was identical with the one now prevalent. In a letter to Judge Peters, November 6, 1807, he says:

The disease and early death of our peach trees is a fertile source of observation, far from being exhausted. * * * Even that sickly appearance of the tree, called the yellows, attended by numerous weakly shoots on the limbs generally, is attributed to insects by a late writer in our newspapers.

There is no mention of premature fruit, associated with the "weakly shoots" as a part of the disease, but, as an effect of climate, mention is made that "a fine early peach, which ripened in Northampton, Va., so early as June, did not ripen on my farm before the last of August or the first of September." In the same communication Dr. Tilton speaks of "measures proposed in our newspapers for curing the yellows," as though the disease had become general.

I have no doubt that Dr. Tilton saw yellows in 1807, and am strongly inclined to think that Judge Peters was talking about the same disease. Clearly Dr. Tilton thought so. This would put back the first appearance of peach yellows to some time prior to 1791.

Returning to 1806–7 we may inquire to what extent this new disease was prevalent. The foregoing citations show clearly enough the condition of orchards around Philadelphia.

Mr. William Coxe, a nurseryman and fruit grower who lived at Burlington, N. J., 20 miles northeast of Philadelphia, writes to Judge Peters on April 5, 1807:

I am perfectly ignorant of the disease to which you give the name of yellows. Nothing of this description has ever appeared among my peach trees. For four or five years past my trees have borne well and have resisted the worms.

Doctor Tilton writes to Judge Peters:

In my jaunt through Maryland I was attentive to the subject of your letters. I found the peach trees generally were long-lived, healthy, and bore well. In Edward Lloyd's garden I observed some of these trees 15 or 18 inches in diameter and perfectly healthy. Colonel Nichols, near Easton, abounds in the best kind of peaches. He is an old residenter, and particularly attentive to fruits.

In reference to Delaware, Judge Peters himself says:

I received verbally from a wealthy farmer, Mr. Bellah, who is the proprietor of a considerable landed estate in Delaware [near Dover], the following account, which he says is generally applicable to the culture of peaches in the southern country:

"In Kent county, Del., they cultivate the peach without any difficulty or risk. * * * They obtain fruit in three years in plenty; and the trees have been known to endure fifty years. No worms or diseases assail them. * * * There are orchards of 50 and 70 acres, and some larger in Accomac and other parts of the isthmus between the bays of Chesapeake and Delaware, farther south."

Timothy Matlack, Esq., writing "On Peach Trees" in 1808, from Lancaster, 65 miles west of Philadelphia, speaks of the borer, but does not mention yellows.

It would appear, therefore, from these statements and from considerable additional negative evidence, that at this date, 1806-'07, the disease was restricted to a small area around Philadelphia, including probably a portion of New Jersey and upper Delaware.

From this date the disease gradually extended into New Jersey, Delaware, Maryland, New York, and other states.

Mr. Coxe, of New Jersey, who knew nothing about yellows in 1807, knew it apparently only too well in 1817, for he says of the peach:

It is, when in perfection, the finest fruit of our country for beauty and flavor; it is deeply to be regretted that its duration is so short, and that it is subject to a malady which no remedy can cure nor cultivation arrest. Of the numberless modes of mitigating or preventing the diseases of the peach tree, with which our public prints are daily teeming, none have yet been found effectual. The ravages of the worm, which destroys the roots and trunk of this tree, may be sometimes prevented and with care may be at all times rendered less destructive, but the malady which destroys much the largest portion of the trees has hitherto baffled every effort to subdue it; neither its source nor the precise character of the disease appear to be perfectly understood. In one of the consequences of this disease every cultivator of the tree will agree, that it can not be cultivated with success on the site of a former plantation until some years and an intermediate course of cultivation have intervened: in a nursery established on ground previously occupied by peach trees the stones may possibly sprout, but in a few [?] weeks they will assume a languishing appearance, the leaves will turn yellow, they will dwindle, and the greater part will perish the first season.

If trees are brought from a sound nursery and planted on the site of an old orchard, or in a garden previously occupied by them, or among old trees, the young plantation will share the same fate with the nursery plants, it will seldom survive the first season, and it will never be vigorous or thrifty.

The fine peaches which are raised for the Philadelphia market are cultivated in the following manner. [Here follows an account of the method of cultivation, not different from that now in use in Maryland and Delaware.] With this management [which included search for borers in the spring, summer, and autumn], a peach orchard near a market, or on navigable waters, will be a profitable application of land, but no precautions will insure its duration beyond two or three, or at the utmost four [bearing?] years. If it succeeds even for this short time, with a judicious selection of kinds, the product will amply renumerate the trouble and expense, beyond any other mode of employing the land in this country.

The proper soil for a peach orchard is a rich sandy loam; I have no recollection of a very productive one on very stiff or cold land.

As early as 1810, according to Darling, and 1814, according to Downing, the disease had already destroyed "a considerable part of all the orchards" in New Jersey, and had made its appearance on the banks of the Hudson and in Connecticut.

Mr. Coxe in his treatise—all the pertinent portions of which I have quoted—does not mention premature fruit. The earliest reference to this as one of the symptoms of yellows is by William Prince, of Flushing, Long Island, in 1828. Mr. Prince was a famous nurseryman. His extensive knowledge of theoretical and practical horticulture, together with his good general knowledge of botany, not only made him familiar with the disease, but fitted him to write upon it with some degree of exactness, although he does not always distinguish clearly between things proved and things probable. He describes the disease which we now call "yellows," and leaves no doubt whatever that he has in mind the same disease mentioned by earlier and less explicit writers, such as Coxe and Peters. For these reasons, and because the book is seldom found, even in public libraries, I have here transcribed all that relates to yellows:

There are two causes that have operated against the success of this tree [the peach], and which seem peculiar to it—the one is a worm which attacks the tree at the root,

DISEASED TERMINAL PEACH SHOOTS,

(Delaware.)

near the surface of the ground, and often totally encircles it; the other is a disease usually denominated the yellows. [Here follows an account of the borer.]

Yellows.—This disease which commenced its ravages in New Jersey and Pennsylvania about the year 1797, and in New York in 1801, and has spread through several of the states, is by far more destructive to peach trees than the worm, and is evidently contagious. This disease is spread at the time when the trees are in bloom, and is disseminated by the pollen or farina blowing from the flowers of the diseased trees, and impregnating the flowers of those which are healthy and which is quickly circulated by the sap through the branches, and fruit, causing the fruit, wherever the infection extends, to ripen prematurely. That this disease is entirely distinct from the worm is sufficiently proved by the circumstance that peach trees which have been inoculated on plum or almond stocks, though less affected by the worm, are equally subject to the yellows—and a decisive proof of its being contagious is that a healthy tree, inoculated from a branch of a diseased one, instead of restoring the graft to vigor and health, immediately becomes itself infected with the disease. As all efforts totally to subdue it must require a long course of time, the best method to pursue towards its eventual eradication is to stop its progress and prevent its further extension—to accomplish which the following means are recommended, which have been found particularly successful.

As soon as a tree is discovered to possess the characteristics of the disease, which is generally known by the leaves putting on a sickly, yellow appearance—but of which the premature ripening of the fruit is decisive proof—it should be marked, so as to be removed the ensuing autumn, which must be done without fail, for if left again to bloom, it would impart the disease to many others in its vicinity; care is also necessary in its removal to take out all the roots of the diseased tree, especially if another is to be planted in the same place, so that the roots of the tree planted may not come in contact with any of those of the one which was diseased.

If your neighbor has trees infected with the yellows in a quarter contiguous to yours, it will be necessary to prevail on him to remove them, that yours may not be injured by them. By being thus particular in speedily removing such trees as may be infected, the disease is prevented from extending itself to the rest of the orchard, and the residue will constantly be preserved in perfect health at the trifling loss of a few trees annually from a large orchard.

"A distant subscriber," writing to The New York Farmer in 1831 (p. 154), also mentions premature fruit. He says:

Notwithstanding the wide destruction that the yellows has made, very few even at this day appear to understand the unerring symptoms of the disase. Let me say when the fruit ripens prematurely, from two to four weeks before the ordinary time, and the pulp is marked by purple discolorations, then beware!

EXTENSION OF YELLOWS SINCE 1830.

The disease extended somewhat slowly, and its general movement appears worthy of special consideration, particularly as this may throw some light upon the nature of the disease. It may be noted, however, that it continued to prevail in the country about Philadelphia, where it was originally discovered, as shown by the following citations:

In 1838, in the Farmer's Cabinet, it is styled "that most insidious and fatal disease of the peach tree, the yellows."

In 1839 the same journal prints the following from the pen of a correspondent:

The worm (*Ægeria*) and the yellows are two great contemporary evils, which probably have no necessary connection with each other. The worm does not inquire whether the devoted tree is sick or in health; the yellows is not always followed by its ravages.

In 1847 the following appeared in the Farmer and Mechanic:

For many years the peach tree has been subject to a disease known as the yellows. This disease seldom makes its appearance before the tree has arrived at maturity, as its great vigor and rapid growth appear to preclude the development of the disease previous to the tree fruiting. Much time, and labor, and research have been spent in

fruitless endeavors to eradicate the disease after it has made its appearance in orchards, and the only result arrived at is the necessity for replanting new trees to take the place of the old ones at short intervals of time. Many applications to trees have been recommended, and potash, lime, tobacco, banking up trees in winter, etc., have had their advocates.

Although individual cures may have been effected, or decay for a time have been arrested by the remedies, yet such instances are extremely rare; and when applied on a large scale are shown to be without value. The disease, a true consumption, still continues and will continue, unless some radical method is adopted to eradicate it. From my own observation and experience, I am led to the belief that this formidable disease has been much aggravated and spread throughout the country by budding from trees containing in themselves the seeds of incipient consumption, not yet externally developed. A bud may be taken from a tree apparently sound, but after a time both trees will be affected and decay. * * * That the disease, however it may have originated, has not its origin in either the soil or climate of this latitude is pretty evident. Natural trees can now be found in great numbers of many years' growth alongside fences and other neglected situations, perfectly sound and likely to remain so.

In 1878 yellows was still quite prevalent near Philadelphia.

Mr. Smith next traces the progress of yellows from this vicinity of Philadelphia, where it seems to have originated, first noting its spread to the north and northeast.

Its presence and disastrous course in New Jersey was noted at various times up to 1858, when Edward Wilkins, a Maryland grower, found that "nearly the whole of the peach orchards of New Jersey had been destroyed by a disease known as the yellows." Other writers are quoted proving the continuous existence of yellows in more or less of the state, from that date on till the present.

In eastern New York, yellows was reported by Wm. Prince in 1801 and by A. J. Downing in 1814, but the latter notes in 1849 that by practice of digging and burning the disease had nearly disappeared. Prior to 1846 yellows totally destroyed the peach trees on Long Island, but new plantations were then healthy and flourishing. Its presence was continuous, even to the present, although spasmodic to some extent, for in 1878 Charles Downing said yellows had been in the state sixty years, "sometimes continuing for five or six years and then several years free from it."

Yellows first appeared in Connecticut as early as 1815, and in course of twenty years nearly exterminated the trees, though efforts at cultivation continued to the present but without success.

Its appearance in Massachusetts is not noted prior to about 1862, "but when it came it swept everything."

Prof. Smith thus summarizes: So far as its present distribution is concerned we may infer that the disease occurs, or is likely to occur, anywhere from the Delaware river north and northeast, through New Jersey, eastern New York, Connecticut, Rhode Island, and Massachusetts, to the extreme limits of peach growing in the more northern New England States.

It would seem also that the disease did not appear on the northern limits of peach growing until many years after it had destroyed orchards in more favorable southern locations.

As to the northwestward and westward march of the disease, Prof. Smith traces its progress through Pennsylvania, although it took till 1887 for it to reach Pittsburgh. Yellows was first reported in Ohio in 1849, but little or nothing more is recorded of it till 1887, when it was reported as generally prevalent throughout the northern part of the state, though kept pretty well in check by early destruction of infected trees.

In western New York peach growing was begun by whites some years prior

to 1821, but undoubtedly peaches were grown by Indians at a much earlier date. Yellows was reported in Cayuga county in 1824, yet it was comparatively unknown twenty years later, what then existed having been, presumptively, imported from New Jersey in nursery stock. By 1861 yellows had become "quite at home" in some parts of western New York. In 1874, and for a few years later, Niagara county was the center of extensive and highly successful peach culture; but in that year yellows existed in at least one orchard, and by 1887 the ruin was nearly complete.

Brief mention is made of appearance of yellows in Ontario, Canada, in 1878, but its ravages are not reported to have been so generally fatal as in this country; and of its real and presumptive existence in Indiana, from 1842 till now, though Mr. Smith admits he has no positive information of it from the southern part of the state.

This brings him to consideration of Michigan, and we resume quotation:

MICHIGAN.

Peach growing in Michigan may, for convenience, be divided into an early, middle and later period, the first and second periods ending, respectively, with 1839 and 1866.

Michigan was settled much more recently than southeastern Pennsylvania, New Jersey, Delaware or eastern Maryland. Although a fertile soil and a favorable climate offered special inducements to settlers, the tide of immigration flowed steadily past the state for many years, and did not set strongly into it until after 1830. Consequently, peach growing for commercial purposes was begun more than one hundred years later than in the Atlantic coast states. Seedling peaches were grown, however, in a small way, all over southern Michigan from the time of the earliest settlements.

In Berrien county, prior to 1809, Mr. Burnett planted peach trees, some of which were living in 1829, twenty years after his death. Two years later another pioneer, Samuel Wilson, found peaches growing in the Burnett orchard.

At this time most of the settlers in Berrien county had a few seedling peach trees.

In 1834 Mr. Brodiss, who lived six miles northwest of Niles, "brought seedling peaches by the canoe-load down the St. Joseph river to peddle in Saint Joseph." In 1837 peaches were also brought into Saint Joseph from the Abbe orchard, said to have been set with improved trees sent from Rochester, N. Y.

In Van Buren county, Dolphin Morris planted peach pits as early as 1830, and grew trees therefrom which lived many years. In 1836 Isaac Barnum brought peach pits from New York and planted in Van Buren county.

According to Harrison Hutchins, of Fennville, when the first whites settled in the lake-shore region of Allegan county, about 1835, they found a small peach orchard on Peach Orchard Point, on the Kalamazoo river, supposed to have been planted by French traders. The growing of seedling peaches by the settlers themselves began here soon after 1840.

Mr. Hutchins, of Allegan county, also recalls that—

Before the war small "hookers" (boats) sometimes came to Saugatuck, and carried thence small loads of peaches, half grown and fuzzy, to sell in the more northern markets among the lumbermen. Their arrival was hailed by the pioneers as a good opportunity to dispose of a few surplus peaches, although they usually carried apples.

In the central part of Allegan county Daniel Foster planted a small nursery of apple and peach trees soon after 1844. At this time most of the settlers in that part of Allegan had small peach orchards, grown from pits of their own planting. In 1849 an orchard of budded fruit was planted at Monterey and continued to be profitable for many years.

In Ottawa county many orchards were planted between 1836 and 1855, some of which contained peaches. In 1839 Allen Stoddard, of Ottawa county, sold peaches in Grand Rapids, from trees planted by his wife in 1836, around stumps in the clearings. And as early as 1858, according to Frank Hall, George Lovell, of Ottawa county, planted a large peach orchard for commercial purposes.

In 1839, at Saint Joseph, in the garden of B. C. Hoyt, grew the first peaches ever sent from Michigan to the Chicago market. These were seedlings. The next year Capt. Curtiss Boughton, of Saint Joseph, "bought peaches by the barrel and dry-goods box;" took them to Chicago on his vessel, and sold them at an enormous profit. This transaction induced many to plant peach trees.

In 1842 Mr. Hoyt procured buds of improved varieties from William Prince, of Long Island, and started a peach nursery; but no improved fruit was shipped from Saint Joseph until 1844, when he sent over a few baskets of Crawfords.

After 1845 the shipment of choice fruit began to increase, beginning with a few hundred baskets of three pecks each, and reaching several thousand in 1855, when a great many Crawfords were shipped.

In 1848 George Parmelee, of Benton Harbor, who afterward became a celebrated fruit grower, set his first peach orchard. This contained between two and three acres of budded trees. He continued planting peach orchards as rapidly as possible, until he had nearly 90 acres. In 1850 he set his first Crawfords. In 1873, the original orchard of 1848 was yet standing and contained "some of the largest and finest peach trees in the country."

In 1849, Captain Boughton set out 130 budded trees in St. Joseph township, south of St. Joseph river. In 1850 he shipped 250 barrels of seedlings and 150 barrels of improved varieties twice a week. The shipments for the year were by his vessel alone not less than 10,000 baskets.

In 1857, the "Cincinnati" peach orchard, containing 65 acres, was set in Berrien county. "From this time the fruit interest commenced to grow rapidly, as one after another settled here and went into the business."

At South Haven, Van Buren county, "during or soon after the year 1852, S. B. Morehouse and Randolph Densmore planted [peach] orchards north of the river. * * * Within the next few years Mr. James L. Reed planted an orchard * * * south of the village." In 1857 a peach nursery was established. In 1859, Aaron Eames planted from this nursery four acres of peach trees. Soon after 1861 John Williams planted a peach orchard. Others planted orchards about this time.

In 1861 C. Engle, of Paw Paw, Van Buren county, planted 700 trees of Crawford's Early and Snow's Orange on an elevated ridge, he having noticed as early as 1850 that peach trees on high land in his vicinity endured the winters better.

Peach growing for commercial purposes may be said to have begun in Michigan in 1848, but owing to lack of shipping facilities it did not assume proportions at all comparable to eastern interests until more than a decade later. Of this early period A. S. Dyekman of South Haven writes:

When about the end of the last half century Eleazur Morton, George Parmelee and Curtis Boughton, the pioneers of Saint Joseph peach culture, set their respective orchards—an aggregate area of 25 acres—people opened their eyes in amazement at this exhibition of lunacy, thinking the product of such large orchards would overstock the market.

These references concern only those counties in which peach growing was begun earliest and has always held a prominent place. However, prior to 1860, according to Mr. Lyon, peaches had been grown successfully to a greater or less extent in at least fifteen other counties, for periods ranging from six years to upward of thirty years.

In all of these counties, through all of these years, from 1800 down, the peach grew thriftily and bore good crops. When not injured by borers or by those hard winters which every now and then killed or enfeebled some of the orchards, the peach tree was healthy, hardy and long lived. There was no yellows in any part of the State.

This disease, known for so long in the east, first appeared in Michigan in 1866 or 1867, in the extreme southwestern part of the State, in Berrien county. I have been at considerable pains to verify this statement and think it can be accepted unqualifiedly, or with only that general qualification given to all inductions which rest on a multitude of details, some of which have not been examined. In this case absolute proof would be nothing less than concurrent exact testimony concerning every peach tree ever grown in the State, but such rigid proof no one demands beyond the limits of the exact sciences. The belief that yellows did not appear in Michigan until 1866 rests upon the positive statements of hundreds of intelligent peach growers and on the negative evidence of all the rest.

The disease first appeared in a circumscribed area near the village of Saint Joseph, within a few miles of lake Michigan and in the most favored peach region of the State. According to W. A. Brown, of Benton Harbor, it is said to have appeared first on the lake shore four miles south of St. Joseph, in the orchard of D. N. Brown, in trees brought from New Jersey and planted in 1862 or 1863. It extended at first slowly, being confined to the vicinity of Benton Harbor for several years. Later it spread more and more rapidly, until by 1877-'78 it was destructively prevalent in nearly every orchard in the county. The fact that at first it occurred only in a limited area, or sporadically, accounts for the various dates assigned for the first appearance of the disease. It is certain that the disease was not prevalent enough to attract general attention or cause well founded alarm until after 1870. After 1875 few new orchards were planted and the old ones rapidly disappeared under its blighting influence. Even young orchards prematured all their fruit within two or three years' time, and rapidly disappeared.

The progress of peach growing in Berrien county from 1866, when yellows first appeared, to the culmination of the industry in 1874 or 1875 was almost phenomenal. Careful estimates of the number of peach trees in the fruit region of this county were made by private enterprise from time to time with the following results:

Year.	No. of trees.
1865	201,603
1869	385,530
1872	594,467

In 1865, a canvass showed that only about two hundred and fifty persons were engaged in fruit raising; in 1872 the number had increased to over eight hundred.

In 1871, according to Charles W. Garfield, who then first saw the Saint Joseph region, the peach orchards were everywhere.

In 1873, J. E. Chamberlain declared the number of peach trees in the fruit region of Berrien county to be not less than 600,000 by actual count. A. S. Dyckman made a similar statement in 1874. Both apparently based their statements on the careful canvass made by Mr. Merchant in 1872.

The peach shipments, by water, from Berrien county in 1877, were estimated by John Whittlesey, of Saint Joseph, at 422,225 baskets. A few baskets went also by railroad.

From about 1870 we begin to meet frequent references to the ravages of yellows.

In 1871, by invitation of the Berrien County Horticultural association, Dr. R. C. Kedzie visited Benton Harbor and examined many trees having all the characteristics of yellows.

In 1872 "L. T." states that yellows has commenced its destructive work Saint Joseph, Mich., where he has a twenty-acre orchard.

In April, 1873, L. Collins, of Saint Joseph, says:

> We have the disease called yellows among our trees and that to an alarming extent. I have lost one orchard of 800 trees entirely by the disease.

In 1872, Messrs. Cook and Bidwell found yellows more or less "in every direction from Benton Harbor." It extended northeast 12 miles, as far as Watervliet and Paw Paw lake, in the extreme north part of the county. They state that:

> The disease has probably existed in the vicinity five years. The exact time of its advent is not known. The people have tried to believe that it was not the yellows, but the result of peculiar soil or seasons. But the fact can no longer be concealed. They have "the yellows" in its most aggravated form.

In April, 1873, A. R. Nowlen, of Benton Harbor, says:

> I think the disease made its appearance five years ago [1868] for the first time, and in various orchards several miles distant from each other simultaneously.

In 1873 a committee, consisting of Prof. J. C. Holmes, H. G. Wells, and S. O. Knapp, were appointed by the State Pomological society to make a report upon yellows in Michigan. During that year these gentlemen spent nine days, July 30 to August 7, in southwestern Michigan searching for the disease. They found it only at Saint Joseph, Benton Harbor, and South Haven. No diseased trees were seen north of South Haven, nor many anywhere; but the trip was too hasty to permit of thorough examination. They talked with many peach-growers and concluded that the disease was not widely prevalent. Among others the following well-known peach-growers reported to this committee that yellows was not present in their locality: E. D. Lay, Ypsilanti; T. T. Lyon, Plymouth; I. S. Linderman, Casco; Henry S. Clubb, Grand Haven; C. J. Dietrich, Grand Rapids; D. R. Waters, Spring Lake; S. B. Peck, Muskegon; J. D. Husted, Lowell; S. L. Morris, Holland; and C. Engle, Paw Paw.

Four years later, in the Annual Report of the Secretary of the Michigan State Pomological Society, it is stated that at Benton Harbor and Saint Joseph, "they are giving up peaches on account of the yellows." These villages are both on Lake Michigan and only about three miles apart. The same year a Benton Harbor correspondent of the Cultivator and Country Gentleman says: "We have lost most of our trees in this region by yellows." The same year the same journal quoted from T. T. Lyon: "This violent and

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contagious disease has nearly destroyed the peach orchards at Saint Joseph."

In 1880, says Charles W. Garfield, there were scarcely any peach orchards left at Saint Joseph. The growers attributed their destruction to yellows.

In 1878 W. A. Brown of Benton Harbor writes:

> The disease is supposed to have been introduced in this vicinity about the year 1866, by means of trees imported from New Jersey, which had been grown from the buds of infected trees. But few trees were so affected, and it was several years later when the disease in the vicinity of Benton Harbor first assumed a contagious type. A few trees in the large orchards south of Saint Joseph showed signs of yellows, but the character of the disease being known, such trees were immediately destroyed, and many fine crops were grown before the trees were all affected. The area of country infected was comparatively small until the past two seasons (1877 and 1878), when the disease has assumed a more virulent character, and has spread over all of Berrien county, excepting a small portion in the extreme southern part.

In 1887, A. O. Winchester of Saint Joseph writes:

> We do not know where it came from or how introduced. * * * The disease first appeared (first destructively) in the center of the peach belt eighteen years ago, and gradually spread north and south along the lake shore until there was not a healthy orchard left.

This is not an overdrawn picture. No one who knows the character of the authorities cited will doubt the general correctness of the foregoing statements. Indeed, were further proof necessary, a great mass of additional testimony might be brought forward. The peach industry was literally swept out of Berrien county by yellows within one decade. There can be no doubt of this. From being the foremost peach county in Michigan, with an acreage more than equal to that of all the others combined, it became ninth in order, and could boast of only 503 acres. In other words, with a prospect of an expanse in peach growing which would be limited only by market facilities and the ordinary accidents of culture, yellows appeared in destructive form, and the industry gradually fell away to about one-twelfth of its former proportions. The exact figures for 1874 can not be obtained, but the following statement is approximately correct:

Year.	Acres.	Number of trees.
1874	6,000	654,000
1884	503	54,827

From the immediate vicinity of Benton Harbor and Saint Joseph, peach growing disappeared almost completely. In 1884, the townships of Benton and Saint Joseph contained only 47 acres of peach orchard, and the entire north part of the county, including these two townships and seven others, had an aggregate of barely 210 acres. Even these figures do not tell the whole truth. In the townships of Benton and Saint Joseph the bearing trees numbered at this time only 757, and in the entire nine townships, aggregating about 225 square miles, they numbered only 6,668.

Many peach orchards have been planted in Berrien county since 1884, but it remains to be seen whether these will escape the disease which raged in the last decade. At present it looks as if they might.

T. T. Lyon of South Haven states that the disease appeared in the central part of Van Buren county somewhat earlier than at South Haven, following, as he thinks, the line of the railroad from Berrien county, northeast, *i. e.*, being disseminated from nurseries.

Yellows first appeared upon the lake shore, at South Haven, in 1869, in the orchard of Rossiter Hoppin. Although it finally destroyed most of the trees in that orchard and appeared in many others, it did not spread rapidly at first. Messrs. Holmes, Wells and Knapp found the disease there in 1873 in three orchards only, and but to a very limited extent, *i. e.*, one orchard contained one tree; one, two trees; and one, four or five trees.

In 1873 a committee was also appointed by the South Haven Pomological Society to inquire into the existence of yellows at South Haven. This committee, consisting of H. E. Bidwell, H. Linderman and John Williams, reported July 3, 1874, that, with the consent and assistance of the owners, they had removed a few cases of the disease from three orchards, and that "some traces of it" yet remained. On August 22, 1874, the same committee reported again, as follows:

Your committee, who were appointed to examine the peaches in this vicinity to see if any yellows could be found, and if so to have it removed, beg leave to report: That where traces of it were found one and two years ago, and then removed, none now can be found; and where new trees are set in their places they are growing finely, and to all appearances healthy. In one case two years ago [1872] the owner tried to cut it out of the tree by cutting off the affected limb, but last season he found that and three adjoining trees affected. These were carefully removed, and no traces of the disease can now be found in his orchard. A similar case was found last season, where two peaches were found diseased on the end of a limb, which limb was removed as soon as the peaches were discovered to be diseased. On a recent examination this tree was found to be covered with diseased peaches, and several other trees in the neighborhood were likewise found affected in whole or in part, which have all been removed.

South Haven peach growers knew of the existence of yellows in Berrien county, that village being only about 20 miles north of Benton Harbor. They were therefore on the lookout for its appearance in their own orchards, the nearness of the danger making them specially watchful. Under such conditions yellows could not have existed long without detection, and there is no reason for supposing it existed at all until 1869. It did not become general until considerably later. Finally, however, it destroyed many trees and some whole orchards, the Hoppin orchard, among others.

The condition of peach growing at South Haven prior to 1860 has already been noted. During the next ten or twelve years many peach orchards were planted. In 1864 A. S. Dyckman, one of the large growers, shipped 600 baskets; in 1872 he shipped 12,000 baskets. After 1870 the planting of peach orchards increased with special rapidity, owing in part, it may be presumed, to discouragements in western Berrien arising from yellows, but chiefly to the increased facilities for shipment due to the dredging of the harbor and to the building of a railroad.

The disease appeared first in a few trees and in a few orchards only, gradually extending to others. According to Mr. Lyon there was not much yellows at South Haven "until after the severe winter of 1874–'75, when about 5 per cent of the trees were found diseased and taken out. Afterwards, until this year [1880], there was very little of the disease manifest. This year the disease shows an increase."

In 1878 A. G. Gulley, of South Haven, writes:

At least 5,000 trees have been destroyed by this disease the past season [1878] in this county alone.

In 1882 Secretary J. G. Ramsdell, of South Haven, writes:

That dreaded scourge of the peach grower, yellows, has made slow but marked progress during the year in this locality.

In 1883 Joseph Lannin, of South Haven, writes:

We think we are holding the disease in check by promptly destroying the trees on the first manifestation of the disease. If, however, yellows continues to spread, it will be only a question of years when peach growing will cease on the lake shore.

In 1888, Mr. Lannin told me he had lost his entire orchard. His neighbors, however, think it might have been saved by a prompt and full compliance with the law.

Yellows is still present at South Haven, but is no longer a source of alarm.

Speaking of the advent of yellows Mr. Lyon says:

The peach interest at that time was already extensive and the trees were free from disease.

Other South Haven growers testify to the previous freedom of the peach tree from disease. We may therefore conclude that peaches were cultivated at South Haven for a period of at least sixteen years, 1852-'69, unmolested by yellows.

Yellows first appeared at Lawton, in southeastern Van Buren, in 1878. This village is 30 miles east of Benton Harbor and 25 miles southeast of South Haven. Here, as elsewhere, peach growers being forewarned, were on the watch for the disease and presumably detected it very soon after its appearance.

Peach growing for commercial purposes began at Lawton in 1860, when N. H. Bitley planted 500 trees. These trees bore their first crop in 1866, soon after which several other orchards were planted. Later occurred a very general planting, so that in 1878, when yellows appeared, there were about 150,000 peach trees in the vicinity of Lawton.

Hon. C. D. Lawton, of Lawton, writes as follows:

The first appearance of the yellows here was in 1878. I think it had appeared in Mr. Engle's orchard near Paw Paw [four or five miles distant] the year previous to 1878, but that was the season we first recognized the disease here. Peach trees have grown here since the first settlement of the region. The first orchard for market—500 trees—was set by Mr. N. H. Bitley in 1858, and it survived and bore finely for twenty years, until destroyed by severe winters and yellows. No finer, healthier peach trees or peach orchards exist anywhere than were found here up to a few years ago. We have had several very severe winters, 1884, '85, '86, during which many tree were injured or destroyed. This, added to the ravages of yellows, has caused our peach orchards to look somewhat ragged.

In the season of 1881 there were shipped from this station upward of 100,000 baskets of peaches, in 1883 perhaps as many, and possibly as many in 1887.

Up to about 1875 there were not many shippers. There were but few orchards. Still there were some that were proving profitable, and the success of these few induced others to set out trees. Yellows seems to have gradually spread here from Benton Harbor. We heard of its appearance in the west part of the county a few years before we discovered it here, and were looking out for it, anticipating its arrival.

At Lawton peach growing has not been abandoned, although entire orchards have been ruined.

Yellows does not appear to have worked as disastrously in Van Buren county as in Berrien, owing possibly to the timely and rather strict enforcement of the yellows law. This phase of the problen will be considered later, under "restrictive legislation." In 1884 the State census credited Van Buren county with 2,181 acres of peach orchard, a small acreage, considering its favorable situation, but enough to show that peaches can still be grown in spite of yellows. In 1888 Mr. Lyon says of South Haven, the best peach region in the county, "the acreage planted is largely increasing from year to year."

At Douglas, Allegan county, yellows appeared in 1873 or 1874, simultaneously in at least two orchards several miles apart. This village is 17 miles

north of South Haven and a few miles only from the lake shore. Rev. J. F. Taylor, for six years yellows commissioner of Saugatuck township, and for twenty years a resident, writes as follows concerning the appearance of the disease in that locality:

Yellows appeared here first in 1873 or 1874. In an orchard south of mine about two miles [orchard of Robert Linn] one tree produced some beautiful red fruit. No one knew the cause of the changed color. This orchard contained about 300 trees. After this tree had borne such fruit a year or two it was pronounced diseased with yellows. The man refused to cut it down, and in about eight years all of his trees (300) were dead by the effects of this contagious disease. The same year (1873 or 1874), two miles east of my orchard, another man [D. W. Wiley] found three or four trees in his orchard of 6,000 tree which had yellows. He did not know the appearance of affected fruit and went to Saint Joseph to learn what effect yellows had on tree and fruit. He cut and dug out these trees and planted new ones in their places, which grew and bore [healthy] fruit. This orchard has suffered but little from yellows.

Yellows does not appear to have spread rapidly at first. Harrison Hutchins, of a neighboring village, himself a well known peach grower, writes:

Peach yellows made its appearance on the lake shore [12 to 14 miles north of South Haven] about ten years ago, and one or two years later [1878 or 1879] about Fennville, 6½ miles east of the lake.

Peaches were grown in the lake shore townships from the earliest settlement; commercial orchards were planted in 1862, and by 1872 the business of peach growing had become general. Two years later, 1874, Henry S. Chubb, made a careful canvass and found that in two townships only, Ganges and Saugatuck, the number of peach trees in orchard exceeded 62,000. The name of each grower is given and the number of acres or the number of trees. There are many comments on the healthy appearance of individual orchards, and no mention is made of yellows.

In other words, peaches were grown in western Allegan in constantly increasing numbers, unmolested by yellows for a period of not less than thirty years, even on the assumption that the disease appeared there considerably earlier than the earliest date assigned.

G. H. LaFleur, a nurseryman at Millgrove, says that yellows first appeared in the township of Casco in or about the year 1874. "From that point it gradually spread until it reached Ganges and Saugatuck. I first saw it at Fennville in 1876." Three years after its appearance at Fennville, yellows appeared in Allegan township, on a favorable elevation, in an orchard growing on some of the best soil in the county.

Mr. LaFleur adds:

I think the disease prevails in nearly every town in the county where peach trees are growing, although some parts are almost exempt as yet.

In answer to inquiries concerning the extent of injury done to orchards about Fennville, Mr. Hutchins writes:

I think one-tenth of all bearing trees has been affected with yellows; not nearly as large a per cent near the lake. I am 1½ miles west of Fennville, and out of 5,000 bearing trees I have lost nearly 5 per cent.

To the question: Has peach growing been discouraged to any great extent by yellows? he replies: "I think not. In some few instances, perhaps, but not generally."

To similar inquiries respecting Saugatuck township, Rev. J. F. Taylor makes a similar reply.

In western Allegan, as a whole, peach growing is on the increase. Accord

ing to Harrison Hutchins, almost every farmer has a peach orchard, varying in number of trees from a few hundred to 5,000 or even 10,000.

Respecting the eastern part of Allegan county, G. H. La Fleur states that yellows has reduced the number of trees 50 per cent., although many are planted each year.

The state census of 1884 shows that peach growing is fairly prosperous in Allegan county, the acreage there given being more than double that of any other county, *i. e.*, 8,367 acres, corresponding to about 900,000 trees.

In remoter parts of Michigan peach yellows appeared at dates much later than 1869. Peaches have been grown in Ottawa and Kent counties for thirty years or more. In 1884 Ottawa was credited with 984 acres, containing 84,223 bearing trees; and Kent was credited with 3,362 acres, containing 161,065 bearing trees. Nevertheless yellows did not appear in either county until within the last eight or ten years. In the vicinity of Grand Rapids the disease did not appear earlier than 1883, although peaches have been grown since 1850 and to a very considerable extent since 1875. Farther north, in the Grand Traverse region, where peaches have been grown to a limited extent since 1865, it is said that the disease has not yet appeared. On the eastern side of the State, it was not present at Plymouth, Wayne county, in 1873, and has not been reported from Oakland county, where in 1884 were 1,093 acres, containing 44,320 bearing trees.

In the vicinity of Ann Arbor, peach trees were planted as early as 1842, and peach growing has been a considerable industry since 1875. In 1884 the number of bearing trees in the city and township was 59,592 (446 acres), and many have been planted since that date, yet the orchards have never suffered from yellows. Indeed, I can not find that a single case has ever appeared. I have myself examined many trees.

In view of some inquiries to be made later, respecting climate as a cause of peach yellows, it will be necessary to note briefly the conditions under which peaches are grown in Michigan, particularly as these conditions vary somewhat from those found in the Chesapeake and Delaware region. As a whole the climate of Michigan is too severe for the peach. Bitter experience has shown that the excessive cold and the rapid temperature changes of some of the Michigan winters are sufficient to kill entire orchards. So much depends, however, upon location that no general rule can be laid down, other than that in the interior and on the east side of the State the peach does not winter well north of latitude 43°. South of this, in favored localities, the peach has passed through the severest winters in safety.

What is known as the "peach belt" is a narrow strip of sandy and loamy land in the extreme southwestern part of the State, bordering on Lake Michigan. There peaches were first planted for commercial purposes; there their cultivation had been most uniformly successful; and there it still involves the largest amount of capital. The reason for this, aside from proximity to a great market, lies in the nearness to a large body of water. The prevailing winter and spring winds being from points between northwest and southwest must pass over Lake Michigan on their way to the peach orchards, and during this passage they lose much of their severity by contact with the warmer water. In winter the temperature never falls as low along the lake as in the interior or on the eastern side of the State, and the extremes of temperature are neither so sudden nor so great. In the spring the lake water is cooler than the air, and the winds which then blow over it lose some of their

warmth, and the vegetation in the orchards is retarded until there is little danger of frost. The equalizing influence of this great body of water is very considerable. In southwestern Michigan peaches can be grown almost as successfully as in Delaware, and near the lake can be grown to some extent even as far north as latitude 45° 30′. On the contrary, in northern Illinois and in Wisconsin, on the west side of the lake and exposed to land winds, peaches are not grown in open orchards at all north of latitude 42°, and very little north of latitude 40°. At Madison, Wis., latitude 43°, peaches will not ordinarily live through a single winter. The same may be said of all that part of Wisconsin due west of the great peach orchards of Allegan county, Mich. What is true of Wisconsin and northern Illinois is said to be true also of the northern half of Indiana.

In recent years it has been found that peaches can be grown anywhere in central and western Michigan south of latitude 43°, if the right locations are selected. These are hills and table-lands. Trees on hilltops pass safely through winters which destroy whole orchards in valleys and bottom lands. This fact is now so well understood that away from the lake it is rare to find an orchard on low land. The orchards at Ann Arbor, Lawton, Paw Paw, and Grand Rapids are all on the highest hills.

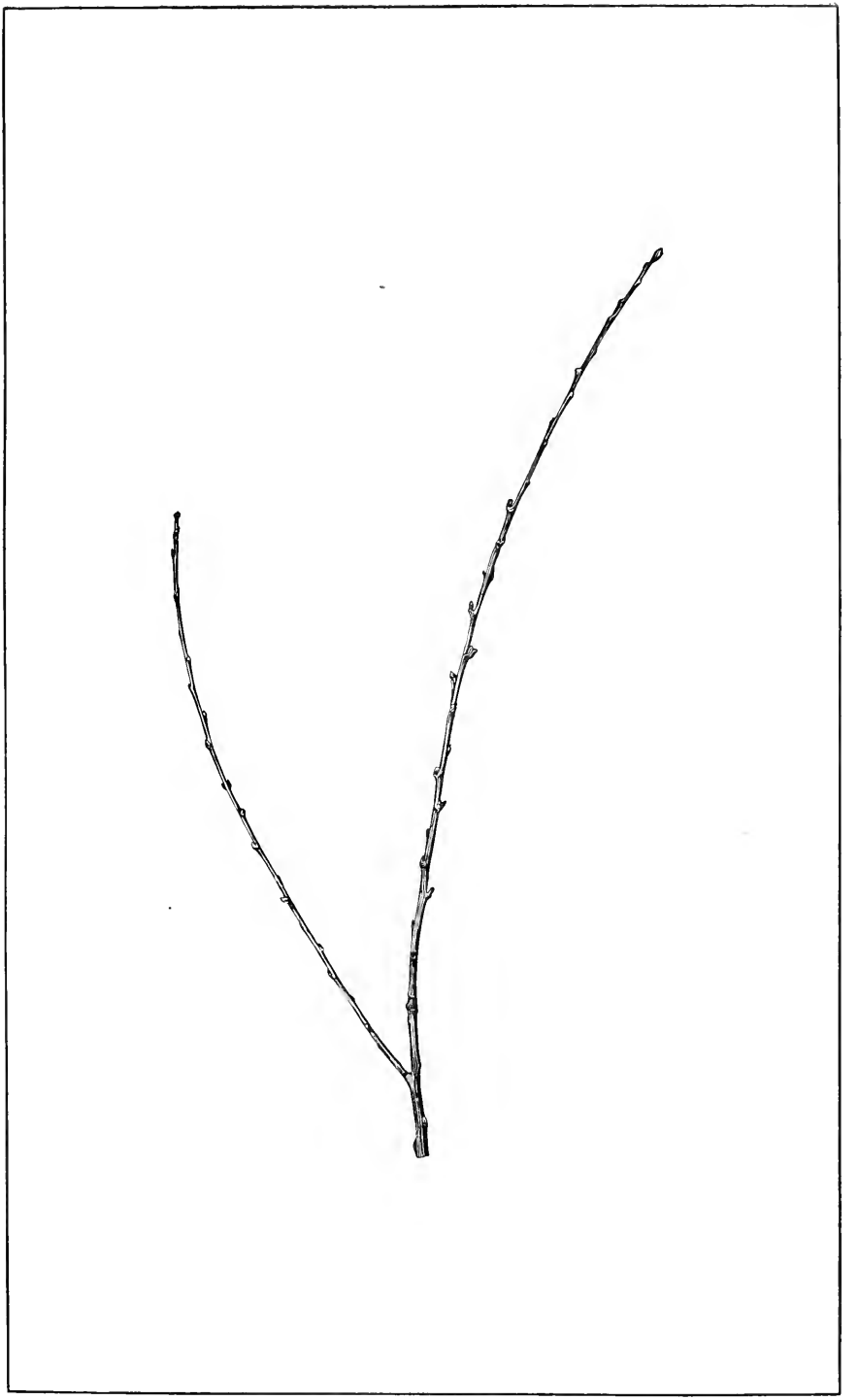
To express the same fact somewhat differently, we may say that while the peach region *par excellence* lies in the southwest along Lake Michigan, peaches may also be grown more or less successfully south of an irregular line running northwest from Lake Erie to Grand river, and thence along the lake to near the northern end of the southern peninsula. The chief peach counties outside of the most favored region are Monroe, Kalamazoo, Jackson, Washtenaw, Ionia, Kent, Muskegon, and Grand Traverse, in some of which yellows has not yet appeared, and in none of which has it been present for any great length of time.

To the question, "Do peach trees continue to be planted in Michigan?" there is no official reply later than that given in the state census for 1884. The number of acres of peach orchards in Michigan at that time was 24,502, containing 1,428,209 bearing trees. Assuming that there were one hundred and nine times as many trees as acres, the number of trees not in bearing, *i. e.*, planted recently, would be 1,242,509. Aside from this evidence we know that peach growing has rapidly increased of late in many places, and as it has encountered no new or unusual obstacles since 1884, it is safe to assume that what was then true of the State as a whole continues to be true. In other words, we may safely conclude that one-half of all the peach trees in Michigan have been set within the last four or five years, and probably as many as one-fourth within the last two years.

Summary.—So far as its present distribution is concerned, we may infer that the disease occurs, or is likely to occur, anywhere in Pennsylvania, New York, Ontario, Ohio, Indiana, Illinois, and Michigan.

It is also certain that the disease did not appear in the west until at least a half century after it had ravaged eastern orchards, nor until many years after the introduction of the peach.

Prof. Smith next considers the southwestward movement of yellows, from its place of origin in Pennsylvania, tracing especially its progress through Delaware and Maryland, and its present general prevalence. The story presents the same general features of the foregoing accounts, and therefore we see no need of its reproduction. The disease exists in Virginia and South



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Carolina, and probably in Georgia as well, though perhaps there is, in the latter, some variation from its characteristics in the north, except as to fatality. Mr. Smith thus states his

CONCLUSIONS.

The literature of peach yellows is a medley of contradictions. All sorts of views have been promulgated, with greater or less show of wisdom, and many theories have been built on a very slender basis. It would seem that at least a personal acquaintance with the disease ought to be requisite to writing on such a perplexing subject, yet even this does not appear to have been thought necessary in all cases, those who knew the least having often expressed their opinions with the most confidence. In connection with my field studies, I have endeavored to find, read, and sift the whole of this voluminous and incongruous mass of writing, and in the preceding pages I have presented all that seems pertinent to the question of history and distribution. Wherever possible, the writers have been allowed to tell their story in their own way, only such portions being suppressed as seemed foolish, irrelevant, contradictory, or untrustworthy. Two reasons led me to quote rather than summarize and speak *ex cathedra*: (1) The inaccessibility of a very considerable portion of the early literature, some of which has been misquoted frequently. (2) A feeling, shared in common, I doubt not, with many others, that statements are more certainly to be depended upon when safely inclosed between quotation marks than when condensed or paraphrased.

Among the facts which I believe to be well established by this inquiry are:

(1) That yellows has frequently been confounded with other diseases of the peach, especially in New Jersey, where the borer and the root aphis are very prevalent.

(2) That genuine peach yellows appeared in the vicinity of Philadelphia prior to 1791.

(3) That since 1791 the country has never been entirely free from this disease.

(4) That it was prevalent on the Atlantic coast long before it appeared in the west.

(5) That the area of its action has extended northeast, north, and northwest much more rapidly than south.

(6) That it is now more or less prevalent from Massachusetts to Georgia and westward to Lake Michigan and the Mississippi.

(7) That the disease spreads from centers, usually appearing first in localities thickly set with orchards.

(8) That the first cases of yellows in any district are usually, if not always, in young trees imported from infected localities.

(9) That everywhere it is the same destructive malady.

Some deductions which may be accepted provisionally and with more or less caution are:

(1) The disease is confined to the United States.

(2) It is absent from the Gulf States and from those west of the Mississippi.

(3) There have been great outbreaks of the disease, *e. g.*, 1791, 1806–'07, 1817–'21, 1845–'58, 1874–'78, 1886–'87–'88, followed, apparently, by periods of comparative immunity.

CHARACTERISTICS OF PEACH YELLOWS.

In the preceding pages, while dealing with the history and distribution of peach yellows, I have assumed it to be a specific disease. Is it really so, or is it only a sort of a marasmus, due to various causes and itself as variable as the conditions which produce it? In other words, is the name yellows a misnomer and the disease a nonentity, as some would have us believe, or is there a well defined set of symptoms to which this term may properly apply?

By the term specific we mean ordinarily a disease which runs a definite course and is characterized by a more or less peculiar set of symptoms, clearly distinguishing it from other maladies. Whether we know much, little, or nothing of the cause of a specific disease, of one thing we are never in doubt: it begins, progresses, and ends in a definite way; it can be defined; it is a genuine disease. Although in different individuals there may be peculiarities due to idiosyncrasy or to unknown causes, yet in its broad, essential features the disease is the same in all individuals, so that from the careful study of a few typical cases we can readily predict what will be the general course of the disease in any number of other cases. Instances of such diseases readily occur to all, *e. g.*, in man, consumption, small-pox, diphtheria; in the lower animals, anthrax, glanders, swine plague; in plants, smuts, rusts, mildews. Each of these diseases is characterized by a very definite set of symptoms, so that we are in no great danger of mistaking one for another.

Unquestionably by the term yellows much confusion has arisen, different persons having used it to convey different ideas. By this expression some have meant simply the results of starvation, or the effect of very wet subsoils; others, no doubt, have had in mind that stunting peculiar to trees infested by root-aphides; others again, the effects of the peach-tree borer. By the term yellows I mean none of these things, though any one of them may cause the foilage to become yellow, and though any or all of them may be found in the tree along with genuine yellows, just as a person may at the same time have measles and whooping-cough, scarlet fever and diphtheria, or consumption and ague.

Peach yellows as it occurs in Michigan, and as I saw it in hundreds of trees in many orchards in Maryland and Delaware in 1887 and 1888 is a disease of haste and waste; the fruit ripens too soon; the buds push too soon; assimilation is disturbed; the stored starch and other food materials are wasted by excessive and unnatural growth; and the entire vitality of the tree is exhausted in the course of two or three seasons.

Healthy peaches grow somewhat slowly until a few days before the time of their maturity; then they increase in size rapidly, and all ripen at about the same time, this time varying with the latitude, but being quite constant for the same variety in any given locality. Upon the variability of different varieties, as to time of ripening and the constancy of the same variety, depends the peach season and the whole peach industry. For example, in middle latitudes of the eastern United States the peach grower knows to a certainty that he may expect the Early Louise or Early Rivers to be ripe at a given date in July; the Mountain Rose and Crawford's Early at two given dates in August; the Old Mixon, Stump, Crawford's Late, Smock, Bilyeu's, etc., at successively later dates. Consequently, in planting his orchards he

takes great pains to select these varieties or others which mature in the same way, one after another. To such an extent is this now carried that in the more favored localities, such as Maryland and Delaware, the "peach season" begins early in July and lasts until mid-October, there being between these dates a nearly unbroken succession of varieties. In a given latitude each one of these many varieties ripens, year after year, so nearly at a given date that months in advance the grower can tell to within a very few days at what time it will be necessary to pick and market any variety, and can arrange all his work accordingly. Soil, situation and weather exert some influence, *e. g.*, peaches on light, warm soil usually ripen a few days in advance of those on clay.

Manifestly, if these varieties should ripen out of season or at nearly the same time, either the markets would be glutted and the price of peaches would fall below the cost of production, or else the fruit, unexpectedly ripe, would rot upon the trees for lack of sufficient help to pick it. In either event great losses would result.

This is very nearly what happens when an orchard is attacked by yellows. The disease is characterized by the following symptoms:

FIRST YEAR OF ATTACK.

The diseased fruit ripens prematurely, and frequently in such a way that varieties, ordinarily maturing several weeks apart, are ripe all at once, often quite unexpectedly. There is no time to gather this fruit, even if it were perfect, and much of it decays on the trees. It is also rejected by drying and canning establishments and by commission merchants, except in years of scarcity.

Diseased trees exhibit great variability as to time of ripening their fruit. Sometimes this period precedes the normal time of ripening by only two or three days; sometimes it precedes it by as long a period as six weeks or even two months, in which case healthy peaches on the same tree or on adjacent ones are not half grown. As a rule it may be said that such peaches ripen at least two or three weeks in advance of the proper time.

These prematurely ripened peaches differ from healthy ones very materially in color. Once seen they can never be mistaken. Generally they have more color than healthy peaches, but the essential difference lies less in the amount of color than in the peculiarity of its distribution. Instead of being delicately punctate with minute crimson dots or imbued with uniform masses of color, like the ruddy cheek of a healthy peach, the surface is coarsely blotched with red and purple spots of variable diameter, but usually not less than one-sixteenth of an inch across. These give to the peach a mottled or speckled appearance unlike that produced by any other disease, and so entirely different from the healthy appearance, that the yellows might, in many cases, be diagnosed from a very small fragment of the skin of a single peach. Sometimes these spots are infrequent; sometimes they are very numerous. Usually they are somewhat sharply defined on a much lighter background, but sometimes they coalesce, giving to the whole peach a dark crimson or purple color, or, more rarely, a brown purple or dull red.

These red or purple discolorations are not confined to the skin of the peach, but extend into its flesh, appearing on tangential section as roundish crimson spots, and on radial section as more or less irregular dots, streaks, splashes or

veins of color. These streaks extend entirely through the flesh from pit to skin, or only part way in or out. Always there is more than the usual amount of crimson color about the pit. Sometimes, especially in white-fleshed peaches like Troth's Early, Mountain Rose and Old Mixon, the whole interior is mottled with the brightest crimson, or becomes a nearly uniform mass of this deep color.

In some instances, in yellow varieties, particulary in Maryland, the flesh of the prematures was not very high colored; and in two or three cases I found scarcely a trace of crimson spotted flesh. Noyes Darling also mentions one instance in which the usual high color was wanting, the only exception he ever found.

The taste of peaches ripened prematurely by this disease varies considerably. Usually they are insipid and worthless for eating; occasionally they retain a nearly normal flavor, and not rarely they are slightly bitter or mawkish.

Such peaches seem to decay more quickly than healthy ones. Judging from my own experience, the palatable ones are not injurious even when eaten in large quantities. Most prematures, however, are unfit to eat.

If the tree is in bearing this prematurely ripe, red spotted fruit is the first symptom of the disease, at least the first unmistakable symptom. Not infrequently out of several hundred peaches upon a tree I saw the disease in one or two only, and very often it was manifest only in the peaches on one or two small limbs; sometimes, however, the disease showed itself simultaneously in peaches on all parts of the tree, affecting nearly or quite all of them, the disease appearing to have attacked all parts of the tree at once. Occasionally I saw trees loaded almost to breaking with such peaches and they were as large as those on healthy trees.

When the tree had been healthy the previous season, and especially when the diseased peaches were confined to one limb or to a few limbs, I found the branches and foliage perfectly normal in appearance. Indeed, judged solely by their foliage and young wood, many of the diseased trees which I examined in Maryland and Delaware in July and August, 1887, would have been pronounced very healthly, the only symptoms I could find being the prematurely ripened, red-spotted fruit.

Upon some of these trees at this time, and later in the season upon many others, I found young shoots developing into a most strange and unnatural growth. On many trees this was very striking, filling the whole interior of the tree-top. To it the expression "fungus growth" is often applied by peach growers, although it is a part of the tree itself and no fungus. This abnormal growth is so peculiar and so characteristic of yellows that it deserves to be considered at some length as the next morbid manifestation. This growth appears to be a secondary symptom, although upon barren trees it may be the first to appear, as it is often the first to attract attention. My reason for thinking it is a secondary symptom is that while limbs often bear premature peaches for one season without showing this diseased growth, they never in any instance send forth this growth, and at the same time or afterward produce healthy peaches. Having once borne these starved shoots they always thereafter bear diseased peaches, if they bear any. This growth consists of more or less depauperate shoots which are often much branched, so as to be suggestive of what the Germans call "Hexenbesen" or witch brooms, some of which are known to be caused by fungus attacks. There is not only a polycladia,

but there is a marked prolepsis. These shoots may appear upon any part of the tree, and often are developed numerously upon the trunk and main limbs, from obscure or adventitious buds. Most commonly I found them growing out close together upon the upper side along the entire length of a main limb, or of several such limbs, giving the interior of the tree-top a very peculiar appearance, entirely unlike that caused by any other disease. Where these shoots appeared numerously upon a limb they were frequently unbranched and only a few inches in length, at least in July and August. More often, especially late in the season, I found them branched. In some instances these diseased shoots and their branches were very long and willowy. Often the leaves also suggested the willow.

The manner of this branching was to me a striking peculiarity, and one which I had never seen mentioned in connection with the disease. There is, as we have seen, an excessive duplication of shoots. Shoots, it is true, are likely to occur to some extent upon the trunk and main limbs of all robust trees, but never in such numbers, nor branched in the manner to be described, nor with such a starved appearance. Not only are the shoots dwarfed and sickly but their growth is extremely hurried, *i. e.*, in their leaf axils they develop buds which the same season give rise to diminutive branches, and in turn these branches in the same way give rise to others. Very often I found that three sets of branches, and in some instances four and even five, had developed on these shoots as the results of a few months' growth. These branches are very clearly shown in some of the photographs accompanying this report, as may be seen by comparing them with contemporary healthy growths. The tissues of these branches are very poorly developed and their buds are diminutive and very often dead before they enter the winter, differing in these respects from the few witch brooms I have had opportunity to examine. Moreover, there is never any hypertrophy of the branches which bear them. The foliage of such shoots is often blanched or pale yellowish green, and never of a vigorous green. It is abundant but very much dwarfed, the best developed leaves being frequently less than 3 inches long and proportionately narrow, and many of the smaller ones being less than an inch in length, while full-grown, healthy leaves are from 6 to 9 inches in length by $1\frac{1}{4}$ to 2 inches in breadth. Frequently by failure of the internodes to properly lengthen and by the excessive production of branches the growth becomes considerably tufted.

As autumn passes away these diseased shoots manifest no signs of preparation for winter (see Photo. V). There appears to be something analogous to what in animals would be called a lack of innervation. The ordinary functions of the plant are disturbed or set aside altogether. Growth goes on without much reference to the needs of the plant or the time of the year, and is at the same time excessive and imperfect. In late October and in November, when healthy trees had dropped their leaves and were ready for winter weather, such shoots were still growing.

Although these diseased shoots appear to be a secondary symptom, yet they may follow the diseased fruit speedily. In autumn I saw them on many trees which were not diseased the previous year, or at least showed no external manifestation of disease; and in nearly all such cases they were *secondary* growths from obscure buds, first appearing in June or July or later in the year, the *primary*, terminal, or spring growth being usually the picture of health, as regards both branches and foliage. However, this was not *uniform-*

ly the case, for occasionally in August I found terminal shoots which had become much branched and were otherwise diseased exactly like those shoots which grew from obscure buds on the branches or trunk. This manifestation of the disease upon terminal shoots appears not to have been observed very generally. A. J. Downing says it never occurs; A. G. Gully never saw it. Possibly, it is more prevalent in the South. In Georgia it occurs early in the season and appears to be the common form of the malady, whole trees of robust growth being diseased nearly or quite throughout.

In September and October I also saw not a few yellows infected trees, on which all the buds of certain terminal shoots had just begun to develop into branches, although these shoot axes had previously appeared healthy throughout. Often, much earlier in the season, I saw robust shoots from the trunk and main limbs, the lower parts of which showed every indication of health, the leaves being large and dark green and the wood and bark all that could be desired; yet, as growth progressed, these lusty shoots, some of them four or five feet long, developed at the apex into a complex of repeatedly ramified, feeble branches covered with innumerable diminutive, pale green, willowy leaves. Sometimes from a healthy looking main limb grew out two yearling shoots within an inch of each other, one of them being diseased in the manner described and the other being unbranched and perfectly healthy, with vigorous dark green foliage. Such shoots were upon trees but recently attacked.

The relation of the diseased to the healthy portions of the tree were in some instances quite peculiar. The following are some of the more interesting cases, observed in August and September, 1887:

Occasionally the diseased shoots grew out of the trunk or from the main limbs, while nowhere else were there any indications of disease, such trees being barren.

Sometimes the diseased shoots grew out immediately above or immediately below a healthy branch.

Midway of its length a diseased branch sent out well developed shoots, then two years old, which bore healthy leaves of normal size. This branch may have become diseased the previous year.

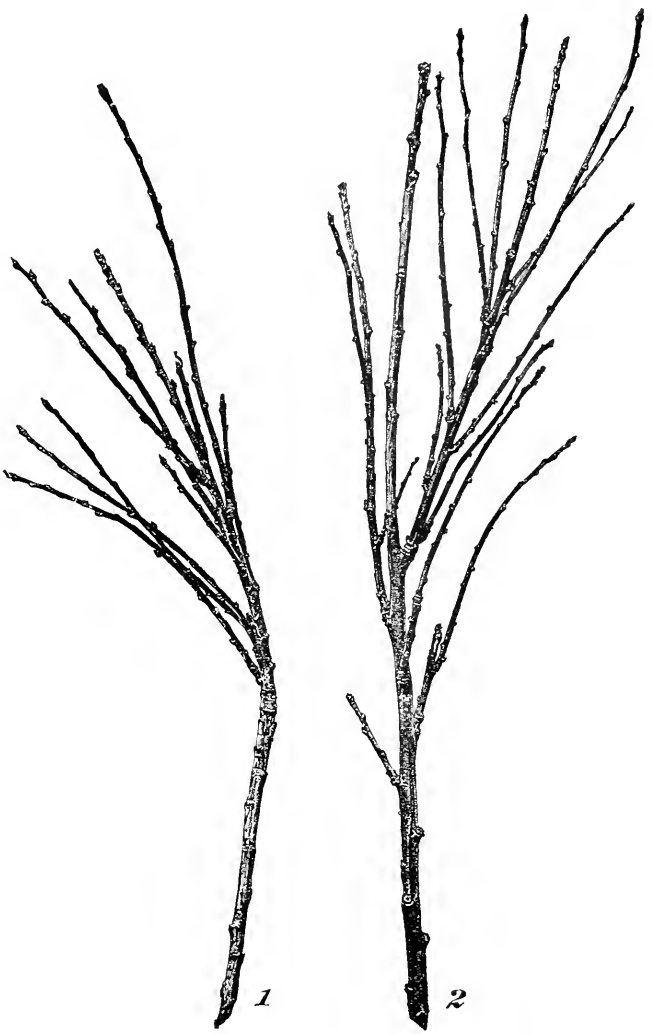
Midway of a healthy branch grew out a very characteristic yellows tuft. Lower down grew out several branches, large and small, bearing full grown, dark green leaves, while above the sickly tuft the branch divided four times and the sub branches ramified considerably, all the parts bearing healthy leaves.

On one part of a tree the limbs bore very healthy foliage and sent out from their base exceedingly stocky yearling shoots, where four to five feet long and bore large, healthy, dark green leaves. One limb, however, of this tree, also bearing healthy spring foliage, sent out along its branches, from obscure buds, many of the characteristic, secondary, small, starved, light green twigs.

Prematurely ripe peaches were sometimes found upon every main limb mingled with healthy green ones.

A tree bore premature peaches on every main limb and put forth a hundred or more of the starved, secondary shoots from obscure buds on the body and limbs, and yet showed no sign whatever of disease in the spring foliage or in the growth of any of the terminal shoots, every one of these being well developed and provided with full grown, fine looking leaves.

In another instance these pale, sickly shoots came out unbranched (August) singly all over the tree, except on the trunk, the extreme base of the main



DISEASED TERMINAL PEACH SHOOTS.

(Michigan.)

limbs, and the shoot-axes of the season. This tree was six years old and well developed. If it hung full of healthy peaches the previous year, as I have reason to believe, from the assurances of the owner and his tenant, then it must have become diseased some time between September, 1886, and June or July, 1887, unless we assume that the tree may be diseased for some time without external manifestation.

As already noted, premature peaches were frequently observed upon branches apparently sound.[1]

In one instance numerous secondary shoots grew out erect, along the whole length of the branches much as if the tree had been defoliated and were making a desperate effort to get new leaves; yet the terminal shoot-axes of this tree (the spring shoots) had, in every instance, made a good growth of one to two feet, and bore full grown, dark green leaves, except on some small branches in the center of the tree where they were beginning to look yellowish green and unhealthy. In this tree even the terminal shoots were beginning (August 16) to put out miserable, starved branches one to two inches long, from the axils of their lower leaves; and I am inclined to think it may have been affected in some part of the previous season.

These two symptoms—prematurely ripe, red spotted peaches; and pale, diseased, dwarfed shoots, strongly inclined to prolepsis and polycladia—are the only ones I could find in trees that were healthy the year before. Most frequently both symptoms were present. In some parts of the country, however, the diseased shoots do not appear so abundantly, and sometimes not at all until the second year. Perhaps seasonal or climatic peculiarities may control this. They are certainly more numerous in rainy than in dry seasons.

SECOND YEAR OF ATTACK.

The symptoms of the second year include those of the first, and there are several additional ones.

The fruit is usually smaller and less abundant, and the kernel is often abortive. The flavor of the fruit is also very inferior. It prematures with the same general appearance as the first season. Quite often the tree is barren, if diseased throughout. I have observed many such instances.

The diseased shoots continue to grow from the affected limbs, those of the previous year, if any grew, being for the most part dead.

There is also a progressive development of the disease, more and more of the tree becoming involved. In other words, it appears first to be a local disease; then, later on, a general one. Quite often, the first season, only one limb or a few limbs are diseased, but additional limbs are invariably affected the second year. I know of no exception to this. The first year of attack it is comparatively infrequent to find a tree diseased in all its parts; the second year it is somewhat rare to find many sound branches; often there are none.

Another symptom, not very noticeable the first year, is the dwarfed, yellowish or reddish-brown, and more or less curled and inrolled appearance of the entire foliage of the tree, or at least of all that on limbs diseased the previous year. This appearance renders diseased orchards plainly distinguishable at some distance, and no doubt gave rise to the name yellows, as applied

[1] The foliage of many such branches was observed to be yellow and badly diseased in 1888, and generally the shoot-axes of that season were also much dwarfed.

to this disease. At this stage the most careless observer is aware that something is wrong with the orchard. The trees have a most miserable, sickly, languishing appearance. Some curling and inrolling of the leaves is undoubtedly due to mites or other leaf insects, but I could not satisfy myself that all of it was so caused. It should also be stated that the leaves on the diseased, secondary or summer shoots do not ordinarily show this rolling and curling. Frequently there are brown or red spots upon the foliage, but this is not a constant symptom and appears to be due to a leaf fungus (*Cercospora*), which finds in the diseased leaves its most favorable condition for growth.

THIRD AND LATER YEARS.

The diseased tree rarely dies the second year of attack and rarely lives beyond the fourth or fifth year. It is generally worthless after the second year, *i. e.*, after all the branches have once borne the premature peaches; sometimes it becomes entirely diseased and worthless the first year of attack. Whatever may be thought of remedies, it is certain that left to itself the diseased tree invariably dies. It is not more likely to recover than is a consumptive animal. I have heard it said that such trees sometimes recover, but none under my own observation have done so, nor can find satisfactory evidence of any such recovery.

The symptoms of these later years are those previously mentioned, to which may be added some additional ones due apparently to an increasing lack of vitality. One of these is the death of large limbs and, finally, of the entire tree. Sometimes as early as the second year, and quite often the third or fourth year, the only symptoms of life exhibited by the tree are a few very feeble, dwarfish, broom-like tufts of branches, developed from obscure buds, here and there upon the otherwise naked limbs. These branches are clothed with very depauperate leaves of a greenish-yellow or reddish-brown.

Some additional minor symptoms attracted my attention, but not being certain that they are constant I present them here as suggestions rather than final conclusions.

The diseased shoots appear very brittle. I first noticed this in trying to make some withes, and afterwards found it nearly or quite constant. This recalls a statement made by Noyes Darling that diseased branches lose their elasticity and sway in the wind with "a stiff, jerking motion." I did not meet this statement until my field work for 1887 was completed, but, in connection with the brittleness, I am inclined to give some weight to it, particularly as Noyes Darling seems to me to have been the most acute observer and the most logical thinker who has ever written upon peach yellows.

In diseased limbs I also found that the cambium-cylinder was active very late in the fall, as might be expected from the prolonged growth of leaves and shoots already mentioned. This activity of the cambium continued long after it had ceased upon the neighboring healthy trees. This was indicated by the ease with which the bark could be peeled. In Kent county, Del., in all cases, the bark of healthy trees stuck tightly and could not be peeled at all after the last of August. From diseased branches in the same orchards long strips of bark could readily be separated as late as September 20, leaving exposed the smooth, moist surface of the wood.

I should expect to find these symptoms correlated with peculiarities of microscopic structure, some of which might perhaps prove of diagnostic value, but up to this time I have not been able to make the necessary number of careful observations. What induces this prolonged activity of the cambium remains to be determined. It is apparently something in the nature of an irritant.

Other abnormal appearances, *e. g.*, the black heart wood, mentioned as symptomatic by various observers, and the cracked and discolored bark found by Professor Penhallow, were objects of diligent search and were observed occasionally. However, not having found these two symptoms constant in yellows infected trees, and having found the same in many trees not diseased by yellows, and even in localities where yellows has never appeared, I am constrained to rule them out as not peculiar to this disease. I think peach s ems are apt to become black hearted by severe freezing or from very slight injuries,if at all exposed to the weather. The appearance of the bark on trunks and main limbs was noted with great care in hundreds of trees, diseased and healthy. In the early stages of the disease in almost all the younger trees, *i. e.*, those under six years of age, the outer bark was smooth and fair. In older trees the bark is naturally more or less rough and cracked. I could find nothing in color or cracking of the bark which appeared to me to be of diagnostic value, although in some cases, on shoots of but a few years' growth, the production of cork in irregular patches appeared to be excessive. Whether this is a peculiarity of any importance remains to be determined.

Since, in spite of all that has been said and written on the subject, there is still much confusion in the minds of peach growers as to exactly what constitutes yellows, I have thrown my conception of it into the following propositions, the symptoms being noted in order of appearance :

DIGEST OF SYMPTOMS.

(1) Prematurely ripe, red spotted fruit.

(2) Development upon the trunk and branches, which bear, or have borne, the diseased peaches of secondary or summer shoots, often in great numbers, and always dwarfed and feeble in appearance.

(3) A very marked tendency of the buds on these secondary shoots to develop the same season, forming sometimes in this way within a few months secondary, tertiary, quartan and quintan branches.

(4) The appearance of the disease the next spring in the entire growth of the tree, or at least of the diseased parts—the shoot-axes being shortened and the foliage dwarfed and sickly, of a yellowish or reddish-brown color, and with a greater or less tendency to curl from end to end, and to roll sidewise, so that the lower surface becomes the convex outer surface. Sometimes, however, the disease affects the terminal shoots the same autumn, causing the winter buds to develop either before or after the leaves have fallen.

(5) A slow progress of the disease from limb to limb, so that in one or two years, or at most three years, the whole tree is involved.

(6) Co-ordinate with the progress of the disease from part to part, a marked diminution of the vitality of the tree, ending in death.

These are symptoms characteristic of peach yellows, and they seem to me quite as definite as those of any specific disease. If peach yellows, as I have seen it and have defined it, is not a specific disease, due to some constant cause or causes, then neither is glanders or anthrax, or measles or small-pox.

DISEASES MISTAKEN FOR YELLOWS.

Having defined yellows, it will now be proper to state what it is not; *i. e.*, to describe somewhat carefully those abnormal appearances for which it has been mistaken. This is the more necessary because many growers, and even some writers upon the subject, have never seen genuine yellows, and because some of these abnormal appearances are likely to be found in every peach orchard and to cause unnecessary apprehension.

(1) *The borer.*—The larva of *Ægeria exitiosa*, Say, devours the inner cortex of the tree at the surface of the earth, or immediately above or below, often causing extensive destruction, and not in frequently girdling the trunk.

If these injuries are slight the tree is not harmed, but if they are extensive there is a marked yellowing of the entire foliage, the leaves being also more or less folded sidewise, upward, along the midrib, and curled downward end to end. The fruit in some cases also ripens prematurely. Thus injured, the tree presents a very sickly appearance, and generally dies in a year or two, the symptoms being not markedly different from those manifested by any tree when some portion of the trunk-cylinder is deprived of the whole or greater part of its bark.

This disease is easily distinguished from yellows. If the foliage is very yellow, an examination at the base of the trunk will show that a large part of the inner bark has been destroyed, and will often discover the larva still at work. If such trees are vigorously shaken in July or August the yellow leaves will fall in a shower; but no amount of shaking will dislodge the leaves of a tree infected by the yellows. So tightly did the latter stick to the branches that, even in September, when I undertook to remove them from some of the much-branched secondary shoots, considerable force was necessary. Indeed the process was likened not inaptly by one farmer to picking pin-feathers from a starved chicken.

The prematurely ripened fruit, so far as I have seen, is natural in color and resembles that produced by the gardener's devise of "ringing" or girdling, being found only on nearly or completely girdled trees. It is never red spotted, never associated with dark-green foliage, and never connected with those hasty, much-branched and feeble summer growths which are always found on trees badly diseased by yellows. Usually also this fruit ripens only a week or two in advance of the normal time and retains its normal flavor. The only case in which the two diseases can be confounded is where they both exist in the same tree.

(2) *The roots aphis.*—A very shining dark-brown or black aphis, which corresponds nearly to *Aphis chrysanthemi*, Kosh, but which I have not been able to identify with certainty, infests the roots of the peach often in such vast numbers as to interfere seriously with its growth or to kill it outright. This insect is common to parts of New Jersey, Maryland and Delaware, particularly on sandy land. It frequently so stunts trees that at three or four years of age they are but very little larger than when first set. The insect occasionally infests whole nurseries, and may be distributed in this way. Possibly this may be an explanation to the fact that peach trees are most likely to suffer from root aphides the first year or the second year after they are set. Such trees are said to be "Frenched." The foliage partakes of the universal stunting and is usually somewhat yellowish. In districts where yellows has not appeared I found this disease called by that name, and have no doubt it has often been mistaken for it, particularly in New Jersey.

There is no question but that the root-aphis has killed thousands of trees, and been in some sections a very serious obstacle to successful peach culture, although it is not so much to be dreaded as the yellows. The marked feature throughout is the stunting, something which is not a precursor of yellows nor characteristic of the earlier stages of that disease. After a year or two of languishing such trees also not infrequently recover. Upon none of them have I seen premature, red-spotted peaches and the characteristic diseased shoots except when the tree was also suffering from yellows.

(3) *The peach nematode.*—A species of *Anguillula* infests the roots of peach trees in Florida and probably also in some other portions of the country, although I have never observed any on the Chesapeake and Delaware peninsula or in the peach districts of Michigan. This minute worm produces knobby enlargements and excrescences on the smaller roots, in which usually the cysts of the parasite may be detected. In this way the roots are often badly injured, and the tops become yellow and die, but, so far as I can learn, with no symptoms peculiar to yellows. I have seeen only the infected roots.

(4) *Decay of roots.*—Southwest, in Arkansas and Texas, the peach is reported to suffer considerably from root rot. In what way this affects the parts above ground or whether its manifestations are likely to be mistaken for yellows I am unable to say.

(5) *Starvation.*—Trees set upon pure sand or upon peat make a very feeble growth, although usually managing to live for some time. This starved condition, which readily disappears when suitable fertilizers are applied, might possibly, also, be mistaken for yellows, although I do not think it very likely, as such soil is generally well known to be barren and will not grow any fruit trees satisfactorily. Certainly this trouble would never be confounded with yellows by any person familiar with that disease.

(6) *Yet subsoil.*—Sometimes, by inexperienced growers, peach trees are set upon cold, wet soils. If these trees do not die outright they grow very slowly and produce only dwarfed yellowish foliage. I have seen such cases in a number of orchards, and believe the sickly appearance was due entirely, or at least primarily, to the nature of the soil. Few persons would, I think, be likely to mistake this for yellows. The premature peaches and the diseased shoots are wanting, and the unfavorable situation is a sufficient explanation of the symptoms which do appear.

Mr. Smith's next chapter is devoted to "Losses Due to Yellows," and he gives details of ravages in many orchards in Delaware and Maryland; but on this point Michigan peach growers scarcely need more information than they already possess from their own experience.

To resume Mr. Smith's report:

EXTENT OF THE PEACH INDUSTRY IN THE UNITED STATES.

The peach is, by common consent, the choicest fruit of middle latitudes, and is cultivated in both the north and south Temperate Zones the world over; but nowhere else in such enormous quantities as in the United States. Notwithstanding this, since facilities for drying and canning on a large scale have become general, there is a demand for the entire product of even the most prolific years, and indirectly the industry has thus become one that interests all parts of the country.

The districts of the United States and Canada now chiefly interested in the production of this fruit are the following: Southern Connecticut, southeast-

ern New York and western New York, southern Ontario, New Jersey, eastern Pennsylvania, Delaware, Maryland, middle Georgia, Tennessee, northern Ohio, southwestern Michigan, southern Illinois, southern Kansas, parts of Missouri, Arkansas and Texas, and nearly all of California. The areas of greatest productivity lie (1) along the Atlantic coast between New York and Norfolk and (2) on the Pacific slope in California.

The total peach product of the United States, as determined by the tenth census, was never published and can not now be be ascertained. But though it can not be determined for the whole country, it can be determined approximately, and for a series of years, for the Delaware and Chesapeake peninsula, which has been one of the most productive areas. The following table gives the shipments over the Delaware Division of the Philadelphia, Wilmington & Baltimore railroad for a series of years; and if one third be added for years prior to 1880, and one-half for years following, to make up for peaches dried, canned, and consumed on the peninsula, or marketed by water, the total will very nearly represent the actual product of the entire peninsula, or at least will not be in access of that product.

Peach shipments from the Delaware and Chesapeake Peninsula.

Year.	Baskets (five-eighths bushels.)	Year.	Baskets (five-eighths bushels.)
1867	1,086,530	1878	434,500
1868	12,267	1879	2,165,500
1869	2,143,467	1880	1,708,500
1870	1,443,733	1881	270,500
1871	2,668,800	1882	2,731,770
1872	2,181,867	1883	1,783,477
1873	1,521,600	1884	1,936,617
1874	675,200	1885	1,870,496
1875	4,536,000	1886	1,099,738
1876	1,058,500	1887	848,378
1877	2,001,500	1888	3,177,477
Total for twenty-two years			37,356,417

VALUE OF PEACH PRODUCTS.

Skill and industry are needed in peach growing. Not every man who sets an orchard becomes a successful peach grower. There are many obstacles to be overcome, and failures are not infrequent. Nevertheless, in the peach districts no other crop can be grown with anything like the same amount of profit. Many farmers have become rich in the business, and very often a comparatively small peach orchard has yielded a larger money return than all the rest of the farm. Some idea of the profits of successful peach growing may be gained from the following statements:

A 70-acre orchard belonging to James Hurdd, of Locust Grove, Md., and now nineteen years old, has borne twelve crops at an average yearly value of about $6,0 0.

An orchard of 2,700 trees owned by Thomas D. France, of Chestertown, Md., is said to have netted its former owner over $40,000. The trees are between twenty-one and twenty-six years old and appear to be healthy enough to bear peaches for another five years.

During a series of years the tenant on the Ashcraft farm, near Magnolia, Del., made enough out of his share of the peach crop to buy a valuable farm of his own. The same is true of the tenant on the neighboring McBride farm, and is true also of other tenant in Maryland and Delaware.

In 1874, Dr. Henry Ridgely, of Dover, Del., paid $11,000 for the Slaughter farm, southwest of Dover. This was over $70 an acre and was at that time considered an exorbitant price. Between 1874 and 1887 this farm yielded over $30,000 worth of peaches. The orchard also bore a large and valuable crop in 1888. To say nothing of other products, this farm has paid for itself in peaches alone three times over in fifteen years. On this farm in 1880 the product of 16 acres of early peaches, then three years old, sold for over $1,800.

Dr. Ridgely kindly furnished me with records from other farms which are of equal interest.

About twenty-five years ago he raised 30 acres of fine wheat, which he sold for $2,800. The same year from 10 acres of Troth's early peaches he realized nearly $2,600, *i. e.*; over $250 per acre.

In 1863, 1864, or 1865 (he is now uncertain which year), the peach crop from his Cowgill's Corner farm sold for $4,260, *i. e.*, $213 per acre, although some peaches were lost by the equinoxial storm.

In 1873, from 70 acres of peach orchard, he sold peaches to the amount of $10,200, although the Early Yorks, which were very fine and hung full, were all lost by a cloud-burst or very heavy rainfall. That year one tree bore $20 worth of peaches; another tree, $25 worth; and a third tree, $26.50 worth. From this third tree, by mistake, the men picked 15 baskets of green fruit two weeks too soon, and this was lost. But for this accident a single tree would have produced over $30 worth of fruit.

In 1884, from 400 trees (four acres) of Fox's Seedlings, he realized $820; *i. e.*, $205 per acre. This fruit was sold in four days, the highest price paid for any of it being 65 cents per basket.

T. C. Crookshank, of Cecilton, Md., sold $1,200 worth of peaches in 1886 from 12 acres.

Richard Hollyday's orchard of 30 acres in Spaniard's Neck, set in 1866, netted him an average of $30 per acre for ten consecutive years. The trees were dug out at the age of twenty, having borne for about sixteen years.

From the farm of William Hudson, near Clayton, Del., $16,000 worth of peaches were sold in the two years 1883 and 1884, the orchards at that time containing about 100 acres.

In 1870, according to William Parry, a Middletown, Del., peach grower, formerly from New Jersey, cleared $38,000 from 400 acres of peaches. Mr. Parry also declared that he could name several fruit growers who, in 1869, sold from 20,000 to 60,000 baskets each, at a clear profit of from $10,000 to $30,000. He is also authority for the statement that the peach blossom farm in Maryland, which sold some years prior to 1871 for $31,000, yielded the buyer the

first season peaches enough over and above all expenses of picking and marketing to entirely pay for the farm.

Mr. Parry's conclusion is that "so far as peach growing on a large scale is concerned, the net profits may very safely be set down at from $100 to $175 per acre, while in many instances they yield right through from $175 to $250 per acre." If gross profits be substituted for "net profits," this conclusion does not differ materially from my own. It relates, of course, to bearing years.

Michigan peach orchards are not less profitable than those of the Atlantic coast.

About 1868, in a letter to D. A. Winslow, George Parmelee stated that in 1865, on his Berrien county farm, "forty-five early Crawford trees produced a few baskets over 1,100 [peck (?) baskets] and sold for $2 per basket, amounting to $2,200. The trees were twenty feet apart each way, which puts 109 trees on an acre, and makes the yield at the rate of $5,848 to the acre. This, of course, is given as an extreme result, but if any man thinks that peach growing in this region is not profitable, let him call on our fruit growers and get facts."

In 1865 or 1866, S. F. Heath, of Heath's Corners, Berrien county, Mich., purchased 5 acres of bearing peach orchard for $1,350. His first crop sold for $1,800. He sold then 5 acres to William Gates for $7,000. Mr. Gates sold his first crop for $2,000 and his next one, 1868, for $4,000, and had "good prospects for a greater crop the following year."

In 1874, after correspondence with one hundred of the largest peach-growers, H. E. Bidwell, of South Haven, Mich., stated the average profit on peaches in Van Buren county, for the three years, 1872–'74, to have been $343.89 per acre, *i. e.*, $300 in 1872, $431.68 in 1873, and $300 in 1874.

In 1879, George T. Lay, of Allegan county, Mich., sold $1,000 worth of peaches from less than 4 acres, and another man is said to have sold $4,700 worth from 10 acres. The average value of the peaches from Mr. Lay's orchard for five years, 1876–'80, was $213 per acre.

At Lawton, Mich., in 1880, the peaches from 10 acres of five-years-old trees sold for $250 per acre.

I have no data concerning the profits of California orchards, but presume an equally good showing might be made.

VALUE OF PEACH FARMS.

When on the Delaware and Chesapeake Peninsula I made careful inquiry as to the value of peach farms in districts unaffected or but recently affected by yellows. Real estate is dull and sales are slow, but peach farms bring more than any other.

The "Cassidy" or "Peach Blossom" farm, on Sassafras river, in Cecil ounty, contains about 663 acres, and has been sold several times within the last thirty years, each time for about $50 dollars per acre. In Sassafras Neck, good farms with buildings are worth from $40 to $70 per acre. In some instances offers of $100 an acre would be refused.

About Chestertown good peach farms are worth from $70 to $100 per acre. Plenty could be bought for $70. Recently, in the upper part of Queen Anne county, a farm brought $73 per acre at a forced sale, and good peach farms will readily bring that sum, while many peach growers would not sell for less than $100 per acre.

DISEASED PEACH SHOOT FROM A MAIN LIMB.
(Delaware.)

In Spaniard's Neck the well established peach farms are worth from $70 to $100 per acre. Land at some distance from the river and not well adapted to peaches is worth much less.

The peach farm now occupied by William Hudson, at Clayton, Del., contains 222 acres, and was bought in 1883 at $130 per acre, 100 acres being in bearing orchard.

Good peach farms, situated within a few miles of Dover, are worth from $75 to $100 per acre. A few might be bought as low as $50 or $60.

Peach farms in the vicinity of Magnolia are worth from $75 to $100 per acre.

DEPRECIATION OF REAL ESTATE DUE TO YELLOWS.

This has been marked in some sections. Real estate is undoubtedly dull the country over, owing to various causes; but that there has been a marked depreciation in values in upper Maryland and Delaware, due solely to the ravages of yellows, can not be denied. It is too patent. In places where the disease has prevailed most destructively it would now be hard to sell a peach farm at any price. Buyers do not care to invest; the risk is too great. Owing to the prevalence of this disease many farms will not now sell for over one-half or two-thirds as much as they would have brought five years ago. In sections where yellows has entirely destroyed the orchards or rendered peach growing precarious and unprofitable, farms are now worth on an average about one-half what they were formerly.

Farms about Middletown, Townsend, McDonough and Odessa are now worth from $50 to $80 per acre. Fifteen or twenty years ago, when peach growing was at its height in this section, real estate brought fabulous prices, but usually paid for itself in peaches within a few years.

In October, 1866, near McDonough, 170 acres of poor land, without fences, brought $120 an acre at public sale.

In 1867 Mr. G. W. Karsner's farm of 300 acres, near McDonough, was assessed at $150, and valued by some at $250 per acre. This farm was bought in 1832 for $14 per acre.

In 1867 a farm of 150 acres, two miles east of Odessa, sold for $199 an acre, and at that time the upland portion (150 acres) of Mr. E. C. Fennimore's farm would undoubtedly have sold for over $300 per acre. This farm, lying on Delaware river, contains 800 acres, 650 being marsh and the rest sandy upland with red clay subsoil. It was sold in 1832 as part of a tract of 2,800 acres for 93 cents an acre, and again in 1853 to Mr. Fennimore, when its value for peach growing was understood. for $25 an acre, marsh and all.

In 1874 the peach farm of Mr. Serrick Shallcross, near Middletown, containing over 1,000 acres, was valued at $150 per acre.

At about the same time Mr. Shallcross bought three farms to put into peaches, paying $156, $127, and $120 per acre. At that time, about Middletown and McDonough, land of any sort suitable for peaches sold readily, even without buildings, at from $100 to $125 per acre.

The depression of real estate values in Berrien county, Mich., subsequent to the loss of the orchards was also very great, and many persons were financially ruined, but I have not enough data to render it worth while to consider it at length. During the flush peach times real estate in southwest Michigan changed hands at prices fully equal to those which prevailed in Delaware.

Should peach yellows sweep away the magnificent orchards of the middle part of the Chesapeake and Delaware peninsula, as it did those of New Castle county, Del., and Berrien county, Mich., the effect, not only on the price of lands, but also on railroad and steamboat traffic and on the general prosperity of the peninsula, must be very great. Growers whose farms are mortgaged would be financially ruined and life would be harder for every inhabitant. This would be true especially of the poorer classes, many of whom are supported almost entirely by the peach industry. The single item of the carrying trade amounts to thousands of dollars annually, as may be seen from the table of shipments by railroads, and this is only one of many items. In a word, the prosperity of nearly every business interest on the peninsula hinges on the peach industry.

That the peach orchards are really in danger of being destroyed must be apparent to any one conversant with the facts, or to any one who will carefully examine the data presented in this report. In the celebrated Sassafras river region, and also in all the upper part of Kent county, Del., there will not in five years be a single productive orchard over six years of age if yellows continues to spread as rapidly as it has done for the last three years. I have no desire to present a sensational or gloomy view, but I give this as my deliberate judgment, after sixteen months' continuous study of the subject, with every opportunity to examine peninsular orchards.

Either of two things may possibly avert this dreaded result:

(1) The application of some remedy or preventive.

(2) The disappearance of the virulence of the disease from unknown natural causes.

In my judgment we are already in possession of knowledge available for a partial suppression of the disease, but, from a wide acquaintance with the peninsular peach growers and some knowledge of human nature, I am inclined to think it can be reduced to practice only in sections but recently invaded, *i. e.*, toward the lower part of the peninsula.

CONDITIONS KNOWN OR SUPPOSED TO FAVOR THE DISEASE.

CLIMATIC CONDITIONS.

From the foregoing section upon history and distribution, and especially from that part devoted to the early history of the peach in the United States, it must be apparent that portions of this country are well suited to this fruit. Otherwise it never could have gained such an early strong foothold or flourished in the open air unprotected as it has done.

The peach is undoubtedly of Asiatic origin, but neither in China nor on the table-lands of Persia does it appear to be more at home than in parts of the United States; and this might be expected from the fact that we are in the same zone and under climatic conditions not markedly different from those existing in the middle latitudes of Asia.

From the recent suggestion by Professor Budd, and the earlier one by Dr. Emerson, that yellows may be a disease of non-acclimatization, it is worth while to inquire (1) what constitutes acclimatization? (2) what indicates that Asiatic peaches are hardier than our own?

It ought not to be difficult to determine whether a cultivated tree takes kindly to a climate. I know no more certain proof than that it makes a vigorous growth, is productive, attains the usual longevity of its species, and

is capable of maintaining itself to a considerable extent outside of cultivation, in fence rows, hedges and other neglected places. In the more favored parts of this country the peach fulfills all these conditions, and has done so for more than two centuries. In my examinations on the Deleware and Chesapeake peninsula in 1887 and 1888 I saw at least fifty orchards of ages ranging from twenty to thirty years, and I saw a few still older. Such orchards are by no means infrequent, except where yellows has prevailed for a long time. Even in the relatively severe climate of Michigan orchards have lived twenty-five and thirty years. The average age of the orchards in Maryland and Delaware is only about sixteen years, but this is to be attributed to overproduction and neglect rather than to climate. If our trees were pruned as carefully as European trees they would undoubtedly live as long. Even without special care they sometimes reach a great age. There are well authenticated cases on the Atlantic coast of peach trees which have lived forty or even fifty years, and George Thurbur mentions one in Virginia which reached the age of seventy years.

That Chinese peaches are more hardy than our own is a belief rather than a well established fact. They are certainly inferior in flavor and probably not hardier than the commonly cultivated "Persian" sorts. I have myself this year seen well marked yellows in North China peaches growing in Delaware, and have no doubt that Chinese peaches will prove subject to all the diseases incident to other races, and on *a priori* grounds, in the absence of sufficient well-authenticated information, I have no doubt that in China itself they are subject to various diseases, especially where grown in quantity. Certain, at least, is the fact that in the North Island of New Zealand the peach has been nearly exterminated within the last ten years by some mysterious blight.

Nevertheless, with some show of reason, peach yellows has been attributed to various unfavorable climatic conditions. The relation of these conditions to yellows will, therefore, be dicussed in the following pages. Four theories have received most frequent mention by writers on this subject, and as no proofs or valid arguments have been advanced in favor of any others it will be sufficient to restrict attention to these four, with a view to determine, if possible, just what relation these supposed causes bear to the disease.

The theory of general change in climatic conditions may be dismissed with a word or two. It is easy to propound and difficult to establish. In reference thereto it may be said: (1) There is no evidence of any marked change in the climate of the United State during the last one hundred years; and (2) if there were, there is no evidence that the outbreaks of peach yellows have conformed to any such change. We may, therefore, set aside this theory until evidence is adduced in proof of both propositions.

The theory of early autumn frosts has been urged with more show of reason. When we reflect upon the function of the leaves, and on the nice balance between roots and foliage which is necessary for the health of a growing tree, it is evident that any premature destruction of the foliage must not only affect the maturing wood, but also more or less seriously injure the whole plant. With this fact in mind, I have given careful attention to the subject, the more because some very considerable authorities in horticulture have favored this theory, and have stated by way of proof that this disease never occurs in the South or when the peach is grown under glass.

After careful inquiry my conclusion is that early frosts have nothing what-

ever to do with yellows. This conclusion is based, in part, upon the following facts:

(1) In the peach districts of Michigan severe frosts sometimes occur in August and often in September, *i. e.*, before the leaves have fallen; yet there are localities where peach trees have been grown continuously for thirty years, and where yellows has not yet appeared.

(2) In the region of the great lakes early frosts have not been confined to recent years, yet peach yellows did not appear there until quite recently, *i. e.*, in southwestern Michigan in 1866; in nothern Ohio in 1878; in Ontario in 1876.

(3) On the shore of Long Island sound, in the vicinity of New Haven, Conn., peach yellows was very prevalent between 1831 and 1846; yet, during the entire period of sixteen years, at Middletown, in the interior of the State but not far removed, there was but one severe frost as early as September.

(4) On the upper part of the Delaware and Chesapeake peninsula peach yellows has appeared within the last three years in a great many young orchards, often affecting hundreds of trees in a single orchard in one year. In 1887 and in 1888 I saw it repeatedly in trees set only three or four years, and occasionally in still younger trees, most of which were healthy in 1887. In connection with these facts I made inquiries to determine (1) the exact dates at which early frosts have occurred in recent years, (2) whether usually, or occasionally, the peach is liable to lose its foliage prematurely, *i. e.*, while its buds and wood are immature. In 1887 and 1888 I supplemented these inquiries by observations of my own.

At Dover and Clayton weather records have been kept for a number of years, and these show that there have been no severe early frosts, certainly none that serve in the least to explain the sudden widespread devastation of the orchards by yellows. Below is a synopsis from these records:

At Still Pond, Md., the entries in the journal of Dr. W. S. Maxwell agree substantially with the Dover and Clayton records, although thermometric readings are not given. A daily record by Dr. Henry Ridgely, of Dover, also agrees substantially with that of Mr. Jester, although not so complete.

From these records it is clear that during the three years 1885 to 1887 there were no frosts in August and none of any consequence in September. In 1885 the first severe frost was on October 10; in 1886 it was on October 17; in 1887 on October 15; in 1888 on October 10.

The first point raised is whether the shoots of the season were in such an immature condition at the time of these frosts as to be seriously injured by loss of leaves, assuming for the sake of argument that the leaf function was entirely suspended after these dates. The second point is whether the severest injuries of this sort can develop peach yellows, or anything resembling it.

In the autumn of 1887 I paid particular atttention to the ripening of foliage on deciduous trees, especially on the peach, and to the effects of the October and November frosts Leaves in some orchards, especially about Chestertown, Md., began to fall in considerable quantities as early as August 25, but this was, I think, abnormally early.

At Dover, in the McDaniel orchard by September 27 from one third to two-thirds of the leaves on all the lower branches had already fallen, and those remaining on these branches (except the terminal ones) detached very readily when the shoots were seized at the base and drawn gently through the half-closed hand, thus showing that though still green their work was very nearly completed. Some of the smaller branches had already lost all their leaves.

The branches on the tops of the trees were yet thickly covered with green leaves, but the buds were well developed and the twigs had the appearance of maturity. On an average the trees in this orchard had lost about one-fourth of their leaves.

At Clayton, in an old orchard owned by Alfred Hudson, and considerably injured by yellows, the leaves had nearly all fallen by October 4. The early varieties shed first. Smocks and some other late sorts retained quite a sprinkling of green. On many trees in this orchard there was not a leaf, and on an average about four-fifths of all the foliage had fallen. Such was substantially the condition of other bearing orchards examined at that time in that locality. The young orchards were greener. Three days later I found that the trees in the four-year old orchard of John Hudson (No. 9 of this report) had lost from two-thirds to nine-tenths of their leaves. On some varieties there were more leaves than on others. A one-year old orchard on the same farm looked very green and retained most of its foliage. This was healthy in 1888, but No. 9 was badly diseased.

On October 8 near Smyrna I examined two orchards, each about three or four years old. They had shed from one-half or two-thirds of their foliage, but the tops of many of the trees were still quite green. From my window at Clayton I could also see another young orchard of many acres. The lower two-thirds of what foliage remained was reddish brown, the upper third was green.

On October 10, near Clayton, in a very thrifty three-year old orchard belonging to John Gault, I found that the trees still retained from one-third to one-half their leaves. Fully one-third were yet entirely green and doing duty. They were entirely gone from some shoots and from the lower one-half to two-thirds of most of the shoots. The ends of many shoots still retained all their leaves, although the buds in their axils would probably have grown if taken for inoculation in August. My memorandum on this orchard was: If frost occurs before October 20 it will catch the terminal leaves, but I question whether the trees will suffer appreciably thereby. On a partial examination at that time I found in this orchard twenty-five trees with yellows, and many additional cases developed in 1888.

Speaking for a majority of the young orchards about Clayton, in which many new cases of yellows appeared in 1888, it may be said that from one-half to three-fourths of the foliage had fallen by October 10, and in older orchards a much larger proportion, although there had been no frost.

Variety, age, situation, kind of fertilization, time and manner of cultivation, and the production of fruit all have much to do in determining how early the leaves shall fall.

In 1887, judging by the number of leaves which had fallen, and by the appearance of the young wood, it is reasonable to suppose that peach trees on the Delaware and Chesapeake peninsula were well out of harm's way before the first frost. If this is true of 1887, it is undoubtedly true also of 1885 and 1886, and these frosts can not have been the cause of this outbreak of yellows. Indeed, on general principles it may well be doubted whether even very early and killing frosts will produce peach yellows. The burden of proof is all on the side of those who support this theory.

In Washington, D. C., especially where somewhat shaded or protected by buildings, peach trees retained their foliage much longer than in the open field. The first severe frost occurred October 16, at which time many of the trees were yet in nearly full leaf. Between this date and October 30, especially

after a heavy rain, the leaves fell rapidly, but were not all gone or all yellow until about November 7, although there were a number of severe frosts.

COLD WINTERS.

The winter of 1880-'81 was unusually severe. On the Delaware and Chesapeake peninsula in January the temperature fell to 12° below zero F., a very unusual occurrence. The fruit buds were nearly all destroyed. Many trees were killed outright. Thousands more were badly injured and have not recovered to this day. Many persons have attributed the recent alarming increase of yellows to this severe winter. It has also been asserted that in New Jersey and upper Delaware a corresponding increase of yellows followed the severe winter of 1856-'57. In Berrien county, Michigan, the increase of yellows was also ascribed to the severe winters of 1872-'73 and 1874-'75.

This theory appears more tangible than the preceding, because the effect of hard freezes is very apparent in injured bark and discolored wood, and because dark heart wood is not infrequent in trees suffering from yellows. It has been a favorite theory with many writers. They have insisted that yellows is very strictly a disease of northern climates, naturally unsuited to the peach, the fact or supposed fact that the disease did not prevail in middle Delaware or in the southern States being cited as ample proof of this. Dr. Emerson and Mr. Hovey, in particular, cite the very part of Delaware now badly affected as proof that a mild climate is a safeguard.

It is probable that anything which reduces the vitality of a tree will render it more susceptible to disease, and in this way severe winters may have exerted an evil influence; but that any degree of cold, or any sudden change of temperature, can of itself cause peach yellows is, I think, impossible. The following reasons seem to be conclusive:

(1) If peach yellows is due to severe freezes it ought not to have appeared first in centers of cultivation, but rather on northern border regions, where severe winters are of more frequent occurrence. The whole history of the disease shows the reverse of this to be true.

(2) On such an assumption, peach yellows ought not to appear at all in mild southern climates, yet it has been present for a number of years in Georgia, on nearly the southern limit of the successful culture of the peach, at least of the so-called "Persian" peaches, the only race yet grown to any great extent in this country. In this connection it is also well to remember that the peach is not indigenous to a warm climate, as some writers have taken for granted. It flourishes best in the middle latitudes of either hemisphere, *i. e.*, between the thirtieth and fortieth parallels, and only exceptionally north or south of these boundaries.

(3) During the winter of 1856-'57, at Grand Rapids, Mich., many peach trees were killed to the ground or greatly injured. Since that date there have also been freezes which much injured peach trees. Yellows, however, did not appear until about 1883 and has never been very prevalent. In other parts of the State, *e. g.*, in Washtenaw county and Ionia county, peach trees have suffered repeatedly from cold winters, being killed back more often than not upon low grounds, yet I have never seen a single case of yellows resulting therefrom. At Spring Lake, near Grand Haven, a succession of severe winters between 1870 and 1880 greatly injured peach trees and practically put a stop to the planting of orchards, but yellows did not became prevalent in consequence, and has never proved a serious evil. Nevertheless, in

DISEASED PEACH SHOOT.

(Georgia.)

Berrien county, near the same great body of water and 70 miles farther south, the orchards were entirely destroyed by yellows during the same period. Here are two localities subject to the same rigors of climate. When the supposed cause has been acting in both localities why has the disease prevailed only in one?

(4) Sussex county, Del., is almost or entirely free from yellows, unless it be that portion in the immediate vicinity of Milford, yet it was as much subject to the severe winter of 1880–'81 as Kent county.

Seaford is only about 35 miles south of Dover, and the difference in elevation is so trifling that they may be said to be subject to the same temperature, especially during cold waves. Dover has suffered severely from peach yellows for three years, while Seaford has been entirely free. In August, 1888, I visited Seaford, talked with many growers, and examined about thirty orchards, some of them very carefully. I did not see a single premature peach or any well-defined case of yellows, and did not hear of any. Most of the growers are entirely ignorant of the symptoms and effects of this disease, so far as personal experience goes. The only suspicious trees I saw were a few in thrifty young orchards recently imported from New Jersey.

About Seaford are many old orchards which were seriously injured by the hard winter and which still show its effects in discolored or dozy heart-wood and partially dead limbs and trunk.

One of the orchards of Wm. E. Cannon was of special interest, because it was very badly injured by the winter in question. The orchard was then three years old. Some of the trees died, and none of them have entirely recovered. The trees lost large patches of bark from trunk and limbs, and the year's wood was frozen brown, and has since become dozy and rotten, frequently involving all the annual rings except those laid down within a year or two. There is much dead wood, and a slight pull breaks down large growing limbs. Nevertheless, the foliage was green and full grown, and the orchard bore peaches and looked as if it might continue to bear for a number of years. This orchards now contain five or six hundred trees; originally, seven hundred. I carefully examined each one, but found not a trace of yellows.

An orchard twenty-four years old, belonging to Charles Wright, was also badly injured by the winter and has never entirely recovered. It contained, originally, about eight hundred trees, seventy-five of which are now missing. There are many partially decayed branches and some dead trees, and all are lichen-covered. The orchard bore peaches, and will, no doubt, continue to bear for a number of years. I carefully examined every tree, but found not a trace of yellows. On the same farm is an orchard of one thousand seven hundred trees now fifteen years old. This was also badly injured by the winter, and looks more ragged and broken than the older one, but yellows has never appeared in it. Col. E. L. Martin also has two orchards, one eighteen years old and the other fifteen, which were badly injured by the winter of 1880–'81. Yellows has never appeared in either, and the younger one has borne four good crops of fruit since 1880. I saw both.

The history of these orchards is the history of all the old orchards about Seaford—all suffered from the unusual winter, but none developed yellows.

EXCESSIVE RAIN-FALL.

As long ago as 1807, Judge Peters observed that yellows was unusually prevalent during two successive rainy seasons, and concluded that excessive

moisture had something to do with the disease. Since his time many have held the same view, although not much evidence appears to have been brought forward to sustain it. Mr. Rutter, however, states that yellows was very prevalent in West Chester during the rainy season of 1878. Whether the former great outbreaks in Upper Delaware, in New Jersey, Connecticut, New York, Ontario, and Michigan occurred during rainy seasons is uncertain. I have found no trustworthy evidence of such coincidence. On the contrary, Charles W. Garfield states that yellows was much worse at Saint Joseph, Mich., in two excessively dry seasons, 1871 and 1872.

Careful rain-fall records in inches are not kept on the Chesapeake and Delaware Peninsula, so far as I know; but from general entries in several weather records and from newspaper paragraphs and the statements of many trustworthy persons, it is beyond question that in the vicinity of Dover and Still Pond, and in fact over all the upper part of the peninsula, there was excessive rain-fall both in 1886 and 1887. As regards 1887, my own observations confirm these statements. It was very rainy—hay was a large crop; corn-fields could not be properly cultivated; wheat spoiled in the shock; weeds grews amazingly; and the peach tree itself made a much larger growth than in 1888. According to Dr. Henry Ridgely's daily record the exceedingly rainy months of 1886 were May, June, and July; and the months in 1887 in which most rain fell were April, June, July, and August. In 1887 the last one-half of April, the whole of July, and the first two-thirds of August were especially wet, the July rainfall being enormons. In a general way the rain charts of the signal service confirm these statements, and would undoubtedly be shaded still more deeply in this region were they based on a larger number of observations. Coincident with these two rainy seasons was a marked increase of peach yellows, which seemed attributable thereto and was so attributed, very commonly.

One could not help noting such a striking coincidence or avoid being influenced by it. Until this year, therefore, I held the view that excessive rainfall, while not the cause of yellows, was a necessary factor in its rapid dissemination. It seemed wise, however, to follow the progress of the disease another year before making very positive assertions. It was, therefore, with unusual interest that I waited the season of 1888, hoping it might be dry. Fortunately, it was dry; but a careful study of the disease in five counties showed no marked diminution in the number of newly infected trees. If some orchards showed fewer new cases than in 1887, others in the vicinity showed more, and still others developed the disease for the first time, often in many trees (see record of examinations in numbered orchards). Many other orchards might be cited. I also found that all trees diseased in 1887 continued to be diseased in 1888, and that the disease had invaded contiguous territory which was free in 1887.

It cannot, therefore, be said that the excessive rainfall of 1886 and 1887 was especially favorable to the spread of the disease, unless, as is quite likely, the conditions then produced remained and continued their injurious activity in the dry year of 1888. It may, however, be stated without qualification that, contrary to expectation, a dry year following the two wet ones did not check the spread of the disease. Rainy weather may have some influence in originating a widespread epiphytotic, which is then capable of holding its own during succeeding dry weather. On the other hand, too much influence may have been ascribed to wet seasons from the fact that diseased trees put out a more abundant growth of secondary shoots in such years, and are

therefore more easily detected by ordinary observers, or rather not so easily overlooked. In this particular I noticed on the Delaware and Chesapeake Peninsula a very marked difference between 1887 and 1888. In 1888 the diseased trees sent out a scanty growth of the abnormal shoots; in 1887 such growths were very abundant.

All things considered, the question of the effect of excessive rainfall must be left an open one. Certainly it cannot of itself cause yellows, because districts only a few miles south of the infected areas suffered from veritable floods of rain and yet entirely escaped the disease. Another season may throw more light upon the subject. It certainly will if it is dry.

EARTH CONDITIONS.

The belief that peach yellows is in some way related to poverty of soil is not a new theory. As long ago as 1839 a correspondent of the Farmers' Cabinet stated that in earlier volumes of that journal he had found no less than eighteen papers recommending "alkaline substances for the prevention or cure of the premature decay of pear and peach trees. Two years later Littleton Physic, of Ararat Farm, Cecil county, Md., highly recommended nitrate of potash for peach trees, his experiments having begun as early as 1836.

In 1848, J. W. Bissel, of Rochester, N. Y., stated that there is a loss of lime and potash in soils where many peach trees have been grown, and suggested that yellows might be due "to the absence or small quantity of these alkalies." He had never seen any analyses of the wood, but suggested that such be made. The next year Professor Emmons, of Albany, N. Y., published analyses of healthy and diseased tissues. At this time New Jersey peach growers were also attributing yellows to bad treatment and poverty of soil. They then held, as some of them still hold, that the exhaustion of the land by excessive and unintermitted cropping is a sufficient explanation of the disease.

An analysis of healthy branches was also published in 1854 by Mr. Kirtland.

In 1871, Dr. R. C. Kedzie, of Lansing, Michigan, visited Benton Harbor, examined many diseased orchards, and made analyses of healthy and diseased tissues. He found in the diseased tree a deficiency of carbonate of potash and phosphate of lime, but in view of the fact that the composition of the ash of the same plant varies much according to the age of the plant, the kind of soil on which it grows, and the degree of vigor of its development, he declares that "perhaps it might with justice be said that the results of chemical analysis, like those of microscopic examination [Dr. W. J. Beal's], are merely negative." At about that date Thomas Meehan, of Germantown, Pa., stated that Dr. Wood, of the Philosophical Society, had found that potash benefited peach trees attacked by yellows.

In 1882, Charles Black, a well known nurseryman of Hightstown, N. J., declared that crowding was one of the causes of yellows, and made the following remarkable statement: "If your trees are too thick, pull out every other row, and as a rule you will cure the yellows." Trees are sometimes set as close as 8 or 10 feet, but should be 18 or 20 feet apart.

The same year Dr. Goessman, of Amherst, Mass., published his four analyses in connection with a paper by Prof. D. P. Penhallow on the microscopic characteristics of the disease. Dr. Goessman found in the diseased fruit an excess of lime and phosphoric acid and a deficiency of magnesia and potash; and in the diseased branches an excess of iron, lime, and magnesia, and a deficiency of potash and phosphoric acid. Both gentlemen took the ground

that the yellows was due to a lack of necessary food elements in the soil, and cited the four analyses in proof. A remedial treatment based on this theory, and consisting of liberal doses of phosphates and of sulphate and muriate of potash, was begun at Amherst, by Professor Maynard, in 1878, and the results of this treatment were also offered in proof.

This treatment was repeated by Professor Penhallow, at Houghton Farm, New York, the results there obtained being embodied in a special report of that experiment station, which was published in 1883.

In 1884, at the request of P. M. Augur, State pomologist, the Connecticut experiment station also made analyses of diseased and healthy peach twigs, from which it appears that the ash of the diseased tissue contained no excess of lime, but an excess of silica and other insoluble matters, and a deficiency of nearly all the other constituents.

In recent years Professor Penhallow is the one who has insisted most strenuously on the correctness of this soil exhaustion theory, and among practical peach growers who have given more or less sanction to his views may be named H. H. Appleton, Odessa, Del.; John P. R. Polk, Wilmington, Del.; Eli Minch, Shiloh, N. J.; and J. H. Hale, South Glastonbury, Conn. His treatment, as given in a Houghton Farm Bulletin, Series III, Nos. 1 and 2, and in a more recent communication to the author, consists in the application of 625 pounds per acre of a mixture, by weight, of 1 part of kieserite (crude epsom salts), 6 parts of muriate of potash, and 18 parts of dissolved bone-black (bone-black in sulphuric acid). This to be applied, one-half spring and fall, just before and after leafing; and, if marked evidence of the disease is present, an additional 2 pounds of muriate of potash must be given to each tree in spring and fall. The orchard must also first be pruned severely, to cut out all the noticeably diseased wood.

If yeach pellows can be cured in this simple manner every peach-grower ought to know it, for hundreds of orchards in New Jersey, Delaware, and Maryland are being ruined, entailing great financial loss. Even if this treatment can be depended on as a reasonably certain preventive, it is one of the most important horticultural discoveries of modern times. The fact that the ingredients here supplied in a concentrated soluble form are found naturally in considerable quantity in the ash of healthy peach trees is certainly an argument in their favor. If yellows, therefore, is only synonymous with starvation, the results of this treatment ought to be speedy and unmistakable. Six years have passed since the publication of Dr. Goessman's analyses, and many faithful trials have been made by peach growers. What have been the results?

When I began my field work, in July, 1887, I had no favorite theory to advance, but gave very careful attention this one, among others, hoping, for the sake of the fruit growers, to be able to confirm it. This I have not been able to do.

In the first place, there appears to be an error of logic in deriving conclusions from premises. In the diseased tissues Dr. Goessman found a deficiency of potash, and with this fact for one premise, and for the other the knowledge that potash is procured by the plant only from the earth, he and Professor Penhallow assumed a lack of this substance in the soil. Even assuming a constant deficiency of this sort in diseased trees, the conclusion which they reached by no means logically follows, any more than it follows that the leanness of a consumptive or a dyspeptic is attributable to a want of appetite or of sufficient food. If in diseased tissues there is a constant

deficiency of potash, such as the analyses seem to indicate, why may it not be an effect of the disease rather than the cause? The amount of this substance is believed to be proportionate to the vigor of growth. In weak and feeble growths, such as are characteristic of the later stages of yellows, we might consequently expect to find less of this element. In my judgment the amount of assimilable material in the soil has little or nothing to do with the deficiencies said to exist in diseased tissues.

Again, it would seem that four analyses, however carefully made, are an insufficient basis for so important an assumption. On this ground alone the fact of any characteristic disparity of chemical composition might very properly be denied, or held in question, until established by many careful analyses. Up to this date only a few have been made, and these are not altogether consistent. At least half a hundred analyses ought to be made, under various conditions of growth, if anything like exact information is desired. At present we do not even know that trees stunted by borers, by root aphides, or by starvation would not yield chemical results identical with those given by trees suffering from yellows. The probabilities are that they would.

Moreover, knowing from personal experience how easy it is to make mistakes, I am inclined, with all due respect to those who advocate this theory, to think there may also be a possible error of fact as to the alleged cures.

The Amherst trees were set, in 1870, only 12 feet apart; were neglected for five years, and did not receive treatment for yellows until 1878. Only the trees least affected were treated. These became green, bore fruit, and were pronounced cured at the end of three years. We are not told who identified the disease, or whether the trees in question (the identical ones treated) bore the premature red-spotted peaches and the characteristic shoots. Is it not possible that these trees may not have had genuine peach yellows, such as has destroyed the orchards in Michigan and Delaware? I have frequently seen yellow, starved looking trees which were not suffering from yellows, and these, too, in orchards where the real disease was present. It is easy to mistake something else for yellows if one has had but little experience with the disease. The statements that these trees were on an impoverished hill; that they were set only 12 feet apart; that they were eight years old when the disease was discovered, and that the trees in the richer bottom remained healthy, all lead me to think that some or all of them may have been simply starved trees, in which case they would naturally respond quickly to suitable food. On any other assumption I am at a loss to harmonize my own observations with the statements of Dr. Goessman and Professor Penhallow, unless, indeed, there should exist a difference in judgment as to what constitutes a cure. My own criterion is that the restored tree must again bear healthy fruit, ripening at the normal time. Any substance which accomplishes less than this is not a remedy, but at best only a palliative.

Professor Penhallow's field work at Houghton farm in 1883 would also appear to offer insufficient data for judgment as to the real merits of the muriate of potash. One tree only was cured of yellows. This had never borne fruit, but was one of a few young trees procured that year from Rochester, N. Y. Is there not a possibility that this tree was suffering from a cause or causes other than that which produces yellows, although manifesting symptoms somewhat resembling it? This cure was effected in 1883. I am unable to say what has been the subsequent history of this tree. It would be interesting to know if it continues healthy and is productive.

Has this remedy given any more definite and satisfactory results in the

hands of practical peach growers? After two years of observation and inquiry in Michigan, Maryland, and Delaware, I must say I can not find that it has. So far as my own observation goes the most that can be said in favor of any phosphate or potash treatment is that the trees become greener and in some cases produce premature fruit for a year or two longer than otherwise. On the Delaware and Chesapeake peninsula it is the rule rather than the exception to use commercial fertilizers, and some of the orchards which I have examined have received very large doses of fertilizers containing potash, phosphoric acid, sulphuric acid, chlorine, etc.; but it is almost the universal testimony that as a remedy for peach yellows, or even as a preventive, they are of no value whatever. A few men hold a contrary opinion, and in some instances I took special pains to visit their orchards, learn the treatment and note the condition of the trees.

In September, 1887, learning by newspaper reports of some trees near Smyrna, Del., which had been cured of yellows, I visited the place and examined the trees. They are on the farm of J. Scout, near the village. Mr. Scout himself did not assert that the trees had been cured, but said "There they are. You can judge for yourself."

I found a row of fifteen trees, ten years old, of several varieties. They were on level ground, next a gooseberry patch, and near a prolific vineyard. The treatment began four years previous and was at first accidental. At that time the ground under the trees on the side next the berry patch received the same dressing as the latter—*i. e.*, a very heavy coating of privy manure. Since then in the spring of each year the trees have received a dressing of ground bone at the rate of 600 pounds per acre, and of kainit at the rate of 400 pounds per acre.

The condition of these fifteen trees, was that *three* were healthy; *one* was dead; *one* was doubtful and *ten* had yellows, six of them being full of the characteristic shoots and badly diseased, while the other four showed unmistakable signs of it. In thirteen and fourteen there were some indications of recovery, but nothing definite. Mr. Scout thinks that all had the disease four years ago, but of this I do not feel certain.

H. H. Appleton, of Odessa, Del., has boned and potashed his orchards very liberally for years, but trees upon his place were badly diseased by yellows in 1887 and 1888, and although his shrewd neighbors are losing their young orchards by the wholesale, as I know from personal inspection, they have not confidence enough in his treatment to apply it to their own trees.

One of the most striking failures of this treatment is on the "Cassiday" or "Peach-Blossom" farm, on the north bank of the Sassafras River, in Cecil county, Md. The farm is now managed by John P. R. Polk, of Wilmington, Del. He has been a firm believer in the efficacy of this treatment, and for four years, *i. e.*, since the disease began to become serious in that region, has given the young 50-acre orchard very heavy dressings of an excellent peach-tree fertilizer, prepared for him by I. P. Thomas & Son, of Philadelphia, after the Penhallow formula, at a cost of $33 per ton.

I visited and examined this orchard August 29, 1888. It contains 50 acres; the front 15 is six years old; the back 35 is eight years old. The whole farm has been in peach orchard, but in this field ten years intervened between the removal of the old orchard and the planting of this one. The soil is nearly level upland—mellow clay loam with a yellow clay subsoil. The trees are set 108 to an acre. Yellows first appeared in the older part about 1884. The

HEALTHY TREE.—SET FIVE MONTHS.
(Delaware.)

history of the treatment of this orchard and of the progress of the disease, by years, as given by Joseph A. Rickards, the tenant, is as follows:

1884. Kainit was sowed broadcast in the spring on the entire 50 acres at the rate of 300 to 400 pounds per acre [about 50 pounds of potash per acre].

1885. This year there were many premature trees, nearly one-third of the back 35 acres, *i. e.*, the older trees. That fall from 5 to 25 pounds of I. P. Thomas's Peach Tree Fertilizer was put around each diseased tree [about one-half pound to two pounds of potash and the same amount of phosphoric acid per tree]. In all, 4 or 5 tons were thus used.

1886. There were more premature trees this year. The orchard got worse rather than better, and Mr. Rickards wished to dig out all diseased trees, but Mr. Polk objected and desired to continue the treatment. That fall from 300 to 400 pounds per acre of ordinary phosphate, part of it made by Mr. Thomas, was sowed broadcast on the entire 50 acres [6 to 8 pounds of potash and 20 to 30 pounds of phosphoric acid per acre].

1887. The younger, front part of the orchard showed many diseased trees. Nothing was put on the back 35 acres, but on the 15 acres of younger trees the Thomas mixture was applied at the rate of 300 to 400 pounds per acre. This was put on in March or April and plowed under later. The orchard showed no improvement.

1888. No treatment, save the ordinary careful cultivation which has been given each year.

I drove the entire length of the orchard and along one end, and walked through the middle. It is very badly diseased in all parts, and many of the trees are entirely worthless. The boss of the picking gang, who has been on the place five years, and was then at work in the orchard, told me that 20 acres of the 35 was "good for nothing," and would be cut down as soon as time could be found to do it, Mr. Polk having given orders to that effect; in fact five acres had already been cut down. He estimated that about two-thirds of the eight-year-old trees were diseased, and I saw nothing which led me to doubt his statement. Of the six-year-old trees, he thought about one-fourth were premature. Following Mr. Polk's direction the tenant began to cut these down, but found so many of them, that he preferred not to execute the order until he should again see the manager and inform him more fully of the exact condition of the trees. The diseased trees were very yellow and sickly looking, some were barren, and others bore premature fruit and the characteristic shoots. The healthy trees, especially in the younger part of the orchard, bore considerable fruit; they were large, and the foliage was green and vigorous. Evidently they have had good care and plenty of suitable food.

So far as I could judge, assuming for a basis the recent progress of the disease in all that part of Maryland, the fertilizers have had no effect whatever in retarding its spread. It has gone on increasing from year to year until now the orchard is very badly diseased. It is certainly as bad as any untreated orchard within a radius of 10 miles, and much worse than several orchards on the south side of the Sassafras river, on similar soil, and on land which has been "peached" once and has received no special treatment. In my judgment it would have been better to have removed the diseased trees, from year to year, as fast as they appeared. If I have not been misinformed, Mr. Polk is now also of this opinion.

Orchard No. 1 of this report received 200 pounds of ground bone and 200 pound of muriate of potash per acre when three years old.

Orchard No. 2 has also received a good deal in the way of phosphates, potash salts, and barn-yard manure for a series of years.

Orchard No. 14 received kainit broadcast in the spring of 1885, at the rate of 400 pounds per acre. Phosphates and barn-yard manure were used on the field for other crops previous to setting the trees, but not since. The level

30-acre field lying south of this orchard produced between 29 and 30 bushels of wheat per acre in 1888. I saw it fallowed in 1887, and the soil appeared to be identical with that of the orchard.

Orchard No. 16 has been remarkably productive, but has received very little in the way of fertilizers. It is thirty-three years old, and never suffered much from yellows until recently. This orchard may be compared with No. 2, which is on much the same kind of soil; or with No. 18, which was not old enough to bear until 1888, and then produced only a sprinkling of peaches, mostly premature; or with No. 3, which made a vigorous growth, and bore only one or two light crops before succumbing.

Again, on the supposition that yellows is due to exhaustion of soil, ought it not to appear in old rather than young trees, in trees which have produced excessive crops of fruit for many years in succession rather than in those which have borne only one or two light crops or even none at all? The reverse of this is true. I have found yellows more rapidly destructive in young than in old orchards. I know a number of instances where very productive old orchards have been entirely spared for the first fifteen or twenty years, while young orchards on the same farm, or in the immediate vicinity, have become very badly diseased during the first six years of their orchard life. In some cases where soil, location, method of cultivation, etc., appeared to be the same, I have found that old and young trees were attacked at about the same time, both being injured alike, or the young suffering worst; in other cases the young orchards have been attacked a year or two sooner than the old ones. The reverse of this, *i. e.*, old orchards attacked first, is sometimes true, but on this theory it ought to be true always, or at least very commonly. This is certainly far from being the case. Of the eighteen orchards specially mentioned in this report only four are over nine years old, and a number of them have been set only three, four, and five years.

A general consideration of the way in which the disease spreads appears also to be opposed to the view that it results from soil exhaustion. Within five or six years it has appeared in nearly all the orchards on the upper part of the Delaware and Chesapeake peninsula, and for the last two or three years it has affected tree after tree very rapidly. In that region it is now on all kinds of soil, clay, clay loam, sandy loam, and light sand; on the richest farms and on the poorest; on new and old lands; on impoverished hill tops or hill sides, and in rich bottoms; in young and old trees; in budded fruit and in seedlings; in transplanted trees and in those which have never been moved; in trees crowded, set 20 feet apart, and even forty feet apart; on moist fields and dry ones; on highly fertilized soils and on those which have received a minimum of fertilizers or none whatever. These statements, every one of which I have verified repeatedly in Maryland and Delaware, have also all proved true in the experience of Michigan peach growers, as I know from correspondence and conversation with many of them. Is it probable, or even within the bounds of possibility, that *suddenly* all the orchard lands in whole counties should become exhausted and incapable of growing the peach; capable still, however, of growing excellent corn and wheat, and fine vineyards and pear and apple orchards? The chemical analyses of the peach reveal no peculiarity of composition that would warrant any such belief.

Moreover, in some of the lower counties of the Chesapeake and Delaware peninsula, which have been settled as long and have grown peaches nearly or quite as long, yellows has not appeared, at least not so as to be noticed, although the soil is lighter and less fertile.

Sussex county, Del., in particular, contains large tracts of very sandy land, and is noticeably less fertile than Kent county. Indeed, from Seaford to Delmar, along the line of the railroad, it is almost a barren waste of sandy, scrub-pine country. Corn and wheat will not grow. Melons and small fruits are the principal products, blackberries being the crop which thrives best. Peach trees planted on this land are yellowish, small, and starved, and the orchards seldom live more than ten or twelve years; yet, in the whole region, I did see or hear of a case of yellows. The trees sometimes starve, but do not die of yellows. In many orchards it is also the practice, and has been for years, to double crop the land by planting four or five rows of strawberries or of blackberry bushes between the orchard trees. These strong feeding plants take from the soil much potash, phosphoric acid, and other mineral matters, and the peach trees evidently feel the loss; but not even in any of these orchards could I find yellows, although I tramped patiently over many acres and examined hundreds of trees.

In driving from Seaford to Laurel I passed through an especially dreary country. I have seen nothing like it except in the pine barrens of Michigan. The timber was chiefly second growth scrub-pine or old field pine. The roads were of deep, loose, yellow sand. The wheels settled in over the felloe, and it was not possible to drive faster than a walk. All along the road—in soil, crops, orchards, houses, fences and inhabitants—there was every indication of poverty, and sometimes of a hand-to-mouth fight with starvation; yet no indication of the yellows. Now, in the name of all the chemists, if yellows and starvation is synonymous, why does the disease prevail on the rich loams of Kent and New Castle and not in Sussex?

The better soil north of Seaford is a flat, shallow, gray sand, capable of growing 10 or 15 bushels of wheat per acre, but not nearly as fertile as the clays and clay loams of Kent county. There I saw no yellows, and could not learn that it had ever been in that vicinity, the only suspicious trees being recent imports.

In Maryland a similar parallel might be drawn between the sandy pine lands of Caroline county and the loams and clays of Kent county. Kent is much the richer county, but, so far, Caroline has almost entirely escaped the yellows, while Kent has suffered severely. The more southern counties of Maryland, such as Dorchester, Somerset, and Wilcomico, also contain much poor, sandy land, but yellows has not been reported from that part of the State.

Again, my observation has been that thrifty trees on fertile soil are quite as likely to be attacked as any. In orchards Nos. 2, 10, 14, 15, and 17 of this report the largest, most rapidly growing trees, on the richest parts of the field, *i. e.*, those receiving the drainage, were the first to be attacked. In Nos. 3, 6, 10, and 14 all the trees had made a remarkably fine growth. Orchards Nos. 1, 5, 6, 7, 8, 10, and 14 are on good clay loam soil, capable of growing from 20 to 30 bushels of wheat per acre and 40 to 50 bushels of shelled corn. Many other affected orchards which I have examined are on excellent soil, judging from its appearance, from the growth made by the trees previous to becoming diseased, and from the character of the wheat, corn and other farm crops growing in the immediate vicinity. The same fact has been observed by others repeatedly in Delaware, Maryland, and Michigan. A. S. Dyckman, one of the largest growers at South Haven, Mich., told me that he had a sandy bluff the soil of which had been blown away to the depth of 1 to 2 feet by the winds of Lake Michigan, so that nothing but the sandy

subsoil remained. Peach trees were set in this sand, and made almost no growth for a number of years, but grew and bore peaches when manured. In a rich bottom in the same orchard trees suffered from yellows but none were attacked on the bluff, although the soil was too poor to grow peach trees, or even grass or weeds until it was heavily manured.

There is a general impression that peach yellows is more destructive in orchards planted on land previously occupied by peach trees. This has been ascribed to improverishment of soil. The belief, no doubt, arose from the common observation that in districts long infected and where, so to speak, the disease has become endemic, second plantings decay speedily. In such places I am inclined to think this speedy decay is in some way connected with locality, but do not believe it to be the direct result of impoverished soil. At Odessa, Del., I had good opportunity to observe this. That region was formerly very thickly planted with large peach orchards, which disappeared in the seventies, largely on account of the prevalence of yellows. The more enterprising farmers set new orchards, and in 1888 I had an opportunity to examine them. They are from one to eight years old, and almost without exception those which have been planted over three years are badly diseased; but the orchards set on the site of former orchards do not seem to be worse affected than those set on ground never before in peaches. One of the worst orchards seen is near the Delaware river, on the farm of E. C. Fennimore. The trees are six and eight years old, set on sandy land, clay subsoil, previously occupied for sixteen years by the very productive orchard already mentioned. The old orchard suffered badly from yellows toward the end, and was entirely removed in 1874—seven years before the field was again planted to trees. At the time of my visit Mr. Fennimore was pulling out orchard trees with a span of mules, and I saw large strips from which the trees had been removed in 1886 and 1887. Many of the trees were badly diseased, and a natural inference was that the previous orchard had exhausted the soil. However, the orchard is not more badly diseased by yellows than Nos. 1, 3, 7, 8, 11 and 17 of this report, which are on land never before in peaches; nor is it worse than others which I have seen in Maryland and Delaware on "unpeached" land.

Somewhat farther south in Delaware, where the disease is now obtaining a strong foothold, it does not attack orchards on "peached" land any sooner or any more destructively than those on land never before in peaches. I have observed the same fact in Maryland in a number of instances. Some cases may be cited:

About four-fifths of orchard No. 9 of this report is on land previously occupied by a peach orchard, but this portion has not suffered worse than the rest of the orchard. A portion of orchard No. 10 was formerly in peaches, the trees being removed nine years before the present orchard was set. Nevertheless, this part of the orchard was not attacked any sooner, and has not suffered more severely than other parts. Two orchards near Still Pond, Md., on "peached" land have suffered much less than Nos. 1 and 2 of this report, although they are not far from the latter.

Diseased trees also occur in fence rows and by roadsides at a distance from the orchards, near ash-heaps and piles of stable refuse, the drainage of which they have received, and in gardens, lawns, and city lots. In short, in the badly infected areas I have found the disease wherever I have found peach trees. In the uninfected areas I have found the disease in none of these situ-

ations. Between badly infected districts and uninfected ones there is also a middle ground in which may be found some affected trees or orchards.

These facts are all opposed to the Goessman Penhallow theory. There is, however, a still more serious objection.

If yellows is due to soil-exhaustion, the most convincing proof should be found in localities where the action of other presumptive causes, *e. g.*, contagium, freezing, etc, have been reduced naturally or artificially to a minimum. Manifestly it will not do to accept affirmative evidence on this point from sections of the country where several supposed causes are acting unrestrainedly at the same time, and any one of which may be the true cause. For this reason the whole Atlantic coast may be ruled out, and also a large part of the Northwest. In all this region either the winters are severe, or the disease is not present, or it is allowed to spread without any general, systematic effort to check it. The only localities really suitable for such an inquiry are (1) those parts of the South where the climate is mild and the disease has never appeared, and (2) the peach belt of western Michigan, close to the lake shore, in the vicinity of South Haven, Van Buren county, and in the townships of Casco, Ganges, and Saugatuck, Allegan county, where the yellows law is enforced and where the lake tempers the severity of the winters.

The soil in many parts of the South was "exhausted" years ago, and yet peach trees continue to be comparatively free from yellows, and often live twenty or thirty years. However, as I am more intimately acquainted with conditions in Michigan, I will confine the discussion to that region.

The four Michigan townships named border Lake Michigan for a distance of twenty-four miles, and comprise the most important peach district in the state, the only one at all comparable with the peach regions of New Jersey, Maryland or Delaware. The country has not been well settled more than thirty or forty years, and there is still considerable virgin forest of pine, hemlock, beech, and maple. The character of the soil varies from a light sand to a heavy clay loam. At South Haven, and generally near the lake, it is sandy. Some miles inland, at least in Allegan county, the soil is heavier and more fertile.

In accordance with state law, supported in this region by a very strong public sentiment based on a nearly universal belief in the communicable nature of yellows, diseased peach trees are cut down or dug out and burned as soon as discovered. In this way, on the theory of spread by contagion the infective material, whatever it may be, must presumably be kept at a minimum. If it is developed in the tree it can never be very abundant, for there are never very many diseased trees in existence at any one time. The proximity of Lake Michigan also tends to prevent injury by freezing.

Here, then, the influence of two supposed causes is reduced to a minimum, and the effect of soil exhaustion will, if anywhere, be freed from complications, and in condition to be estimated more nearly at its true value.

The fact that cases of yellows still appear in this region, year after year, in spite of the modifying influence of the great lake, and in spite of the comparatively strict enforcement of the law, would, at first, seem to favor the theory of soil exhaustion, but really does not. Some very stubborn facts stand in the way of the acceptance of this theory. These are:

(1) Yellows is much less prevalent where the law has been strictly enforced. This phase of the question will be considered later at some length under "In-

fluence of legislation," and need only be mentioned here. Of the fact itself I think there can be no doubt.

(2) Yellows has appeared in this region on productive virgin soil, *i. e.*, on land cleared on the original forest within less than a decade, and never exhausted by cropping. This statement is so important that I have been at great pains to verify it, by extensive correspondence, and later by a visit to the region. There seems to be no doubt whatever about it.

(3) Healthy trees can be grown without lapse of time and without fertilizers in the places previously occupied by diseased ones. In this region it is the custom, and has been for ten years or more, to set peach trees in the place of those dug out on account of yellows, and these resets are not more liable to the disease than other trees in the orchard. In fact, from many reliable peach growers in southwestern Michigan I have received straightforward independent testimony showing that trees set in place of those unmistakably diseased by yellows have come to maturity and borne healthy fruit, and are now healthy. Such a state of affairs could not possibly exist, not generally, if soil exhaustion were the cause of yellows or one of the necessary factors in its production.

Granted this fact alone and it would seem that the theory of poverty of soil must necessarily fall to the ground, for if one tree has exhausted the soil so as to become diseased how can another tree be set immediately in the same place and come to a healthy maturity? So important is this matter that I desire to introduce abstracts from some of the more important statements received.

On March 24, 1888, and again April 9 and 16, I sent the following question, or modified forms of it, to peach growers in southwestern Michigan.

QUESTION.

In your experience have you ever succeeded in growing healthy peaches from trees set in the place of those dug out on account of *unmistakable* yellows; *i. e.*, set in place of trees which bore the premature red-spotted fruit, or the starved wiry branches, or both? If you have done so, when was it and under what circumstances, and how long did the trees remain healthy?

To these questions I received the following replies:

ANSWERS.

SOUTH HAVEN, MICH., *March 26, 1888.*

1. I have little personal *experience* bearing upon the question of soil-starvation as a cause of yellows, and I have never planted a tree in place of one diseased; but this has been done to a considerable extent in orchards here, and I have not heard of disease traceable to this cause.—T. T. LYON.

SOUTH HAVEN, MICH., *April 2, 1888.*

2. I have taken up peach trees that had the yellows, and reset in the same places, and have picked peaches from said trees two years and they are perfectly healthy yet.—D. C. LEISENING.

FENNVILLE, MICH., *April 11, 1888.*

3. I have done so *successfully*. I planted an orchard on new ground, and out of that orchard one year I cut twenty trees, adjoining, all of which had *unmistakable* yellows —which showed spotted fruit and wiry fungus growth. The trees planted in the places of those taken out have borne nothing but the best of fruit, showing no signs of yellows, and are still bearing.—J. P. WADE.

In response to a letter asking for more explicit information on certain points Mr. Wade replied again, under date of April 16, as follows:

DISEASED TREE.—SET SIX MONTHS.

(Delaware.)

The twenty trees were dug out in 1882, and young trees planted in same places in 1883.

The forest timber was beech and maple. I had one crop only after clearing before the trees were planted.

The trees were five years old when the yellows was first discovered, with the exception of one tree the year previous.

SOUTH HAVEN, MICH., *April 12, 1888*

4. Perhaps to answer your question simply by saying "Yes," would not be as satisfactory as to give you some brief examples.

I came into this country in 1852, when it was one vast wilderness. After the first two years, having some improvement, and knowing that our neighbors south, at Saint Joseph, were raising peaches, we thought we would try it, and up to this date have raised peaches; have set five different orchards at various times on my farm, and in the first three never saw any yellows. From 1875 have had a few cases of the yellows, but with ax and spade soon cured them. Then the question arose, "Can we set trees in the place where those with the yellows have been taken out?" The question was discussed very thoroughly in our pomological meetings. By some it was thought to be dangerous, but the experiment was made and found successful; and for the last seven or eight years we have taken out the affected trees and the spring following have set in the same place, and have raised as fine peaches as we ever raised, free from any blight.—S. G. SHEFFER.

FENNVILLE, MICH., *April 11, 1888.*

5. We have no trouble in making trees grow in the place where we have taken out trees that had the yellows. I have an Early Crawford tree that I set in the place of one that had the yellows seven years ago, and it has borne fruit for the last four years, and shows no signs of the disease yet. Last season I picked three baskets from it of nice marketable fruit, and it bids fair to have on a good crop the present year.

As far as my experience goes a new tree will grow just as well where you take out a tree that has the yellows as it would if the tree had been in the best of health. You can't set a tree in an orchard of old trees and have it do as well as it would if the trees were all young, as the old trees shade the ground with their wide-spreading tops, keeping off the rain and dew, and with their long roots sap the ground of the nourishment that the young tree needs to make it grow. I think the young tree starves to death.

Two years ago I put in new trees in place of those taken out on account of the yellows. I gave the ground a liberal dressing of leached ashes, and you never saw finer looking trees than these are at the present time—full of fruit-buds and capable of holding from one to two baskets of peaches.—W. H. MCCORMICK.

SOUTH HAVEN, MICH., *April —, 1888.*

6. The first case of yellows in our orchard was in 1872, but I think it was discovered in Rossiter Hoppin's orchard, and perhaps in one or two other places, a year or two earlier. My attention was first particularly directed to it in 1872.

I have practiced setting trees in the places where they have been cut out on account of yellows, some of them badly affected. Have trees in such situations now several years bearing. Several of our neighbors likewise. The main thing is to watch vigilantly, cut out promptly and without mercy. *Stamp out the disease* and guard against infection.

Some of our *best cultivators* have large bearing trees in place of orchards destroyed by yellows. But they are thorough men. Our *careless men* have gone out of the business.—A. S. DYCKMAN.

GANGES, MICH., *April 12, 1888.*

7. Last season was the first time the yellows ever appeared on my place. I had a few cases in my old orchard. I am satisfied, however, that as healthy trees may be grown where diseased trees are taken out as could be grown on the same ground in places where healthy trees of the same age had been grown, provided there is no part of the diseased tree left growing.

No one here, so far as I know, hesitates about planting new trees in the places from which diseased trees have been taken, unless it might be for the reason that the ground had become exhausted.

Hon. D. W. Wiley, of Douglas, Mich., planted five trees in the places from which as many diseased trees were taken, twelve or fifteen years ago, and these five trees are still living, and bearing as well as if no diseased trees had ever occupied the ground.

Capt. Robert Reid, of Douglas, Mich., Rev. A. C. Merritt, of South Haven, and hun-

dreds of others have thousands of trees growing and bearing well on land that was once occupied by trees that had the yellows.—A. HAMILTON.

GANGES, MICH., *April 14, 1888.*

8. I have succeeded in growing healthy peaches on trees set in place of trees removed which showed the first stages of yellows, namely, the premature ripening and spotted appearance of the fruit.

My first experience with yellows was eight years ago. I had one tree which *unmistakably* had yellows. I cut it down as soon as discovered, which was in August, and late in the fall pulled out the stump, and removed both stump and branches, and the following spring set another tree in the same place, which commenced bearing the third year, and has borne a crop every year since, and still remains healthy. I have had from one to a dozen trees diseased with yellows every year since, and have continued the practice as stated above, many of the trees bearing now. Have never yet had a tree show yellows where set in the place of one removed.

I always cut down as soon as the first symptoms appear; seldom have one showing the wiry growth. Have never used any preventatives; always give thorough cultivation through the fore part of the season until about the 1st of August.—A. W. FISHER.

SOUTH HAVEN, MICH., *April 17, 1888.*

9. In answer to your first question I can say *yes*, most emphatically, with this qualification, not "or starved wiry branches." The trees that I have cut out with yellows have nearly always been *thrifty and vigorous*, showing the disease only in the fruit and sometimes only in two or three peaches, while all the rest would be healthy, and often only one or two limbs would be visibly affected. Thorough cultivation has been my practice, and also to take out a tree as soon as it shows the disease. I have bought and set a few trees that never showed anything *but* the "starved wiry," fungus growth, but took them out and burned them as soon as discovered. Had I carried over yellows trees to bear the second season, doubtless I could say yes to the last clause of your first question.

Question 2. [When was it?] I first discovered unmistakable yellows in the fruit of one limb of one tree in my peach orcharding some fifteen years ago. I dug the tree out and burned it before the crop matured. Do not remember as I reset the following spring in this particular case, but did very soon thereafter. Have had yellows ever since, reaching as high as seventy-five bearing trees in a season, and it has been my *practice* to reset the following spring, all these years.

Question 3. [Under what circumstances?] I had read of the disease. The fruit was getting color weeks ahead of the rest of the tree, or others. I believed it to be the yellows, invited my friends to see it, the first of whom unhesitatingly denied its being the yellows, but could only say it was getting prematurely ripe for some reason. He was as inexperienced as myself, and that I was right my subsequent experience proved. A few trees followed the same fate the next year, and for several years I took out and reset from thirty, forty, fifty to seventy-five, and then ran down to fifty, forty, thirty, ten, one, one; and last fall, with four thousand trees set and two thousand bearing, I lost six trees. You will notice that two falls I had but one case each.

Question 4. [How many trees were thus reset?] I cannot give the exact number reset, but I fill every vacancy every spring, and the most of these trees are in bearing, and many of them have been until they are past their prime.

Question 5. [How long did the trees remain healthy?] I am not certain that I have lost a tree with yellows the second time in the same place. Since the orchard reached a large growth, filling vacancies has been, of course, at a great disadvantage to the newly-set trees, but evidently the fact that yellows trees preceded them has nothing to do with it. I apply ashes and a little manure to the soil where the old tree grew for the sustenance of the new; and *for years*, and *last fall*, the tree occupying the ground where I lost my first tree with yellows was heavily laden with healthy peaches, and that is only one among many like it.

Question 6. [What reason have you for thinking that the trees dug out were diseased with yellows?] I need only say that from observation and experience I know the yellows at sight as readily as I do the most familiar varieties of fruit or the difference in different species of trees. The best written description of the yellows is as nothing (in conveying an idea or knowledge of it to a person who has never seen it) in comparison with the certainty of knowledge and ability to detect it (when there are visible signs) that come to some who have a practiced eye by long and interested familiarity with it. —A. C. MERRITT.

DOUGLAS, MICH., *April 18, 1888.*

10. My own experience and that of some of my neighbors has, I think, fully estab-

lished the fact, with us, at least, that healthy fruit has been and can be grown upon trees planted in the place where trees diseased with yellows have been removed.

My first experience in this direction occurred the summer of 1874, when, in an orchard of some four thousand trees, I discovered six trees of the Early Crawford variety, all heavily laden with fruit and standing quite near to each other, showing unmistakable signs of yellows. A part of the fruit on each of these trees was spotted with red spots, the red streaks extending from the surface to the pits. I had those trees dug out at once and burned, and the following spring planted trees in the same places. These trees came into bearing the third and fourth year from planting, and produced fine, healthy peaches, and continued in so doing during the life of the trees.

At the present time I have one tree that bore its first fruit last season, being four years old this spring from setting. The fruit was perfectly healthy. This tree was set in the place of one taken out that had the wiry growth of wood, and had yellows, and no mistake.

From my own experience, and with quite extensive observation as commissioner of yellows for four years, I am strongly inclined to the belief that where trees having yellows are promptly removed and destroyed there need be but little cause for alarm but what we shall be able to furnish healthy and fine peaches for many years yet.—D. W. WILEY.

DOUGLAS, MICH., *April 18, 1888.*

11. In reply to your first question, yes. For three years have been gathering peaches from those reset. Those dug out bore the spotted fruit and had the wiry growth.

2d. [When was it?] In 1878—ten years ago.

3d. [Under what circumstances?] Condemned by the yellows commissioner.

4th. [How many trees were thus reset?] Three hundred.

5th. [How long did these trees remain healthy?] Those reset are healthy to-day.

6th. [What reason have you for thinking that the trees dug out were diseased with yellows?] Because the fruit was spotted, insipid, and some of the trees had wiry growth, and were condemned by the yellows commissioner. The three hundred trees were taken out of an orchard of two thousand trees.

I lost an orchard of five hundred trees, which I reset two years ago, and the trees are doing well.—ROBT. REID.

I made additional inquiries and Mr. Reid replied as follows, under date of April 26:

In answer to your first question [How long after you dug out the three hundred yellows trees before you reset?] The next year, 1879.

2d. [When you reset did you manure these trees or give them any other treatment very different from the rest of the orchard?] Used no manure, but put air-slaked lime on all my orchard. Have manured since. The soil is gravelly—wheat soil.

3d. [In the other orchard of five hundred trees destroyed by yellows, and reset two years ago, how long a time intervened between the digging out and the resetting, *i. e.*, what year did you dig them out and what reset?] Three years. Dug out the last in 1883; reset in 1886.

4th. [Have you used potash or any special fertilizer on the trees reset two years ago in place of the five hundred, so that this might possibly account for their healthy appearance?] Have used air-slaked lime on them also. I followed, as near as I could, the directions found in John Rutter's book on Peach Yellows.

DOUGLAS, MICH., *March 16, 1888.*

12. I have trees growing, that were planted where trees having the yellows were taken out, that have borne healthy fruit three years and show no signs of disease.—JAMES F. TAYLOR.

Finally, the recent admission by Professor Penhallow that restored trees are liable to a relapse; the statement by Henry Race, of Pittstown, N. J., that trees can be reclaimed only when the disease is in an "incipient" state; the statement by Charles Black, of Hightstown, N. J., that badly diseased trees cannot be cured, and the universal New Jersey practice of removing diseased orchards when they are only six or eight years old, would seem to warrant the belief that the potash and phosphate treatment, which has been most vigorously championed in that State, does not really cure peach yellows, or even prevent it.

In regard to "incipient" yellows, I must acknowledge that I cannot detect it with any degree of certainty. Others are probably as helpless. I am sure of my diagnosis only when I find the symptoms previously recorded as characteristic of yellows, and then the disease is no longer "incipient," If we are to discuss this subject intelligently, we must know beyond any question that we have in mind the same malady.

I have given more attention to the Goessman-Penhallow treatment than to any other because it has been more prominently before the public, and becawse it seemed to offer more reasonable hope of success than any other. However there is no end to so-called remedies. If we may believe published statements, peach yellows has been cured by stable manure, urine, house slops, lime, gas lime, wood-ashes, potash, chlorate of potash, saltpeter, ground bone, bone-black, hot lye, hot soap, hot water, fishbrine, fish compost, and various other commercial fertilizers, especially those compounded of muriate of potash and dissolved bone-black, and sold under the name of "Peach Tree Fertilizer," or "Peach Yellows Remedy." Some manufacturers have also advertised such fertilizers as possessing the property of germicides. All such statements are false and misleadiug, and are not made in the interest of peach growers.

WET AND RICH SOILS.

In some orchards which I have examined the disease was unquestionably worse in bottoms and sags, which receive more or less drainage from other parts of the field and are naturally richer and moister. as shown by the appearance of the soil and by the larger growth of weeds and trees. It is less apparent on Map VII, but this may be owing to the fact that on two sides of that orchard in the near vicinity are older trees badly diseased for some years, and from which this orchard may perhaps have been infected, if it did not bring its infection from the nursery. However, the disease does not always start in the lowest part of an orchard, and is by no means confined to sags and bottoms, as the maps show clearly enough. Even in the same orchard, where it affects bottoms, one may be taken and the other spared. Orchard No. 12 of this report affords a striking illustration of this. It contains two shallow sags of about the same area, and of the same general character, as determined by soil, moisture, weeds, and the growth of trees. If anything, the northwest sag is a little moister and less fertile. The same weeds grow in both, but in 1888 the weeds were observed to be a little ranker in the south sag. The northwest sag is planted with the Beers' Smock. The south sag is planted with trees purchased for Salway, but which seemed to me identical with Beers' Smock. The northwest sag contained no disease trees in 1887 and only one appeared in 1888, that one being on the outer edge. In the south sag, in 1887, which was the first year of attack, I found eleven trees badly diseased by yellows, and eleven months later, when the orchard was re-examined, I found ten additional cases in that sag and on the dry ground immediately surrounding it. Most of the Crawfords which became diseased in 1888 were also near this bottom. Had the diseased first appeared in the northwest sag, I have no doubt the conditions in 1888 would have been reversed (see the marked tendency toward grouping exhibited on the maps). The general opinion among prominent peach growers, both on the Chesapeake and Delaware peninsula and in Michigan, is that the disease is more likely to

appear first in bottoms and rich places. This coincides with my observations.

The effect of moist spots, as well as of excessive rains, has been ascribed to the dilution of mineral constituents in the earth fluids, whereby the tree starves in the midst of plenty. Another explanation is that root fungi and various micro-organisms thrive better in such situations I have at present no theory to offer.

NEGLECT OF CULTIVATION.

This was once a favorite explanation of the disease, particularly with writers who never went abroad, but evolved truth from their inner consciousness. In recent years, however, I have heard it asserted that trees left in sod and otherwise maltreated where the only ones free from disease. There is no truth in either assertion, or rather each is only a half truth. Many orchards in Maryland and Delaware are kept entirely free from grass and weeds and are cultivated more thoroughly than the corn fields; but cultivation from early spring to middle summer, or even all the year round, has not been able to prevent the appearance of yellows, or to hold it in check. Many orchards which have received the utmost attention have become badly diseased. On the other hand, neglected orchards are by no means free from the disease. I have seen it in a number of such orchards; *e. g.*, in 1887, at Still Pond, Md., in a small old orchard owned by J. Frank Wilson. This had been in sod and used for a sheep pasture four years, but contained quite a number of recently diseased trees. Again, in 1888. on the farm of G. M. Eldridge, near Cecilton, Md., I saw many diseased trees in an old orchard used as a pasture. This orchard has been plowed only once in six years, and that was some time ago. The diseased also occurs frequently on lawns and grass plots never plowed or otherwise disturbed, and I have moreover seen it in trees on soil entirely free from vegetation and packed hard by the daily tread of many feet.

NEGLECT OF PRUNING.

This was a favorite theory with A. J. Downing. He advised the shortening in of the bearing wood one-half every spring. If the trees came from an originally healthy stock he believed this would keep them healthy. There is, however, no good reason for believing it would. S. H. Wilson, of Baltimore county, Md., claims to have tried it faithfully with no success. I can not from my own observation furnish any testimony on this point.

EXCESSIVE USE OF NITROGENOUS MANURES.

The belief that the spread of yellows is favored by the use of animal manures is quite prevalent, and appears to have some basis in fact. One of Dr. Henry Ridgely's orchards which blighted most rapidly with yellows was very highly manured. The McDaniel orchard was also twice very heavily manured soon after being set. The Price orchards Nos. 2 and 3 of this report, have also been freely and repeatedly manured. In particular a narrow strip, of perhaps one-half acre, on the northeast side of No. 2, which contains some stones and was believed to be less fertile, received great quantities of dung, and there I found nearly every tree diseased by yellows.

Orchard No. 1, however, has received no manure, except two loads on one spot. Moreover, in uninfected localities, I have seen orchards which have been heavily manured, and they were healthy. The general tendency of nitrogenous manures is toward the excessive production of wood and foliage.

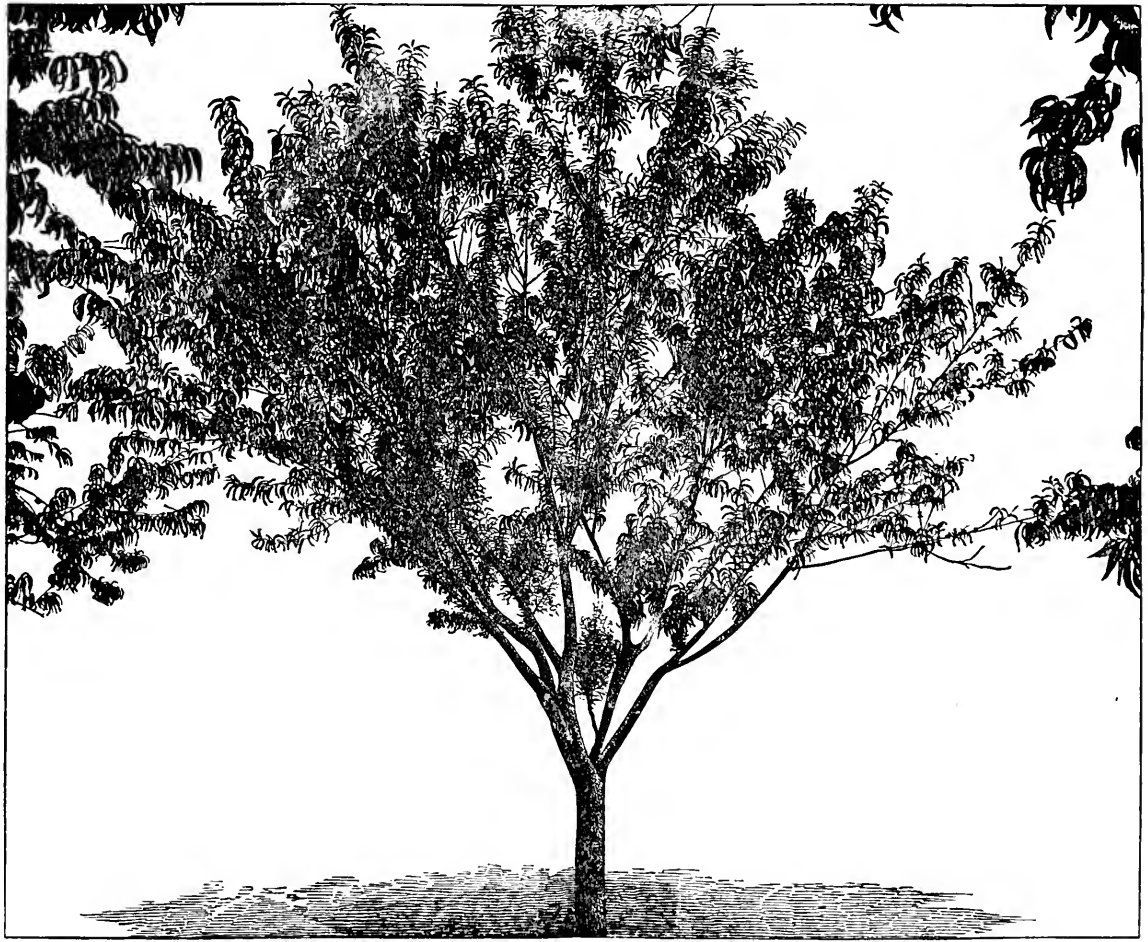
Summing up the evidence, I am inclined to think that, in infected districts, nitrogenous manures have a bad influence, but to what this is due I am unable to say.

DEGENERACY DUE TO CONTINUED PROPAGATION BY BUDDING.

A sufficient answer to this is the statement that yellows affects seedling trees no less destructively than budded ones. This I have verified repeatedly. Seedlings are not exempt, and I have not been able to show that our oldest varieties are any more subject to this disease than those but recently originated. My examinations in over two hundred orchards have led to no positive result. All varieties appear to be subject in like degree when all other conditions are the same. In some orchards, indeed, certain varieties were much worse affected than others; but often the very next orchard would furnish contradictory evidence—*e. g.*, in No. 1 of this report, Christiana was most badly diseased, while in No. 4 this variety had suffered very little. In No. 2, Mountain Rose is badly diseased; in Nos. 4 and 5, this variety is scarcely at all affected. In No. 5, Early Rivers suffered much in 1887 and previous years; in No. 12, not at all until 1888.

Even in the same orchard other things than variety control the spread of the disease. This is quite different from what occurs in many diseases due to fungi, where the limiting effect of variety is very sharply marked. In peach yellows, no matter which variety is first diseased, all become affected alike in the course of a few years. Neither is it true, as some have asserted, that the variety which shows the disease first is always the first to become badly affected. In orchard No. 5 yellows first appeared, in 1885, in one tree in the Mountain Rose variety. This was removed in the fall, and no more affected trees appeared in that variety until 1888—then only three. Other varieties, however, were affected in 1886 and 1887, some quite badly.

Knight, Von Thümen, and some other European writers have insisted that continued propagation by buds, cuttings, etc., leads to degeneracy, and there is a very general impression among farmers and fruit grower that varieties "run out." This theory is not wholly unreasonable, and yet a vast amount of careful experimenting must be done before it can be said to rest on any broad basis of well-established facts. Propagation by budding secures the continuation of a variety for an indefinite period, but this is the ordinary method of reproduction in some of the lower plants, and is something quite different from inbreeding. We know by direct experiment that the latter is injurious, but our knowledge of the effect of continued budding propagation is largely guess work. It may produce deterioration, but there is no unimpeachable evidence that it does. In the higher animals there is a distinct individuality, but in some of the lower animals and in plants it is difficult to decide what constitutes an individual. Strictly speaking, we cannot take an anology from the animal world and say that budding perpetuates an individual indefinitely, and must therefore lead to superannuation. If we are to use this term at all, it would probably be best to restrict it to each new-formed bud, in which case there certainly could be no such thing as superannuation.



TREE IN SECOND YEAR OF YELLOWS. (Delaware.)

The other logical extremity is that taken by Prof. Huxley in his discussion of the non-sexual reproduction of aphides, etc. According to this view all the Crawford's Early or Old Mixon trees in existence are parts only of one individual. These opposing views appear to be about equally absurd.

PROPAGATION BY MEANS OF IMPERFECT OR DISEASED PITS.

There is undoubtedly some reason for believing that the disease is propagated by diseased pits. I cannot state positively that trees grown from premature peaches will develop yellows, but I think it likely. There can be no doubt that such seeds have an enfeebled vitality, and it is not likely that they will give rise to robust trees. How great the danger may be from this source I am unable to say. Some experiments of my own lead me to think it is overestimated. Exact experiments to determine this point have not been very numerous.

Some years ago G. H. La Fleur, a well known nurseryman at Mill Grove, Mich., made a number of trials to determine this. In his first experiment he obtained a few sickly looking seedlings from pits taken from trees having the yellows. The growth was not to exceed 10 inches. They had the appearance of unhealthy trees, and were pulled and burned. In his next experiment he planted in the fall, without cracking, a peck of pits taken from trees having yellows. None grew. The next season, 1881, he obtained a peck of pits selected with great care from fruit showing yellows plainly. These were placed in sand in the fall, in the same manner as he treated healthy pits. In the spring he cracked them himself, and found only one in a normal condition. All the others had turned black or dark colored, and were mostly decayed. The one pit which had the appearance of being sound was planted, but never came up.

Premature pits also failed to grow for Mr. H. E. Bidwell and Dr. J. C. Arthur.

In August, 1887, on the farm of T. J. Shallcross, Locust Grove, Md., I saw about thirty seedlings planted by themselves in a garden and said to have grown from premature peaches. Mr. Shallcross himself gathered and planted the pits. The trees were somewhat smaller and seemed of a lighter green than those in the nursery rows, but were apparently healthy. The under size was thought to be accounted for by the fact of a late spring planting, pits being usually put out in the fall. Part of these seedlings were inoculated in my presence with diseased buds, part with healthy buds and the rest were left unbudded. In the spring of 1888 some of each sort were sent to me at Hubbardston, Mich., along with several hundred other trees, and set upon my father's place. The packing was admirably done, and all the trees were in excellent condition, except those which grew from the diseased pits. These did not appear to have suffered in transit, but were, nevertheless, in a very feeble condition, having not wintered well. Twenty-three of these trees were received, and 19 were carefully set under my own direction, but when examined in June all of them were dead. Three were not considered promising enough to set. Of the other trees set at this time only an exceedingly small per cent. had died.

From field examinations I am also reasonably confident that seedlings sometimes grow from premature peaches, having seen them under diseased trees

so many times as to make it improbable that all of them grew from chance healthy pits.

Nevertheless, from my own experiments, I think it is certain that a great part of the premature fruit will not produce seedlings. In the autumn of 1887 I carefully selected the pits of 2,070 premature peaches. Thomas J. Shallcross, of Locust Grove, Md., and Smith & Brother, of McAllisterville, Pa., also collected for me, making a total of 3,104. These pits were sent in small lots to trustworthy persons to determine what per cent. would develop into diseased trees. Most of these pits were planted out in the fall, as in ordinary nursery culture.

Prof. Smith gives in tabular form the result of experiments with these pits, sent to fifteen persons in Maryland, Pennsylvania and Delaware. In one case only 5 out of 357 grew; in another, 8 out of 175; in a third, 2 out of 525, all of these 15 producing apparently healthy young trees. In each of the other eleven cases not a single pit germinated.

Mr. Smith resumes:

My own collections and transmissions were made with the utmost care, so that no mistake might occur. None but premature, red-spotted peaches were gathered, and in most instances these were of normal size, and from trees which manifested no symptoms of disease till 1887. The collections by Mr. Shallcross and Smith & Brother were from young trees recently diseased, and were made, I believe, very carefully. It seemed, therefore, that these pits must be in the best condition for growing. The results show that only about five-tenths of 1 per cent grew. Of my own collecting only two grew, *i. e.*, less than 1 in 1,000. Judging from these experiments a majority of premature peach pits will not grow. I also infer this from the fact that many which I have cracked and examined, especially those from trees diseased more than one season, either contained no kernel, or one with a dead embryo. If this holds good for all localities and seasons, then one supposed source of danger is greatly lessened. However, it will not do to base a sweeping conclusion on the experiments of a single year. They should be repeated several seasons on a large scale.

It is also possible that enfeebled seedlings may grow from peaches borne on the yet apparently undiseased portions of affected trees. No experiments have been made to determine this point, but in the present state of our knowledge it is certainly wisdom to procure pits from uninfected districts or at least from orchards containing no diseased trees. In this way one possible source of danger will be avoided. Many nurserymen now procure seed for nursery stock from infected districts. In such cases there is always a liability of getting pits from diseased trees, even when the greatest care is used, and this liability is largely increased when the seed is bought indiscriminately from dry-houses and canning establishments, with no previous inspection of the fruit. There can, I think, be little doubt that a majority of the diseased orchards in New Jersey, Maryland and Delaware were budded on seedlings grown from pits collected in districts where yellows prevailed. I know this to be true of many orchards. A portion of even the so-called "natural" or "Tennessee" seed is grown on the Delaware and Chesapeake Peninsula and fraudulently sold to nurserymen for the genuine article. Sometimes this spurious seed is shipped to Tennessee and then reshipped to points farther north; sometimes it never gets any farther south than Philadelphia or Baltimore. I have this information from several reliable sources. I do not know

how one can be certain of procuring genuine Southern pits from unbudded trees unless he collects them himself, or deals directly with Southern men of well established character. Moreover, in recent years, the demand for this kind of seed has probably exceeded the entire available product of the small unbudded orchards of Tennessee and other Southern States. In the South as well as in the North the large orchards are of choice budded fruit. Finally, granting that some pits are genuine and come from Tennessee, there is in this fact no absolute guaranty of safety, because yellows probably occurs to some extent in that State, and is nowhere restricted to budded fruit. Nurserymen will probably do best by personally inspecting orchards in fruit season and selecting pits from such as are entirely healthy. If these orchards are in regions where yellows has not appeared, so much the better. Nurserymen have received much harsh criticism, but as a rule I believe them to be an enlightened and honorable class of men, ready to adopt any methods likely to be for the interest of their patrons. Quite often I have found them better informed on horticultural questions, yellows included, than any other persons in the community.

DISEASED BUDS.

Can yellows be transmitted by budding? This question has an important bearing on the ætiology of the disease. If it can be answered in the affirmative, I do not see how it is possible to avoid the conclusion that yellows is a contagious disease.

So far as I know, William Prince was the first to assert that peach yellows can be spread in this way. That was in 1828. He states explicitly that a healthy tree when inoculated from a diseased one becomes itself diseased, but he does not state when, where, or by whom this was observed.

In the spring of 1831 Noyes Darling, a most careful observer, inoculated a healthy young tree with a bud from a diseased one. The bud died and the stock remained healthy. The evidence in this case is simply negative.

In 1841 Robert Sinclair, another careful observer, states that on one occasion, before he had a nursery, he inserted into healthy peach stocks twelve buds from a favorite, early purple peach, which he suspected of yellows but desired to preserve. The buds were taken from the healthiest branch, but when they had grown about three feet they showed the disease so plainly that they were pulled and burned.

In 1842 or 1843, discussing yellows in his "Catalogue," A. J. Downing states that it may be transmitted from infected trees by grafting or budding, but we are not told whether this statement was a result of his own observation. Mr. Downing often appropriated and digested the statements of other men without credit, and this may have been an instance of that kind.

In December, 1844, Noyes Darling, who had been making additional observations and experiments since 1831, reported again as follows:

> If a bud from a diseased tree is inoculated into a healthy stock, whether peach, apricot, or almond, the stock will become diseased and die. * * * I took some buds from a tree having symptoms of yellows, and inserted part into peach, part into apricot, and part into almond stocks. Some of the inoculations took well, but all showed marks of disease next season. The peach and almond stocks with their buds died the second winter after inoculation. One apricot stock lived five years, but its peach top grew in that time to be only about three feet high.

It is to be regretted that some account of the symptoms which preceded

the death of these trees was not given. This would have made a more complete case.

Two or three years later a writer in The Farmer and Mechanic states that from his own observation and experience he is led to believe that the disease has been aggravated and spread by budding from trees containing incipient seeds of the disease not yet externally developed. A bud may be taken from a tree which is apparently sound but not really, and after a time both trees will become affected.

In 1849, S. W. Cole, an unusually careful writer, states that "healthy trees, inoculated with buds from diseased trees, soon become affected also." He speaks guardedly on most points, but dogmatically on this one—says it is a "well-established fact."

In 1853, J. J. Thomas, another careful writer, says of peach yellows, "It is quickly induced by inserting the bud from an affected tree into a healthy stock."

Dr. F. S. Dunlap states that from experiments in his garden and on his farms, principally between 1865 and 1886, he is perfectly sure that yellows can be transmitted by budding. He has inoculated from twenty-five to thirty trees in different years, "with buds taken from yellows trees with the result, invariably, of giving yellows to the tree budded." The inoculated trees grew from pits of "natural" fruit procured in North Carolina, Virginia, Tennessee and Kentucky.

Dr. Henry Ridgley is also authority for the statement that yellows may be produced by budding. Many years ago, when not so well acquainted with yellows, he inoculated quite a large number of seedlings with buds procured from a tree which bore choice looking prematures. All these trees died of yellows within a few years. None lived long enough to bear fruit.

Hon. T. T. Lyon also states that when yellows was first introduced into Michigan it was budded into seedling trees and distributed in this way. At Benton Harbor, an early Crawford tree, imported from New Jersey, ripened its fruit in advance of the usual season of that variety. "In ignorance of such disease this was treated as a sport, and the tree was literally cut in pieces to supply buds for propagation."

In 1882, G. H. La Fleur, of Millgrove, Mich., undertook to settle the infectious nature of yellows by experiment. Concerning his experiments he writes as follows, under date of September 30, 1887:

> The following August (1882) I budded thirty-two sound stocks to buds taken from a tree showing yellows in the fruit but not in the tree itself. Eight of the buds started the following spring. Four only started one-half inch to one inch, and then failed to grow and soon died; one bud grew three inches; one a little over four inches; two buds grew eight and ten inches high; all turned yellow and looked sickly. In August of the same year I pulled up the trees and burned them. After doing this it occurred to me that the stocks should have been left in the ground to grow, to test the question as to whether yellows could be communicated to healthy stocks by inserting diseased buds. I hope you will test thoroughly this last point, as that is of great importance to know. If the disease can be communicated to healthy stocks by inserting diseased buds, that fact would prove yellows to be a contagious disease and not the result of starvation or any lack of elements in the soil.

In this case an opportunity was certainly lost. Had Mr. La Fleur left the trees for a few years, he would have learned beyond question whether yellows can be communicated to the stock by the insertion of diseased buds. This is the very gist of the inquiry. A diseased bud could not be expected to make a very healthy growth, and yet it might not transmit disease to the stock.

PEACH YELLOWS.—RESULT OF INOCULATIONS.

If it did, it would, as Mr. La Fleur states, be good proof of the contagious nature of yellows.

I have presented as strong an array of testimony in favor of this belief as I could find, yet, in a scientific sense, it must be confessed to be stronger by virtue of the names cited than by the circumstantial nature of the statements. In studying these statements critically it seemed to me there were broken links in the chain of evidence, and chances for error. Most of the statements left much to be desired in the matter of detail, as to when, where, and under just what circumstances these results were obtained. I was the more inclined to doubt some of these statements from the well known fact that errors often pass current from writer to writer, unchallenged for decades, especially when first expressed dogmatically by some strong man.

My own experiments were begun with a view to throwing light on some of the uncertain points, especially on the question of whether the disease could be transmitted from inserted buds to healthy stocks. I had no well established belief that the inoculations would succeed, but had a strong desire to confirm or invalidate the statements already made. Every precaution was taken to avoid sources of error. I collected the buds myself from the trees which bore premature red spotted peaches and the characteristic diseased shoots; carried them to the nurseries; watched the operation of budding; and staked off and recorded the location of the trees. The nurserymen on whose grounds these trees were budded also made proper entries in their books so that when the trees were removed there could be no possible mistake. The examinations in 1888 were made by myself unless otherwise stated.

The inoculations were made in August and September, 1887, in Maryland and Delaware. Nearly one thousand healthy trees, five or six months old, were inoculated with the diseased buds as in ordinary budding, and five hundred similar trees were reserved unbudded for comparison. In the spring of 1888 part of these trees were sent to experiment stations or private individuals, and the rest were left in the nursery rows.

When examined in June, 1888, lot III gave evidence of disease, but owing to the fact that all of the trees were badly dried in transit and had made but a feeble growth, I did not feel like using this lot as the basis for argument, unless further developments should fully warrant me in doing so. Not having seen these trees since June, I am unable to report exactly their present condition. The same remark applies to lots IV and VI, which I have not seen since they were budded.

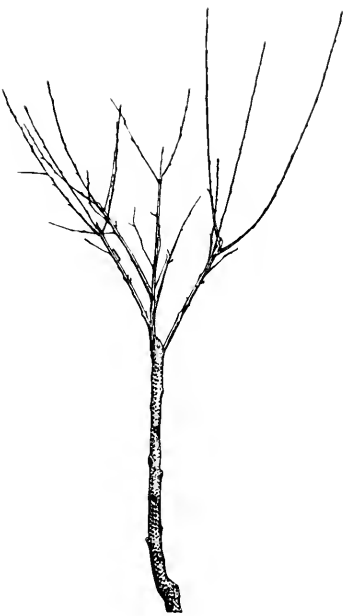
Neglecting, therefore, all trees which were unfortunately dried in transit, or were not personally examined, or in which the disease may have been derived from the stock, we have left for special consideration in this connection lots I and II. These give unequivocal results.

Lot I, inoculated with buds from characteristic shoots of robust young trees in the first year of the disease, was left in the nursery where budded. The trees were budded in August, 1887, and were examined in August and November, 1888. Most of the inserted buds "took," but only about one-fourth of them grew. Some of these buds developed into shoots which appear to be healthy, and some into diseased shoots. In a few cases the inserted bud developed in a normal way, but the stock became diseased. This was also the case with some stocks on which the inserted bud "took" but did not grow. The infection, whatever it may be, was transmitted from the bud to

the stock in about forty per cent of the inoculations, *i. e.*, the previously healthy stocks contracted the disease from the inserted buds and sent out feeble, wiry growths, often at a distance of some inches from the inserted bud. This was the point I most desired to establish, because, as already stated, I thought it likely that the inserted buds might grow into diseased shoots and the stock still remain healthy. The evidence of this infection of the stocks could be seen in July, was clear in August, and still plainer in November, when nearly all the winter buds on some of the stock shoots were just pushing under the influence of the disease. Even as early as August 26 per cent of the infected stocks were dead, and others, then languishing, were dead in November.

Of the entire lot of two hundred trees, only thirty-nine appeared to be entirely healthy in November. From the foregoing table it will be observed that even in August a very unusual number of the trees were dead, and in November the condition of the trees was still worse, less being healthy and more being dead. Early in the season many of these dead trees had put out feeble shoots from the inserted bud or the stock, but these grew only from one-half an inch to three inches and then died. A June examination would have shown fewer dead trees and a much larger number of apparently healthy ones. Even in August the trees marked doubtful and diseased showed a green and thrifty top, and at a distance gave no more indication of disease than do older trees in the first stage of yellows. As a rule, however, their growth was not as robust as that of trees in the adjoining rows. These neighboring trees are of the same age and stock, and were budded at the same time, but from healthy scions. The contrast was very striking, and the comparison left no doubt whatever that in this case the disease was due entirely to the insertion of the unhealthy buds.

Lot II, inoculated with buds apparently healthy, but taken from a tree on which were some limbs in the first stage of the disease, was sent to a locality free from yellows. Up to the last of June only one tree showed any suggestion of disease and this was doubtful. Unfortunately, these trees were not examined in the autumn, and their present condition is not known. It is quite possible that they have already developed yellows, or that they will do so after some years. No nurseryman would ever use such diseased and imperfect buds as I inserted into lot I, but the buds inserted into lot II appeared to be well developed and perfectly healthy, and might have been selected for ordinary budding by a careless or unscrupulous man. The future of these trees will therefore be watched with the greatest interest, since it may throw additional light upon the manner in which the disease is distributed. A point very interesting in connection with this discussion is whether trees of the same age and same variety, and from the same nursery, are entirely healthy in one locality and badly diseased in another. I have made some observations on this point, but not enough to be able to speak positively. The evidence, however, favors the belief that such trees are often healthy in one locality and diseased in another, and if further inquiry substantiates this conclusion, it will be an additional reason for thinking that yellows is not always to be attributed to the nursery, but may also spread in other ways. My own view at present is that the first affected tree in any district is always an introduced one, but that when once introduced the disease spreads from orchard to orchard irrespective of the origin of the stocks or buds.



PEACH TREE.—SET TWO YEARS.
Stunted by Root Aphides.
(Maryland.)

SPREAD OF THE DISEASE BY INFECTED PRUNING KNIVES OR SAWS.

Many persons have asserted that the disease may be propagated in this way. I have no positive evidence on this point; and no experiments have yet been undertaken to settle it, owing to the great amount of work involved in the other examinations and experiments here set forth.

This experiment should be tried carefully on registered limbs in an uninfected district, or if in an infected one then in a larger number of trees and in as healthy an orchard as can be found.

NURSERIES NOT RESPONSIBLE FOR ALL OF THE OUTBREAKS.

On other grounds than those already set forth, I am confident that neither sound stocks nor healthy buds will entirely protect from yellows. The disease does not all come from the nursery. It must have some other means of dissemination. The following are my reasons for this belief:

1. In the infected districts I could not satisfy myself that the trees of one nurseryman were more subject to yellows than those of another, although I took great pains in many instances to trace the history of the trees, especially if they were young ones.

2. Some experiments with stocks and buds of a known character seem to show this quite conclusively. In orchard No. 11 of this report special pains was taken to secure healthy trees. This orchard was budded and planted by Walter Morris, cashier of the Farmers' Bank, Dover, Del. He procured the seed from a load of healthy natural fruit, brought into Dover and sold to Mr. Richardson in a year when there was a great scarcity of peaches. They were budded next year, Mr. Morris selecting the scions himself from a healthy orchard which hung very full of fruit. The yellows first appeared in this orchard about four years ago, *i. e.*, four years after budding, and spread very rapidly in 1886 and 1887. I came across a similar case on the farm of S. H. Derby, near Woodside, Del. Mr. Derby selected the pits himself from a very thrifty-bearing orchard, free from yellows, and cut the buds from healthy trees in an orchard where yellows was unknown and where it did not appear until recently, *i. e.*, within the last three or four years. This orchard contains about 10 acres and is nine years old from the bud. The first premature peaches appeared in 1886, *i. e.*, six years after budding and several years after the orchard had fruited. In 1887 I saw many diseased trees in this orchard, and there were new cases in 1888.

3. The fact that orchards frequently make a vigorous early growth and then bear peaches for fifteen or twenty years, often in enormous quantities, before showing symptoms of yellows.

It seems almost impossible to believe that trees, which are the picture of health when young, and which continue to appear vigorous for three or four years, contain within themselves, in a dormant state, all the elements of disease, yet such is the case, if the yellows is propagated only by diseased stocks and buds. For the sake of argument, in the absence of direct proof to the contrary, it may be admitted that trees which premature their first fruit have in every instance been diseased from the beginning, no matter how healthy they appeared to be. But what shall we say of trees which succumb after having borne several crops of healthy peaches? It is extremely doubtful whether such trees contracted the disease in the nursery. Finally, it passes the bounds

of probability that a germ or anything of kindred nature should remain dormant in a tree fifteen or twenty years, that tree meanwhile being taxed to its utmost in the production of fruit, and often exhausted and injured by over production.

There can be no reasonable doubt that in orchards over five years old the disease is due to some unknown local influence, and not to anything on or in the trees when procured from the nursery. I am the more inclined to this view from the fact that when symptoms of yellows are once manifest in any branch the whole tree becomes involved in a comparatively short time; *i. e.* within one or two years. In other words, the disease is virulent, and does not remain dormant in one branch very long after it has appeard in another.

INJURIES BY MEN OR QUADRUPEDS.

A belief, current in some parts of the country, attributes yellows to any severe injury of trunk or roots, such as might be made by careless cultivation, or by rabbits, mice, etc. This belief arose, no doubt, from confounding a yellow appearance of the foliage with genuine yellows. These injuries are all on a par with those inflicted by the peach tree borer, and what I shall say about the latter will apply to these also.

INJURY BY BORERS.

Tho larvæ of *Ægeria* devour the inner bark of the peach, usually at or just beneath the earth's surface, often entirely girdling the tree. This insect is much more common than *Scolytus*, which I have not observed upon healthy trees, and is the only one worth mentioning in this connection.

Borers are so common and so destructive to the peach tree, and have so frequently been accused of causing yellows, that, while I had no faith whatever, I nevertheless gave particular attention to this theory both in 1887 and 1888. My observations show clearly that while they kill or seriously injure many trees, especially on sandy soil, they have nothing whatever to do with the yellows. Some of my reasons for this conclusion are as follows:

1. Borers have been prevalent for many years, and often very destructive in localities where yellows has never appeared; *e. g.*, Washtenaw county, Mich.; Accomac county, Va.; Sussex county, Del.

2. Borers are much more prevalent on sandy soil than on heavy loam or clay. But yellows is equally destructive on the latter. I observed this fact repeatedly in Maryland and Delaware. Those owning orchards on sand are obliged to search for borers once or twice each year. Those whose orchards are on clay often neglect to "worm" their trees for several years together without evil results.

3. In 1887, in orchard No. 6 of this report, I found the collars and crowns of many trees had never been injured in the least either by borers or by bruises of any sort; yet these trees were suffering from yellows. The earth had been dug away from about one thousand trunks on the east side of the orchard, preparatory to the annual search for borers, but so few were found, that it was not thought worth while to examine further. Almost the only injuries I saw were small hacks made in removing the earth. Moreover, the foliage of the orchard nowhere gave any evidence of borers, and I was informed that this insect had never been troublesome. Notwithstanding this

fact, three hundred and fourteen trees became diseased by yellows in 1887, and an additional three hundred in 1888.

4. In 1887, in orchard No. 7 of this report, I very carefully examined the collar and trunk roots of seventeen trees which were suffering from yellows. Six had been severely injured, by borers or bruises; nine had been slightly injured; and two had never received bark injuries of any sort. Healthy trees in the same orchard were also found to be injured by borers and bruises; while those diseased by yellows did not seem to be affected proportionately to the extent of the injury.

5. According to Mr. William Hudson, orchard No. 8 of this report was never much injured by borers.

6. In 1887, in orchard No. 12 of this report, I found seven trees unmistakably diseased by yellows which had no borers and never had any, and had never received injuries of any sort on the trunk, collar, or trunk roots.

7. In 1887, in the southwest corner of orchard No. 14 of this report, six healthy and six diseased trees were very carefully examined for borers and bruises. Four of the diseased trees were entirely free; two were slightly injured. Four of the healthy trees were entirely free; two were slightly injured. In 1888, three of the six healthy trees became diseased. These were three of the four trees which had never been injured. The entire orchard appeared to be very free from injury by borers. The trees were "wormed" in August, 1884, 1885, and 1886, but not many borers were found. None have been allowed to remain in the trees.

8. The two old orchards of Charles Wright, Seaford, Del., have suffered severely from borers for years, but yellows has never appeared. He now examines his trees twice a year, and says he would lose them if he did not. This year out of some trees he took as many as twenty borers.

At E. B. Emory's, in Spaniards' Neck, Queen Anne county, Md., a region yet almost entirely free from yellows, I saw a few trees which might throw doubt on the relation of borers to yellows were it not for the facts already cited.

In a block of five hundred trees, first examined in 1887, I found two or three hundred which were more or less dwarfed and sickly looking. Several of these trees were suspicious, but I saw no premature peaches, and could not say positively that any were suffering from yellows. The remainder of the block looked healthy, as did all the rest of the orchard, and all the other orchards on that farm and on all the farms in the Neck. Some of the trees had suffered from borers, but after examining sixty I came to the conclusion that only a very small percentage had been seriously injured. In forty-two I found no indications of borers; but in this case my examination was not exhaustive, and I may have overlooked some. These trees may also have suffered from root aphides, as they came from a region where the nurseries were badly injured by this insect some years ago. Anyway this block, in the middle of an otherwise healthy orchard, presented a very striking contrast. The trees on each side were of the same age, but procured from other localities.

In the fall of 1887 or spring of 1888, thirty or more of the worst of these trees were cut back so that nothing remained save the trunk and the stubs of the main limbs. When examined in the summer of 1888, I found some healthy; some dead; and some diseased in the following way: The stubs of the limbs of twelve trees were covered with a pale, yellowish green much branched

dwarfed growth. Six of the most badly affected trees were dug out and examined very carefully. They were all much dwarfed, the trunks at the collar being only about 3 inches in diameter, although four years old (five years from bud). I saw no root aphides, but each of these six trees was very badly infested by borers. From one trunk I removed seven, and from none did I take less than two. Three of the trees were entirely girdled; two were very nearly girdled; and the other had sound bark on less than one-third of its trunk circumference at the collar.

This is the only instance discovered where a growth strikingly like yellows, if not identically the same, seemed to be closely associated with borers. The evidence in this case is, of course, not conclusive. I had my doubts about some of these trees in 1887, and revisited the orchard to settle them. Moreover, in 1888, in this block I found undoubted yellows in one tree, a small Mountain Rose replant of 1887, or possibly 1886. This bore spotted, premature peaches but healthy spring foliage and no diseased shoots. I also saw yellows in another young orchard in that vicinity which I know to have been free in 1887.

INJURIES BY ROOT APHIDES.

An aphis corresponding nearly to Koch's figures and description of *Aphis Chrysanthemi* is frequently found upon the roots of peach trees, especially in New Jersey, Maryland and Delaware. It is, I think, identical with a form occurring upon the shoots and young foliage. This, however, I have found only twice in two years, and then but sparingly, and not in the perfect state. No one appears to have collected the winged insect, and it is possible it may prove a distinct species.

This insect has been known to New Jersey peach growers more than fifty years, and has been on the Delaware and Chesapeake peninsula fully as long. It was at Chestertown, Md., in 1860, and destroyed thousands of trees in various parts of Kent county between that date and 1875.

James S. Harris, of Still Pond, states that he has been familiar with this insect for many years, and until recently has lost more trees by it than by yellows.

At Chestertown in the orchard of Colonel Wilkins it was particularly destructive in 1874 and 1875. In 1875 an orchard of 15,000 Early Beatrice hardly 300 of the original trees remained, there having been successive plantings to the number of nearly 20,000 on account of injury by aphides.

This aphis was also very abundant at Denton, Md., in 1874 and 1875 and at Bridgeville, Del., about the same time. Thousands of young trees were killed or badly injured. Probably it was destructive in many other parts of the Peninsula at this time.

This aphis has also proved a great pest to orchards and nurseries in various parts of New Jersey. But I have heard no complaint from western New York or Michigan.

As already noted stunting is one of the marked symptoms of the presence of this aphis. If trees are much dwarfed, and there are no injuries by borers, aphides are almost certain to be found upon the roots. It is not uncommon to find trees which are only one-half or one-third the size of their fellows solely because their roots are infested by this aphis. Sometimes the second or even the third year after planting they are but little larger than when set. As a rule young trees suffer more than old ones. In some instances, especial-

ly in trees which have begun to bear, I have found no dwarfing, and yet have discovered aphides on the roots, but only in small numbers.

On the young and tender roots they settle in colonies, heads together and beaks thrust into the soft tissues, from which they abstract the juice. This constant sucking renders the root extremities flabby, and death ensues, whereupon the colony migrates to another root, or, what is more likely, is carried there by the yellow ant (*Lasius claviger*, Rogers), which is a constant attendant. This pumping of root juices, with the consequent destruction of thousands of root extremities, acts somewhat like severe root pruning. If too many roots are removed the tree dies; if not so many, it is dwarfed.

The foliage of such trees is greatly dwarfed. It also presents miserable reddish or yellowish-green aspect, with more or less rolling and curling, and purple-spotting of the edges of the leaf. This appearance is known as "Frenching," and is quite constant on young trees, although I have known instances in which it did not occur. Ordinarily, from the appearance of the parts of the tree above ground, one is very safe in diagnosing root aphides, as I know from repeated trials.

When I first began field work I was surprised and puzzled by occasional reports of "dead spots" in orchards, *i. e.*, places where peach trees will not grow. Afterwards, I examined many such spots and satisfied myself that the trouble is due to root aphides, at least in Maryland and Delaware. I have seen spots of soil, not noticeably different from the rest of the orchard, on which the second and even the third planting languished and finally died with symptoms such as I have detailed. This languishing is frequently confounded with yellows, but it is entirely different. Sometimes by repeated trials healthy trees have been grown in such places.

I believe the aphides are retained in such spots or transported to other localities by the yellow ant which I have found constantly associated with it, and which appears to be the only species taking any interest in this aphis. I have frequently found the eggs, larvæ and pupæ of this ant in sandy soil under peach trees; and have seen the ants take the aphides very tenderly in their jaws and remove them to places of safety. In one instance, while digging in orchard No. 16, I placed a small root containing a colony of about thirty aphides on the ground at some distance from the tree, intending to put them into alcohol. Before I discovered what they were doing, yellow ants had carried away all but four or five, and were still carrying. I saw one ant come and go three times, each time taking away an aphis in its jaws, and each time very tenderly. Undoubtedly this aphis is carried from root to root and tree to tree by these yellow ants.

What makes this subject interesting in connection with peach yellows is the theory that that disease is due to the depradations of this insect. In view of the ravages of *Phylloxera* in vineyards, it is certainly an attractive theory and one to which I have given much thought.

Some time after I began my field work, I found them in a number of orchards on roots of trees suffering from yellows. At first I was much perplexed, thinking I might have overlooked their presence on many roots previously examined. This discovery led me to make many exhaustive and very tedious underground examinations, in some cases 50 to 75 cubic feet of earth being turned over under a single tree, all the roots and rootlets therein being examined very minutely, often with a triplet. These examinations somewhat restored my confidence in previous work. In a number of orchards

I found trees in various stages of yellows, on the roots of which the most patient and prolonged search revealed no aphides. The yellow ants were also absent from the soil. This, however, is not conclusive, for it is well known that the *Phylloxera* generally abandons the roots of badly diseased vines for healthy ones, and the same might be true of this aphis. Although the roots gave no positive indication of the previous presence of these insects, I could not deny that they might at some time have been present and have deserted these roots for those of other trees, which would in turn fall a prey to yellows, to be in turn deserted. While this could not be denied, it nevertheless seemed improbable, because on the roots of large trees I never in any instance found them in numbers sufficient to do much injury. Only one experiment looking toward the settlement of this point was undertaken. In 1887, in the southwest part of orchard No. 14 of this report, the roots of twelve trees were very systematically examined, an entire day being spent in the digging. Six of these trees had become diseased by yellows in 1887, and six were entirely healthy. I found aphides in small numbers on a few of the roots of 1, 3, 4, 5, 6, 7, 9, 10, and 12. In the earth under the other trees (two diseased and one healthy) I saw no yellow ants, and found no aphides on their roots. In August, 1888, these trees were re-examined; 4, 8, and 9 had become diseased, while 5, 6, and 7 continued to be healthy: *i. e.*, No. 8, on which no aphides were found in August, 1887, had become diseased, and Nos. 5, 6, and 7, on which they were found, had not become diseased. So far as it goes, this result is opposed to the aphis theory.

A much stronger objection is the well-established fact that trees whose roots have been seriously infested with aphides often recover or linger on for years, with none of the symptoms of yellows. Young trees the first or second year out from the nursery often suffer severely from this root aphis and afterwards recover, making healthy orchards. I have seen a number of such orchards.

Another serious objection is that at Denton, Caroline county, Md., and at Bridgeville, Sussex county, Del., this root aphis has been more or less destructive since 1870, at times very destructive, while so far as known no trouble from yellows has ever been experienced at either place, both localities now being free, or nearly free, from that disease. This insect has also seriously injured trees at Seaford, Del., in the orchards of Colonel Martin, without having caused yellows. Some of the trees recovered, others died.

One point remains to be discussed—that is, whether under any circumstances the root aphis may give rise to symptoms resembling yellows. The symptoms already detailed are the common ones. I have heard it asserted that the aphis causes peaches to ripen prematurely, and the well-known fact that such ripening may be brought about by severe root-pruning lends some countenance to the belief. My examinations, however, developed no proofs. I have seen green, healthy peaches on trees badly infested by root aphides, and when I have found this insect on the roots of trees bearing premature peaches it has never been under such circumstances as to render it certain, or even probable, that it was the real cause of the disease. The only point about which I have any doubt is whether such growths as that shown in Photo. VI can ever result from attacks of the aphis. This photograph was made in autumn from a tree set in spring, and the top shown is the only growth it made during the entire season. The roots were infested by this aphis, and seemingly to an extent fully sufficient to cause the symptoms ob-

DISEASED SHOOTS FROM AN APRICOT.

(Delaware.)

served. The question is, Were they the cause of the diseased top, or was the tree suffering from two distinct evils? In orchard No. 11 of this report (same farm) all the replants of 1887 showed the same diseased appearance as this tree, and in four out of five trees which were examined I found root aphides in considerable numbers, and had reason to think that they had been present on the roots of the other tree. These insects were also found upon the roots of older trees in the same orchard.

In an orchard owned by John Stokes, Still Pond, Md., and containing trees diseased by yellows, I also saw two resets of 1887, with tops of identical appearance. On the roots of one I found aphides, and on the roots of the other some indications of their former presence.

On the other hand, on the farm of Henry Krusen, Still Pond, Md , out of two thousand trees set in 1887, I saw about thirty that had the same appearance. Eight of the worst ones were examined very carefully for aphides and the yellow ants, but neither were found. Two of the trees had been injured by borers, but the rest were free from bark injury.

The only difference which I could detect between the wiry, branched, depauperate growth on these trees and that found on robust older trees, bearing premature peaches, was in the lesser tendency toward autumn growth, and I cannot say that even this is a constant difference. When placed side by side with growths from older trees, it was not always easy to distinguish one from the other. I am inclined to believe that where aphides were on the roots the unfortunate trees were suffering from two distinct evils; but some additional observations ought to be made.

INJURIES BY FUNGI.

The peach, like other plants, is subject to the attacks of parasitic fungi; but whether yellows is caused by a fungus or a bacterium remains to be determined. It certainly does not arise from any easily distinguishable cause of this kind.

In the regions affected by peach yellows, I have observed the following species of fungi on the parts above ground :

Taphrina deformans, Tul., on leaves and young shoots, producing the distortion and enlargement known as "curl;" *Sphaerotheca panosa*, Lév., a white felt-like mildew on leaves and young shoots, causing atrophy and death; *Puccinia Pruni-spinosæ*, P., producing rust-spots and causing the premature fall of the leaves; *Oidium fructigenum*, Kze. and Schw., causing "rot" in the fruit and "blight" in the twigs; *Cladosporium carpophyllum*, v. Thüm., a surface-growing fungus on leaves and fruit, producing roundish black spots, which are especially frequent on Smock and other late peaches; *Cercospora Persicæ*, Sacc., producing faint frosted patches on the under surface of the leaves, and indistinct yellow spots above; *Cercospora* (?), producing numerous leaf-spots having a dead center and a more or less brightly colored rim of red or purple; *Capnodium elongatum*, B. and Desm., an imperfect form, probably referable to this species, producing black patches on the epidermis, and occurring also in the gum; *Polyporus versicolor*, Fr., on trunk and limbs, principally or wholly on dead or dying wood, and not restricted to trees suffering from yellows or even to the peach.

Some of these fungi are genuine parasites; others are what De Bary styles faculative parasites; and others are pure saprophytes. None of them stand

in any casual relation to yellows, but all are likely to be found wherever the peach is grown in the United States. Those which show any special preference for diseased trees—*e. g.*, *Cercospora* (?)—are not confined to trees suffering from yellows, but occur equally on all trees of low vitality, and are clearly a consequence of impaired vitality rather than a cause.

On the parts underground I have found no species of *Agaricus*, and have almost never observed any growing in orchards.

Altogether, I have more or less fully examined the root system of fifty-two good sized trees, all of which were unquestionably diseased by yellows. In every instance the main roots, and all their ramifications down to those smaller than a goose quill, were perfectly sound. The bark was bright colored and sound throughout, and the wood was free from black spots, rottenness, or signs of decay. Certainly it was not disorganized by mycelial threads of any sort, nor were these commonly present on the surface of the smooth bark. My own observations agree in this respect with the greater part of those heretofore reported. All the larger roots are healthy.

I have, however, sometimes observed a delicate cobweb fungus on the smaller roots and on the rootlets of diseased trees, and have in almost every instance found a large portion of these rootlets dry and dead, even where no fungus could be detected by the naked eye or by the use of a triplet. If peach yellows is in any sense a root disease, I predict it will be found connected in some way with the destruction of the feeding fibers or root hairs of the tree. However, the dead rootlets may be a consequence of the disease rather than a cause, and such a view seems more in harmony with the results of some of the inoculations. I do not feel like pronouncing very decidedly on the matter until the inoculated trees have stood another year, and until I have made the most prolonged and painstaking underground explorations, accompanied by careful microscopic examinations. An additional season in the field and a year of laboratory work would throw much light on the question. Concerning the supposed relation of bacteria to this disease, not enough microscopic examinations or culture experiments have been made to venture any conclusion. On or in the diseased tissues I have occasionally observed a bacillus much resembling that found by Prof. T. J. Burrill and Dr. Manly Miles; but he would be a very rash man who, on the strength of the occasional and perhaps entirely accidental presence of these all abounding micro-organisms, should assert their casual connection with this disease. Opinions of any value cannot be given until after an exhaustive study of the diseased tissues. No one has yet undertaken this, and no one is now competent to speak with authority.

The rapid spread of the disease in certain years, together with various other facts in its history, lead me to believe that it is due to a parasite of some sort. I have observed much that is very suggestive, and nothing that is inconsistent with such a belief. Even the fact that the disease has existed in some localities for many years without becoming widely destructive is not opposed to this view, but could be paralleled by many references to animal and plant diseases now well known to be of parasitic origin. Certain external or internal conditions of the host plant, or animal, or peculiarities of locality, not yet well understood, are almost always necessary to the rapid dissemination of a parasitic disease. If these are wanting, the disease will be confined to limited areas or to isolated cases.

If yellows is due to some root fungus or other underground parasite, it

DISEASED TUFT FROM A MAIN LIMB.

(Delaware.)

seems to me it could be entirely prevented by budding the peach upon the roots of trees not subject to this disease, *e. g.*, the plum. If, on the contrary, it is due to some parasite living above ground and attacking the tree through its branches, trunk, foliage, or flowers, then trees budded on plum roots should be as much subject to it as any others.

I have seen some statements to the effect that budding on plum stocks is no protection against yellows; but, having found many errors in the literature of yellows, I am inclined to take all statements with a grain of allowance. The first person to make this statement appears to have been William Prince. He declares that while peach trees budded on plum and almond are less affected by borers, they are equally subject to yellows.

The most explicit statement is that made by Noyes Darling. He says that in 1842 Benjamin Sillman, jr., of New Haven, "procured from Liverpool a considerable number of young peach and nectarine trees budded on plum stocks. Some of them were put for standards, and others walled upon a board fence. There had been no peach trees for twenty years on the ground where these were planted. They grew well the first season and appeared in perfect health. The second season some of the peach trees showed symptoms of yellows, and died the third season. At the present time [four years after they were set] no one of the trees, either nectarine or peach, is free from disease. In the garden adjoining that of Mr. Sillman there were diseased trees standing at the time the imported trees were planted out."

I believe Mr. Darling's own observations to be perfectly trustworthy. The only points here in doubt would appear to be (1) the nature of the inserted buds, presumably unexceptional, because from England, where yellows is said to be unknown; and (2) the nature of the stocks, presumably plum, as stated, from the fact that in England the peach is very commonly budded on the plum.

Charles Downing also states that many years ago one of his friends imported 100 peach trees from France. "In two years one-third had the yellows, and the remainder died with it the third or fourth year." These trees were probably on plum stocks, but no date is given and no name, and it is possible that Mr. Downing had in mind the trees imported by Mr. Sillman.

I have found one or two additional references to the occurrence of yellows in peaches budded on plum stocks. The most important is a statement in the Annual Report of the Secretary of the Michigan State Pomological Society, 1874, page 26, to the effect that "in the orchard of John T. Edwards diseased peach trees grafted on plum stocks were entirely destroyed by the yellows without injuring the root at all; below the graft the live healthy root sent out strong plum stocks." I have tried to discover Mr. Edwards and hunt down this statement, but have not been able to do so.

An eastern Maryland correspondent of The American Farmer, 1875, page 25, also states that plums, when grafted on peach roots, remain free from disease, although standing within a foot of peach trees which die of yellows.

Peach trees where I have traveled are budded almost exclusively upon peach stocks, and I have not been able to confirm any of these statements. One thousand plum stocks have, however, been inoculated with healthy peach buds in a district now free from yellows, and these will be set in some of the badly-diseased orchards in Maryland and Delaware and the results carefully recorded. The trees from which the buds were taken have also been marked, and will be kept under observation for a number of years, so that if any of

them develop yellows this fact may be recorded and given its due weight in estimating final results. If these trees from which the scions were taken remain healthy, while those budded on the plum stocks contract yellows, then underground parasites are excluded, and, if yellows is a parasitic disease at all, the cause must act through the parts above ground. Such a result would also show that the insertion of diseased buds is not a necessary factor in the production of yellows.

From the fact that the disease first appears in the fruit, and occasionally only in one or two peaches, it has been thought that yellows might be due in some way to diseased pollen or to bacteria which find an entrance through the moist unprotected stigma. On this theory the contagium is supposed to enter the tree in the spring of the same year that the disease appears. If this is so, one ought to be able to cut out the disease, at least in some instances. Practically, the cells and vessels of the living parts of the tree are all closed cavities; *i. e.*, there are no capillary tubes large enough and at the same time long enough to easily permit the passage of micro-organisms from one part of the tree to another, if, indeed, there are any bacteria small enough to pass at all in this way without destruction of the tissues. On such a theory it must therefore take considerable time for a germ to penetrate to all parts of the tree, since there is no breaking down and decay of tissues such as occurs in pear blight and other plant diseases known to be due to bacteria. The only destruction of tissues I have observed was due to "gummosis." In the wood of diseased shoots I have found closed gum-cavities, due to the metamorphosis of fibers and vessels, but I do not yet know how constant a symptom this may be, or just what relation it may bear to the disease. Gummosis is known to occur in plums and cherries, which are not subject to yellows.

The almost universal statement of the books is that yellows can not be cut out of a tree, no matter how slightly affected. At first I was disposed to accept this statement as true beyond question; but having heard counter statements, and having seen in Delaware one perfectly healthy tree from which the disease is said to have been removed three years ago by a severe excision, and having seen in another orchard some indication of recovery after similar excisions, I determined to repeat this experiment. Two trees were selected in orchard No. 12, eighteen in orchard No. 14, and three in the orchard from which Photo. X was taken, that tree, however, not being one of the three. The excisions were made in September, 1887, with the utmost care. The trees were all young and vigorous, and were only slightly diseased; *i. e.*, they bore premature peaches on one limb only, or on a few small branches, the rest of the tree bearing healthy peaches and full grown dark green foliage. In most cases the diseased limbs also bore spring foliage of normal size and color, and had not yet sent out many of the characteristic shoots; in some instances not any. In every case I removed not only the diseased branches, but also the large sound limbs which bore the affected parts, taking away from one-third to one-half the tree. These trees were previously selected with great care, as being those in which such an experiment was most likely to succeed. After the excisions each one was again carefully scrutinized in all parts, so that by no possibility should any portion be left which bore external manifestations of the disease. I did not use a disinfected saw, but the stumps were carefully painted with red lead, and this was rubbed in, especially in the vicinity of the cambium.

In August, 1888, these trees were re-examined. All of them bore prema-

ture peaches, and most of them also showed the diseased shoots. Moreover, they were so badly diseased—*i. e.*, bore the shoots or premature peaches on so many branches—that a new or secondary infection in 1888 seemed entirely out of the question. This also seemed improbable from the condition of other trees in the orchards. On the theory of a new infection in 1888, 100 per cent of these trees became re-infected in one year, whereas in the orchards as a whole the new cases did not much exceed 10 per cent.

Fearing I might not have cut early enough in the season, I repeated this experiment in 1888, in August, in several orchards, particularly in orchard No. 6. This time my incisions were still more severe. Many large limbs, clothed with healthy foliage and bearing a great many sound peaches, were removed for the sake of getting rid of small diseased limbs and making assurance doubly sure. In most cases I removed from one-half to two-thirds of each tree, that part remaining, as well as a large per cent of what was removed, appearing to be perfectly healthy. The results of these experiments will be awaited with interest. If they agree with those already detailed, it may be conceded as reasonably certain that the disease cannot be cut out, and it may also be concluded that the trees are not infected through the blossoms, at least not the same year that the premature peaches appear.

Another way of testing the validity of this theory would be to remove all the blossom buds from healthy trees in infected orchards and note the results for a series of years. This experiment ought to be undertaken in the spring of 1889 in several orchards and in a sufficient number of trees to give unequivocal results.

WHAT MAY BE HOPED.

In discussing this question I shall assume that peach yellows is a communicable disease. The evidence in favor of such an assumption is stronger than that which has sufficed to hang many a man, and in the absence of direct proof to the contrary is certainly strong enough to warrant legislative action. In all such cases the public have a right to claim the benefit of the doubt. Even in the present inexact state of our knowledge it is justifiable on the part of State legislatures to make statutes compelling the immediate removal and destruction of all affected trees.

In peach growing states now free from the disease it would be wise to prohibit the introduction of all trees from infected areas. Certainly, if yellows does not now occur in California (and by diligent inquiry I have failed to ascertain that it does), the greatest care should be taken to prevent its introduction, even to the extent of legislation strictly prohibiting the importation of peach trees from the eastern United States. Unless such steps are taken the appearance of yellows in orchards on the Pacific coast is only a matter of time. To what a great extent California is interested in maintaining her present freedom from this disease may be known from the fact that in 1886 the peach orchards of that state contained 3,617,973 trees, while the nectarine, almond, and apricot orchards contained about one-half as many more.

The principle objection to such laws is that valuable property will be destroyed. But it is sometimes necessary to destroy property for the preservation of surrounding property, or for other reasons. Moreover, it may be urged against this objection (1) that premature peaches are of an inferior quality, generally unfit to eat, and are not eaten to any extent where they are

grown, and ought not to be palmed off on an unsuspecting public to the possible injury of health and to the certain injury of markets and the discredit of good fruit; (2) that diseased trees speedily become unfruitful and worthless, and consequently have from the start only a small money value. Neither of these propositions can be disputed, and together they meet and fully answer this objection, which, moreover, is of small weight in comparison with the reasons assigned for action.

In my judgment the prompt destruction of affected trees by fire, if practiced throughout a community, will greatly hinder the progress of the disease. With the utmost care cases will appear from time to time, more some years than others, but there will be no outbreak comparable to an epidemic. At least such has been the experience in communities which have practiced this method from the first appearance of the disease. Whether a locality which has once suffered disastrously can again become a profitable region by the strict enforcement of this method remains to be seen. The results at Benton Harbor and Saint Joseph, Mich., where this is being tried, will be watched during the next few years with the greatest interest. According to R. Morrill, of Benton Harbor, 300,000 peach tress have been set in the vicinity of that place during the past three years, and no yellows has yet appeared.

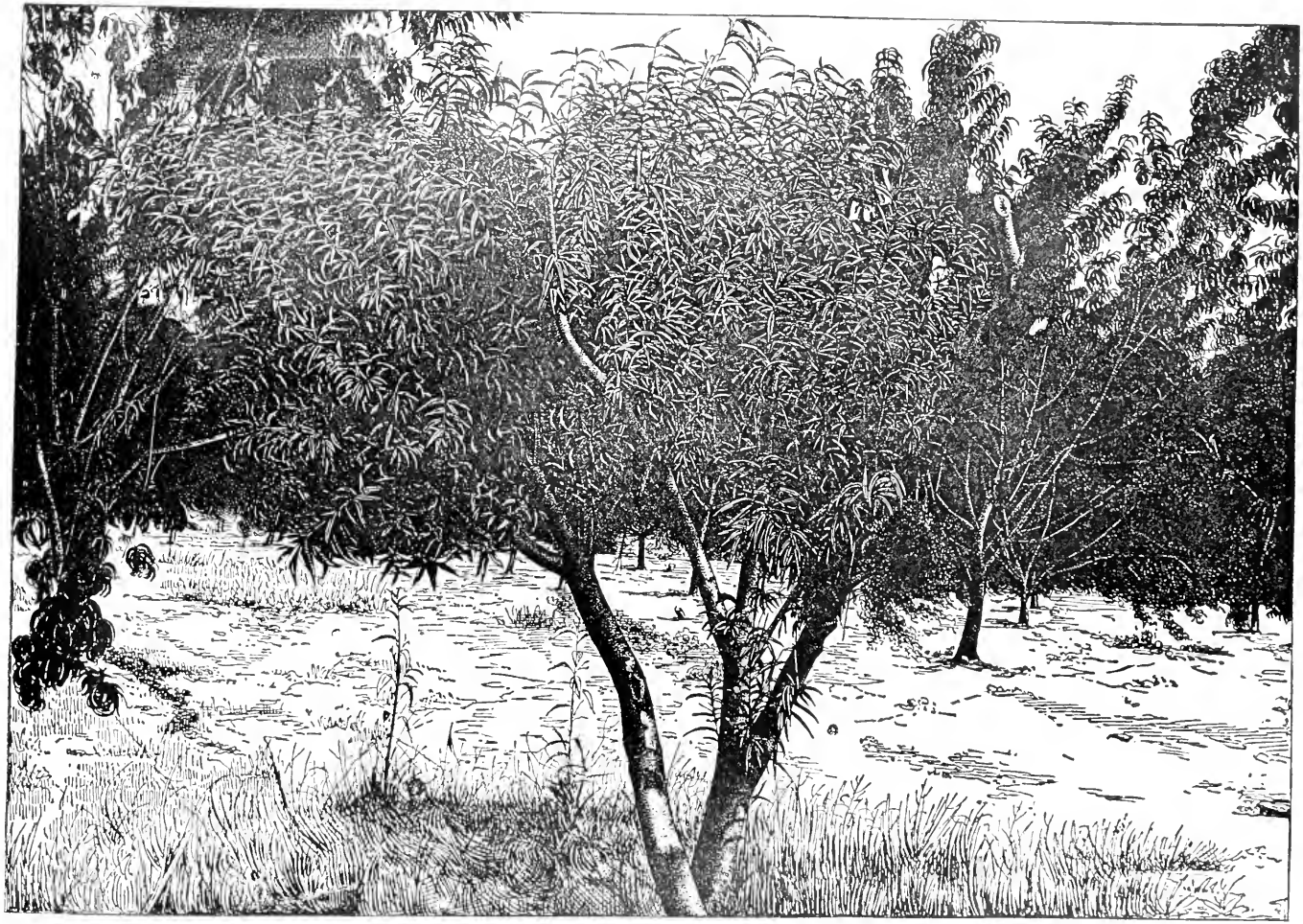
It will not, however, be of much permanent benefit, I conceive, for one man or a few men to remove their trees while the rest of the community neglect to do so. In the union of all fruit growers there is strength and safety. If this method of restriction is to be given a fair trial it must be supported by a strong public sentiment, backed by a suitable law.

Where it is not possible to make a law apply to an entire State, on account of sectional opposition, it might at first be made to apply only to the regions least affected, as in case of the Michigan law of 1875.

CONCLUSIONS AS TO THE CAUSE OF YELLOWS.

HYPOTHESES RULED OUT.

From what precedes we are reasonably safe in concluding that yellows is not due to climatic influences. Frosts, floods, and drouths may be modifying influences, but are nothing more. Injuries by men, quadrupeds, and borers may also be included in the list of disproved theories. They stand in no casual relation to this disease. To the same category may be added excessive cultivation, neglect of cultivation, and neglect of pruning. So also injury to tap-roots, propagation by buds rather than by seeds, defective drainage, use of animal manures, etc. Some of these things may favor the development of peach yellows, but I think none of them can cause it. The evidence here set forth seems to establish this beyond reasonable doubt. Probably most of my readers will be ready to admit that soil exhaustion is also an unsatisfactory explanation. As the case now stands, this theory must be set aside as untenable. At least, we need give no further attention until more and stronger evidence is adduced in its favor. I write this with regret, for I hoped to be able to confirm this view, as it would have offered an easy and practical solution of the whole difficulty.



TREE CUT BACK TO REMOVE YELLOWS. (Delaware.)

HYPOTHESES PROBABLY RULED OUT.

Among supposed causes deserving further inquiry I should place root-aphides and root-fungi. I am inclined to believe that neither one is at the bottom of the trouble; yet another summer in the field would enable me to speak more positively.

REMAINING PROBABLE HYPOTHESES.

What then remains? The larger fungi are out of the question, and I can think of nothing else but micro-organisms. The spread of yellows from diseased buds to healthy stocks, which I have carefully verified, points strongly to some *contagium vivum* as the cause of the disease. If a micro-organism be really the cause, it probably occurs quite constantly in some part of each diseased tree, and this must be established beyond question; it must also be clearly distinguished from similar organisms not related to the disease; and, finally, it must be isolated by cultivation in suitable nutritive media and be able to produce the disease when inserted into healthy trees. If, from a pure culture of some micro-organism peach yellows can be induced in healthy trees, then the case is closed and there can be but one verdict. I write this paragraph with ease, but the work itself is full of difficulties. Nature does not yield her secrets upon the mere asking. Only those engaged in similar inquiries can have any adequate conception of the labor involved or of the perplexities which beset one at every step. Moreover, in such an inquiry nothing can be promised in advance. The investigator and the public alike must take their chances on the results However, as I have elsewhere stated, there seems to be every encouragement for the renewed and persistent prosecution of this inquiry. By such effort sources of error will be discovered, difficulties overcome, and the truth finally established.

The remainder of Prof. Smith's work embraces Appendix A, chemical analyses of both healthy and diseased leaves, trunks, branches and fruit, of the peach, showing considerable variation of constituents between the state of disease and that of health. Appendix B, legal enactments of several States, Michigan having been the first to pass a law for the restriction of yellows; several maps of orchards, showing hight of land, position as to water, etc., and distribution of infected trees; a map of the United States and one of the Philadelphia region, showing infected portions, degree of infection, and territory wholly free of yellows; and thirty-seven plates, some in colors, showing healthy and diseased orchards, trees, limbs, leaves and fruit, both as to yellows and borers. It is matter for regret that the means of this society do not permit reproduction of some of them in this volume.

While but little appears in the way of revelation of the cause of yellows, or as to its prevention or cure, it must be borne in mind that the report is a preliminary one and the investigation only just begun. In this light the report must be regarded as of very great value. It has certainly been made with thorough and intelligent research and with a carefulness as to detail that causes strong hope of excellent results of Mr. Smith's future work.

PRESIDENT LYON'S REPORT

ON

RUSSIAN AND OTHER FRUITS

AND THEIR

ADAPTATION TO COLD REGIONS IN THE NORTHERN UNITED STATES.

A report on Russian fruits and their adaptability to those portions of the United States subject to great extremes of cold was made by President T. T. Lyon, of this society, during 1888, he having been detailed to the work by Prof. H. E. Van Deman, chief of the division of pomology in the U. S. Department of Agriculture. It was made after personal inspection of many of the orchards of Iowa, Wisconsin, Minnesota and more eastern states, where Russian fruits have been growing for many years.

The region considered is that of the northern border of the United States eastward from the Rocky mountains to the Atlantic ocean, but more especially those states and territories commonly spoken of as the Northwest. Says Mr. Lyon: "Of the fruits more or less perfectly adapted to successful cultivation in the region under consideration it will only be necessary to consider those which are, or promise to be, of value either commercially or for domestic or culinary purposes. Among these, named as nearly as practicable in the order of their maturity, will be found the strawberry, raspberry, dwarf juneberry (serviceberry), cherry, currant, gooseberry, blueberry (including the huckleberry), blackberry (including the dewberry), mulberry, cranberry, apricot, plum, peach, apple, quince, and several nuts."

As the strawberry is said to be indigenous as far north as Behring straits, nothing more is desirable in the way of hardiness, and hence the varieties of this fruit common elsewhere in this country are not only sufficient on this score but are in general cultivation. The same is true of both the red and the black raspberries, except that their range northward is not so great and in some parts winter protection is necessary to both, the black especially. These, with casual reference to our native dwarf juneberry (serviceberry), takes the writer on in his list to the cherry, of which he speaks thus:

THE CHERRY.

Our improved varieties of the cherry are reputed to have sprung from a wild species, botanically known as *Prunus avium*, which is supposed to have

been the parent of our modern Heart, Bigarreau, and Duke varieties, and from *Prunus cerasus*, from which are supposed to have originated the Morellos.

The former cannot be considered hardy, either north or west of southern New England and New York, and only partially so in southern Michigan; while from one cause or another the entire class utterly fails further westward and northward.

The Morellos, which in average seasons have been at least partially successful in the latitude of northern Illinois and central Iowa and to some extent even further north, were sadly injured during recent trying winters, compelling the conviction that for the regions northward and westward their failure may fairly be deemed a foregone conclusion, except, perchance, in specially favorable localities.

Within comparatively a few years several varieties, among which may be named Leib, Ostheim, Wragg, and perhaps others, have been put forward as having successfully withstood these trying paroxysms, and for this reason have attracted much attention. Upon inquiry, several, if not all, of these are reputed to have been incidental importations from central or eastern Europe, and to have inherited their hardiness from the typical varieties of those regions.

Under these circumstances the Iowa Agricultural College, through J. L. Budd, its professor of horticulture, made a careful study of the cherries of central and eastern Europe during the summer of 1882, together with comparisons of the climate with that of Iowa and the adjacent regions.

Becoming assured that certain of the typical cherries of Silesia, Poland, and southern Russia were superior in quality to those heretofore successfully grown in Iowa, and, moreover, that the similarity of climatic conditions warranted the hope that they would also prove successful here, during the spring of 1884 about forty varieties of cherries were successfully imported from those regions, planted in orchard at the college, and their propagation comenced for the purpose of distribution and trial in the northwest.

It is by no means warrantable to assume, in advance of thorough trial, that these novelties are to be relied on to supply the existing need, although a very recent examination, not only of the original trees planted in the orchard at the college, but also of those now in nursery there, made since the extreme heat and drought of the past summer (1887), shows their growth to have been strong, while the rich, glossy foliage was as healthy and perfect as could be desired, thus pretty thoroughly demonstrating the fact of their sufficient hardiness in this latitude, together with their ability to resist the depletory influences of extreme aridity.

The effect of the change of ten or fifteen degrees of latitude upon their productiveness, and possibly even upon the quality of the fruit, can only be certainly determined by their actual fruitage through perhaps a series of years.

Uncertain as the result of this experiment must, so far, be considered, it seems to offer the chief apparent prospect for a home supply of this desirable fruit for the extreme north and northwest east of the continental divide.

Of the varieties thus imported and on trial on the college grounds, Professor Budd lists and describes Vladimir, Bessarabian, Lutovka, Nos. 23, 24, 26, and 27, Orel; the varieties given by numbers being of the Bessarabian race.

Another class of varieties, which are designated as the Ostheim Weichsel family, includes Strauss Weichsel, Frauendorfer Weichsel, Susse Früh Weich-

sel, Späte Amarelle, Griotte Précoce, Griotte Douce Précoce, Griotte de Ostheim, and Cerise de Ostheim.

He also describes the following as being of mixed race: Brüsseler Braune, Shatten Amarelle, Königliche Amarelle, Vilna Sweet, Doube Natte, Amarelle Bunte, Fouché Morello, Herozog's May, Herzformige Weichsel, Lithauer's Weichsel, Sklanka, Red May, Red Muscateller, June Amarelle, Amarelle Bouquet, Griotte du Nord, Grosse Lange, Double Yellow Spanish, Glaskirche Kurzstielige.

While the professor deems it probable that several of these may not succeed above the latitude of southern Iowa and northern Illinois, he is yet of the opinion that others will prove hardy enough for central and even northern Wisconsin, Minnesota and Dakota—a region in which the only indigenous representatives of this fruit are the worthless Sand or Mountain cherry (*Prunus pumila*) and the Choke cherry (*P. Virginiana*).

The most successful variations of this fruit in the settled portions of the Northwest, as indicated by the reports of societies and the preferences of planters, are indicated by the numbers attached to names of varieties, as follows:

Early Richmond, 11; English Morello, 9; Wragg, 5; Ostheim, 5; Late Richmond 3; Montmorency, 3; Vladimir, 1.

Dr. T. H. Hoskins, of northern Vermont, in the American Garden, says:

"The Kentish cherries, early and late, with several of the Dukes and Griottes (Mazzards) endure even our hard winters, and sometimes become quite large trees, yet rarely produce a full crop of fruit. * * * We are hoping much from the recently imported Russian, Polish and north German cherries and plums; but in order to get high quality, in addition to hardiness of tree and bud, the same work of crossing may be necessary as in the cases of the pears and apples. That good results can be realized in a reasonably short time in such experiments has been frequently proved; and a great field is open for those rightly situated, who will enter upon the work seriously and follow it up perseveringly."

THE CURRANT.

Both the Black currant (*Ribes nigrum*)—a native of northern Europe and Asia—and the Red currant (*Ribes rubrum*)—a native of northern America—will doubtless be found abundantly hardy at the extreme north; at least when given a shady location, and assisted by irrigation in regions in which moisture is deficient. Both are of extreme northern origin, and will doubtless be found proof against injury from low temperatures.

The Missouri currant (*Ribes aureum*) is valued chiefly for ornamental purposes. It is found wild in Kansas, and also as far north as Dakota, and if not indigenous, it must have been introduced there at a very early period.

The white currants are considered to be mere varieties of the red currant.

Naming them in order of their apparent popularity, numbers are attached to indicate the relative values, as indicated by reports and discussions:

Red Dutch, 13; Fay, 12; White Dutch, 9; White Grape, 9; Victoria, 9; Cherry, 7; Long bunched Holland, 6; Black Naples, 5; Stewart (a local seedling), 2; Lee (black), 1.

THE GOOSEBERRY.

This fruit, also known botanically as *Ribes*, is essentially American and northern in its habitat; appearing on this continent under several forms.

The single English species, *Ribes reva-crispa,* so generally grown in England as a garden fruit, is believed to be the only species of European nativity. It proves unable to withstand the heat and aridity of our American climate. In the cool, moist climate of England it has sported into a great number of varieties, some of which are of very large size.

Comparatively slight improvement has, so far, been effected with those indigenous to America. Among the improved varieties from this source are Houghton and Mountain seedlings. Downing and Smith are more recent originations, of larger size, which give indications of a possible hybridization with the European species.

Industry is a very recent introduction to American growers. It is an alleged seedling of the European species; but it is said to be so much less liable to mildew, as to warrant the hope that it may prove adapted to this climate. Its permanent exception is, however, still a matter of doubt.

Even the purely native Houghton occasionally, under unfavorable conditions, is found to suffer from mildew; which is the chief obstacle to the succese of the European species here.

The improved natives, including Downing and Smith, are abundantly hardy in central Minnesota; although at Minneapolis the Downing, for some cause not understood, has shown a lack of productiveness. There can, however, be little doubt of the success of the American varieties at the north and west, if grown in shaded situations, with the requisite conditions of coolness and moisture. Houghton, Downing and Smith are the varieties which seem to be more generally popular. The gooseberry is now, however, extensively grown in the northwest.

THE BLUEBERRY.

The Blueberry (*Vaccinium*) (which formerly included the Huckleberry, now *Gaylussacia*), is so peculiarly exacting as to soils and surroundings, that but rare, and generally ineffectual, attempts have been made to subject it to cultivation and improvement; although few of the smaller fruits are more highly valued where it is known and accessible. It is essentially a northern plant, and the fruit is abundantly produced in the region of the great lakes, and eastward to the seaboard.

Some, at least, of the various species occur further west, in localities in which suitable soils and other needful conditions occur.

THE BLACKBERRY.

The Blackberry (*Rubus villosus*) and its near relative, the Dewberry, (*Rubus canadensis*) are indigenous throughout the northern States generally in partially sheltered locations, or in tracts of land but recently burned over.

From such localities immense quantities of this fruit annually find sale in the markets of large cities and towns. The fruit thus so produced has been so abundant that, until recently, little attempt has been made to improve it, and this little mainly by selection of choice seedlings. A few of those most likely to prove hardy enough for the North and West are Snyder, Taylor, Stone, Wallace, Western Triumph, Ancient Briton, and perhaps a few others.

The habit of the plant is to produce its fruit buds for the ensuing crop near the top, where the injury in winter is most likely to occur, with the frequent result of a partial, or possibly of an entire, loss of the crop of fruit. Even the so-called hardy varieties are by no means entirely exempt from such loss when fully exposed during winter. In fact, when it is recollected that the blackberry is naturally an undergrowth, we may be allowed to doubt if, with the habit of fruiting already mentioned, there is ground for hope that a variety capable of withstanding a full exposure during occasional crucial winters is even among the possibilities.

If in the more moist and equable climate of the region of the great lakes it is found practicable and profitable to protect the fruiting canes in winter, there must doubtless be increased occasion for such practice in the drier atmosphere and severer winter temperatures further west and north, where quite probably, even with the hardiest varieties, the plants may require to be well covered with snow, mulch, or earth, to avoid the alternative of a loss of the crop of fruit. The low spreading habit of the Taylor, Stone, and perhaps others, is advantageous for such purpose; while the stout upright growth of many others increases the liability to break the canes in the process of laying down.

The trailing habit of the dewberry would, in a snowy region, insure an ample covering; while, if needful, they may be easily covered with earth or mulch.

There are several varieties before the public; but of those disseminated and fully tested, the Lucretia is the only one that has received general and satisfactory indorsement.

The following varieties are more or less grown in the northwest; the numbers indicating their relative popularity:

Blackberries.—Snyder, 21; Ancient Briton, 11; Stone, 7; Taylor, 2; Thornless (?), 2; Kittatinny, 1; Wallace, 1.

Dewberries.—Lucretia, 4, and a local seedling yet unnamed, discovered by Dewain Cook, of Windom, Minn. (this variety has recently been named Windom), 1; also one recommended at Sparta, Wis., as productive and excellent, 1.

THE MULBERRY.

The black mulberry (*Morus nigra*), said to have originated in central Asia, and to have been introduced into southern Europe more than a thousand years ago, is reputed to be the parent of what is now known as the Russian mulberry, which is the only species requiring notice in this connection.

Having been introduced into the west by the Mennonites who emigrated from Russia, it has manifested a degree of hardiness superior to that of any other mulberry. Its limit northward on this continent can not yet be said to have been determined.

The fruit can not be said to possess any special present value, and its prospective importance must depend upon the chance of improvement by new originations from seed. Even in this direction the probability of improvement is apparently very remote.

THE CRANBERRY.

The Cranberry (*Vaccinium macrocarpon*) belongs exclusively to the north, where it assumes much importance as a commercial fruit. It is largely grown for market from New Jersey northward to and including the British provinces. The business in New Jersey and Massachusetts is mainly confined to the sea-coast.

Michigan, Wisconsin and Minnesota possess superior natural advantages of both soil and climate for the purpose; and, although in these States the interest is less fully developed, the production of this fruit here is being rapidly increased.

Many marshes throughout both peninsulas of Michigan were naturally well stocked with the cranberry; and, although during the settlement and development of the state many of these have been drained and converted into arable land, large tracts are still in their pristine condition. In Berrien and Ottawa counties, and probably elsewhere, considerable tracts have been prepared and stocked with the vines with profitable results, and the business seems likely to increase.

Probably the most extensive plantations are to be found in Wisconsin. It is estimated that in four counties in the central part of this state there are fully 50,0 0 acres of marsh adapted to the growth of this fruit, much of which is already in process of improvement for this purpose. The usual process here seems to be to clear the ground of brush, and by partial drainage to enable the plants to take possession of the soil, which they are said to do within a comparatively short period, thus avoiding the expense of preparing and planting the ground and cultivating till the plants have covered the surface.

A tract of 1,080 acres, owned by a company who have already invested a considerable sum thereon, is being improved upon the following plan: At the upper side of the marsh a reservoir of ample capacity is created by digging a ditch across the slope (which is very slight), throwing the earth upon the lower side, thus constructing an embankment or dam, with sluices and floodgates at convenient points, by means of which the water may be accumulated and turned upon the space below at pleasure.

Below, and at right angles with the embankment already spoken of, a ditch is dug nearly centrally through the marsh, of sufficient capacity to receive the waste and surplus water. The earth from this ditch is used to construct an embankment upon each side thereof; and the water therein is maintained at a depth and width sufficient to float a small flat-boat, which is employed for transporting material, as well as for collecting the fruit when picked. The lower end extends to and within a building, which serves as a storage and packing room for the fruit when picked and awaiting transportation.

The marsh below the reservoir is cut up by side and cross ditches into blocks of five or more acres, each of which is capable of being separately flooded from the reservoir and ditches above by means of sluices, as already described.

When a new block has been prepared the sluices entering it are left open, and it is kept flooded during the growing season, with the result that the trees, shrubs, and bushes growing thereon are killed. The sluices are then closed, the trees and brush, if any, removed; and the cranberries that may be already thereon left to take full possession. In case of a block not sufficiently stocked with natural plants for the purpose, the ground is carefully fitted as for a

farm crop; a lot of rooted plants are cut into sections, which are sowed and harrowed in, in the usual manner of farm-sowed crops; usually with a favorable result.

Little seems to be known respecting the status of cranberry culture in Minnesota, beyond the fact that the fruit is indigenous and abundant in its wild state, and that a very considerable amount is supplied to commerce.

That it is less abundant in the wild state in Dakota and Montana can scarcely be chargeable to unfavorable climate, but rather to a lack of the peculiar conditions of soil and moisture indispensable to the growth and prosperity of the plant.

Mr. E. Reeves, of Waverly, Iowa, in a report to the State Horticultural Society for 1886, page 152, says, "The Highland cranberry (*Viburnum opulus*) is not grown as much as it should be. It is a native of our part of the state and is perfectly hardy. It does best on a moist soil, is readily grown from cuttings, and bears good crops of fruit, nearly equal to that found in the markets."

The plant is indigenous as far north as British America, but is usually accounted but a poor substitute for that already described. This fruit, however, seems quite unlikely to become a competitor of the ordinary cranberry.

THE APRICOT.

The apricot (*Prunus Armeniaca*), is reputed to be a native of Armenia, and to have been brought into southern Europe in the time of Alexander the Great.

Seeds of a species (or variety?) differing, at least in hardiness, from the varieties of southern Europe were brought to this country from southern Russia by the Mennonites some years since. These have been generally reproduced in this country, and considerably disseminated as seedlings, which are found to vary greatly in quality. More recently some western nurserymen have made selections from the best of these and have undertaken their propagation.

The apricot has hitherto proved to be so uncertain a fruit at the north, that a variety of even tolerable quality, that shall prove successful north of the middle states, will no doubt be welcomed as an acquisition. It must, however, be admitted that the question of the value of this new introduction anywhere in this country, or for any purpose, is yet to be decided; while it can scarcely be hoped that it will succeed north of central Iowa, and possibly some portion of southern Michigan, where in favorable situations the more common varieties of this fruit fail more especially on account of very early blooming.

Professor Budd, of Iowa (who is by some persons thought to be occasionally excessively enthusiastic respecting the prospective value of Russian fruits), says in a bulletin of 1885:

> We find not in Russia, however, any varieties of the apricot equal to their best plums. We believe the best apricots of the world, for our climate, are to be found in north Bokhara; nd northwest China, [adding] We are sending out for trial plants of a variety from the hill country northwest of Pekin, China, which seems specially promising for the parts of the west, south of the forty-first parallel.

Among those thus named, propagated, and catalogued are the following six varieties introduced by Carpenter & Gage, of Nebraska: Alexander, Alexis, Budd, Catharine, Gibb, and Nicholas.

The following additional varieties are believed to have been selected and introduced by A. H. Griesa, of Kansas, viz: Byram, Evatt, Preib, Remer, and Smith.

Although these have ostensibly been selected for propagation as stated, little is yet known of them beyond what is stated by their introducers. Their real value must depend almost wholly upon the results of extensive trial over an extended region.

THE PLUM.

The cultivated plum of the northern states (*Prunus domestica*), which, according to Dr. Gray, is supposed to have sprung from the Sloe, is an introduction from Europe. It proves hardy and successful from New England westward to and including the lower peninsula of Michigan, although almost universally attacked by the curculio, which usually ruins the fruit, unless efficient means are employed to save it.

The fruit is also, in many localities, attacked by what is known as "the rot," which appears to be either accompanied or caused by fungus, which manifests itself in connection with the decay, which usually occurs just prior to the season of maturity, often ruining nearly or quite the entire crop of fruit.

The foliage is also frequently attacked, toward the end of summer, by a malady which causes the premature ripening and dropping of the leaves, leaving the fruit but partially grown and the wood yet immature, in which case the tree is often either injured or killed by the cold of the following winter. By some persons this malady also is attributed to the attacks of a minute or microscopic fungus, although no sufficient examination is known to have been made to determine the question.

The branches, and occasionally even the trunk, of the tree are also liable to be attacked by a fungus known as black knot, and botanically as *Sphæria morbosa*, which occasions unsightly protuberances, and, if neglected, is quite sure to ruin the tree, but which may generally be overcome by the prompt cutting away and burning of the diseased parts, to prevent the dissemination of the spores.

These various maladies have proved so serious, that in many localities once considered favorable, the growing of this species of plums has been nearly or quite abandoned; although in the northern portions of lower Michigan, in portions of the more easterly states, as well as in Canada eastward of the great lakes, either from more favorable climatic influences or because the inducing causes have not yet reached them, this fruit is still abundantly successful; becoming in such localities not infrequently a very considerable source of revenue.

Further westward, either from lower extremes of temperature or a more arid climate, or possibly from a combination of the two, this species of plum fails almost wholly.

The native plum of the south (*Prunus chicasa*), grows in the wild state in Kentucky and southwestward; and in those regions seedlings of this, among which may be named several known by the common title Wild Goose, have been found productive and profitable under cultivation. These have been tested at the north and found abundantly hardy; but, although they often bloom freely there, either from imperfection of the bloom or from other and unknown cause, they almost invariably prove obstinately unproductive, and

hence worthless, unless, as some have been led to hope, this defect can be remedied by the adjacent planting of other pollen-producing varieties—a hope which as yet lacks the confirmation of actual authentic experience.

The native plum of the north (*Prunus Americana*) is indigenous from about latitude 38° northward, far beyond the limits of the United States. It is quite at home in the lowest lands and along the margins of streams where the lowest range of the thermometer is known to occur. It is always abundantly, if not excessively, productive; and even in the regions in which the *domestica* varieties are most liable to the attacks of the curculio, this species mainly escapes; while in the specimens which bear the mark of the "Little Turk," the larvæ very generally fail to develop.

D. B. Wier, of Illinois, advances the hypothesis, which he insists is borne out by his own experience in the growing of this fruit, that while the curculio freely punctures this class of plums, the larvæ very rarely develop; and upon this circumstance he bases the conclusion that the growing of our native species would probably result in the extermination of the Little Turk.

Although this species in its wild state can not be said to be of high quality, its productiveness, hardiness, and freedom from disease, seem to have directed attention to it as a possible source of improved varieties. So far as is known, the only improvement as yet has been by selection. Even by this mode several desirable varieties have already been discovered; some of them, at least, possessing qualities which in value nearly approach the popular varieties of the *domestica* species. Among these may be mentioned De Sota, Wolf, Rollingstone, and Wyant, which are on trial and being disseminated by the Iowa Agricultural College; also Miner, Bassett, Climax, Forest Garden, Rockford, and other promising newer sorts in process of propagation and introduction. To the foregoing may be added Weaver, introduced several years since, and Pottawatomie, now just introduced. The last two are said to be productive in Iowa, where they originated. In Michigan, with but a limited trial, Weaver shows a lack of productiveness.

There is little occasion to doubt the success of plums of this *Americana* species throughout the northwest, at least eastward of the Rockies, except, possibly, where the failure shall arise from a lack of the needful moisture in the soil.

In his General Notes on Foreign Plums, in bulletin of 1882, Professor Budd says:

> The varieties of really good plums, for dessert and culinary purposes, grown in Russia will be a matter of surprise to visitors. Even as far north as Moscow and Kazan plums of fine size and quality are grown in great abundance. We have introduced a number of fine sorts which we are propagating and sending out for trial. Their success with us will not hinge on their hardiness or tendancy to produce fruit, but on their relative exemption from attacks of the curculio. We have much reason to believe that such sorts as the Red and Yellow Arab, Moldavka, Hungarian, Long Blue, Long Red, Long Yellow, and Skorospelka will not be injured by the Little Turk to a greater extent than our native sorts, as, like them, they start the fruit late, and it is developed with great rapidity. In no line of our experimental work do we expect more useful results than in our trial of the best Russian plums.

Although the foregoing was published more than two years since, it is not known that any of these plums have even yet fruited in this country. The effect, therefore, if any, of so wide a departure in longitude, and the probably more marked result of a transfer southward of 14° of latitude, are yet to be determined; and since the professor fails to clearly indicate the premises upon which his expectations have been based, there is no apparent alternative

but to wait and hope for the desirable results which he seems so confidently to anticipate.

In the transactions of the Iowa Horticultural Society for 1886 the professor says:

Of the Russian plums which I am testing I can say but little as yet; some of them are of the Lombard type in appearance. Our native varieties seem to do well such as Bassett, De Sota, Climax, Forest Garden, and Weaver. The last named does not seem very productive. The Robinson and Marianna I have not tried long enough to speak intelligently about.

In the same volume, at page 437, Mr. Burton advances the idea that—

The Miner plum [why not others also—WRITER] ripens its pollen before the stamen is ready to receive it This difficulty could be obviated by planting another plum adjacent, which ripens its pollen at just the right time.

Some indications of the varieties of plum under cultivation in this region may be gathered from the following list. Their apparent relative popularity is indicated by the numbers attached:

De Soto, 29; Forest Garden, 17; Miner, 15; Weaver, 9; Wolf, 7; Wild Goose 7; Rolling-stone, 5; Maquoketa, 4; Cheney (the earliest, 2; Newman, 2; Speer, 2; Marianna, 1; Robinson, 1; Harrison's Peach, 1; Moore's Arctic, 1; Van Buren, 1; Winnebago, 1; Rockwell, 1; Shaffer, 1; Lombard, 1; Shipper's Pride, 1; Clemmons, 1; Oglesby, 1. Several of these are recent introductions, and not generally known and tested.

THE PEACH.

The Peach (*Amygdalus Persica*) is reputed to be a native of Persia, and to have originated from the almond. The Nectarine is usually considered to be merely a variety of the peach with a smooth skin. It is known, in fact, that within a recent period certain existing varieties of the nectarine have been originated from seed of the peach.

The limit northward of the peach growing region proper at the east may be said to be about latitude 42°; although near the sea-coast, and also in New York and in portions of Ontario, the ameliorating influence of the ocean and of Lake Ontario carry it somewhat above 43°. Further west, in Michigan it extends yet further north; within the more immediate influence of Lakes Michigan and Huron, even as far as latitude 45° 30′. Further west, and away from the influence of the Great Lakes, the limits of the profitable cultivation of this fruit occurs much further south, probably even below 40°, or in southern Illinois and northern Missouri.

At the northwestward of Lake Michigan the peach, therefor, can only be grown as an exotic. There have been various efforts to devise some cheap and effective process for the protection of the tree against the extremes of cold during winter, which occasionally ruin the fruit buds and even the trees. So far, however, nothing effective has been devised short of actually laying down the trees and covering them with earth during the winter.

Prof. J. L. Budd, in the course of his experiments with hardy European fruits, has imported from eastern Asia what he hopes may prove a hardier type of this fruit. In a college bulletin issued in 1885 he says:

The peach does not vary as much in hardiness of varieties as the other orchard fruits of the temperate zone. In our experiments we have used the Wager and Hill's Chili as a standard of hardiness of the old varieties, coming originally from Persia.

Four years ago we imported plants of eleven varieties of the peach from Pekin, China, they having been procured for our use from the hill country northwest of Pekin. They

have larger, thicker leaves than our common sorts, ripen their wood earlier in fall, and have proven 30 per cent. hardier than our old sorts. Plants we have sent out for trial have stood well in south Iowa, north Missouri and Kansas. Some of them will prove valuable on the northern borders of the peach belt.

Two years ago we received pits of the peach from Riga, Russia, said to have been brought from central Asia. The plants are now two years old, and show marked variation in leaf, bud, glands of leaf, and habit of early ripening of wood, from the old varieties originally from Persia.

We are now trying to secure pits from north Bokara, in Asia, the most extreme climate, so far as I know, where the peach is grown. The most we expect to do in this line is to make peach growing possible on the northern borders of the present peach belt.

A peach, said to be a native of China, and known as Tong-Pa, is reported to have been a couple of years on trial in Iowa county, in eastern Iowa; but with so short experience, no conclusion has yet been reached respecting its probable value for that locality.

Peter M. Gideon, of Excelsior, Minn., has a small plantation of bearing peach trees, planted with reference to laying down and covering with earth in winter. In August, 1887, these were in thrifty condition, and carrying some fruit; having apparently been three or four years planted, and from 8 to 10 feet in height.

THE GRAPE.

The grape (*Vitis*) is represented in Europe only by the single species *vinifera*, although since the advent of the phylloxera in the grape growing regions of that country importations of American species have been freely made, with the hope that, by their more robust habit, they may prove better able to resist the attacks of this new enemy. This species proves obstinately unsuccessful throughout the eastern United States. A very considerable number of our improved American varieties have nevertheless become tainted with this strain by hybridization and many of these seem to have derived desirable qualities from this source; although generally, if not always, with increased tendency to suffer from mildew—the chief enemy of the *vinifera* class in this country.

Of our American species, *Vitis cordifolia*—the northern frost grape—is indigenous far northward of the United States. By modern botanists this is blended with or included in *riparia*.

Vitis labrusca—the indigenous wild grape of New England—becomes more rare as we proceed westward, occurring very rarely in western New York and Michigan; and, it is believed, wholly disappearing, as an indigenous growth further west.

Vitis æstivalis can only be said to be indigenous south of the region under consideration; though occasionally extending sporadically into its southern portions.

Within the past thirty or forty years, in the process of improving our native grapes by reproduction and bringing them under cultivation, while there yet remain many varieties which clearly represent the original species, these species have in many cases become so blended by hybridization, that frequently nothing short of an authentic history of a variety would suffice to assign it its correct specific position.

As the result of this blending and improvement, the resultant varieties have come to be planted indiscriminately throughout the region under consideration; reference being mainly had to their probable ability to mature their fruit

within the season, and resort being had to protection in winter in regions in which very low temperatures are to be anticipated.

Vitus vulpina (*rotundifolia*). which includes the Scuppernong, also *candicans, cinerea, monticola, Novo Mexicana,* and *rupestris*, are southern species, generally lacking hardiness at the north; few if any of them having produced varieties of value for northern planting. The fact that Catawba and Isabella grapes, perfectly ripened in the open air at Excelsior, Minn., on the banks of Lake Minnetonka, were awarded a premium at the New Orleans Exposition, was a surprise to very many, since the former especially is not, with ordinary surroundings, considered sure to ripen fully north of latitude 39° or 40°.

That these varieties can be fully matured in the open air five or six degrees further north, would indicate that the summers there are especially favorable for the purpose. A visit this year to the vineyard which supplied the specimens in question showed that it is favorably situated on dry, warm soil, sloping rapidly to the east and south, and that the cultivation and pruning were of the best and most effective kind, rendering the laying down and covering of the plants (which is indispensable here) easy and effective. Under only ordinary circumstances, however, many varieties were in an advanced stage of ripeness, and "Minnetonka grapes" were freely offered in the markets of Minneapolis and Saint Paul as early as the 18th of August.

That there is little difference between this region and those further east, so far as choice of varieties may be concerned, is clearly indicated by the following list, the relative popularity of each variety being indicated by the numbers attached to each, and the varieties being those recommended in the discussions of societies and the reports of committees:

Concord, 33; Moore, 27; Worden, 27; Delaware, 12; Pocklington, 12; Martha, 12; Janesville, 12; Agawam, 9; Lady, 9; Cottage, 8; Brighton, 7; Salem, 6; Telegraph, 6; Elvira, 6; Niagara, 5; Ives, 5; Dracut Amber, 5; Lady Washington, 5; Empire State, 4; Wilder, 3; Woodruff Red, 3; Coe, 2; Early Victor, 2; Perkins, 2; Vergennes, 2, Eumelan, 1; Barry, 1; Massasoit, 1; Lindley, 1; Champion, 1; Jessica, 1; Florence, 1; Hartford, 1; Crevelling, 1; New Haven, 1; Wyoming Red, 1; Northern Muscadine, 1; Clinton, 1; Marion, 1; Bacchus, 1; Black Hawk, 1; Black Eagle, 1; Beauty, 1; Red Fox, 1; El Dorado, 1; Jefferson, 1; Duchess, 1; Iona, 1; Rogers No. 33, 1.

The impolicy of the very common pactice among the originators and introducers of new varieties of sending them out under numbers is strikingly manifest in the almost universal custom in the northwest, in the discussions and reports of horticultural gatherings, to continue the use of the original numbers, sometimes coupled with the name, but quite frequently without such accompaniment, not only greatly to the inconvenience of the hearer or the reader of a report, but also with a greatly increased liability to error consequent upon the use of figures.

It would, beyond doubt, inure greatly to the convenience of all concerned, if all societies could be induced, in cases in which names exist, to resolutely exclude the numbers from their discussions, and especially from the reports of their transactions.

THE PEAR.

The pear of Europe and America (*Pyrus communis*) is indigenous in Europe and Asia. It had early been subjected to cultivation in Syria, Egypt,

and Greece, and thence introduced into Italy during the early days of Rome. From this species comes the great mass of our modern varieties, although there are other species, among which are the Aurelian (*Pyrus salvifolia*), a native of France; the Snowy pear (*Pyrus nivalis*), a native of Australia, neither of which are represented among our cultivated varieties, and the Sand pear (*Pyrus sinensis*), a native of China and Cochin-China, from which, by hybridization with *P. communis*, the modern Le Conte, Kieffer, and others are *supposed* to have originated.

Between March, 1879, and some time in 1884, Professor Budd, as the representative of the Iowa Agricultural College, made no less than twelve importations of pear trees or scions from different localities in Russia (including Poland) and Germany; also an importation from northwestern China.

The varieties included in these importations number sixty-three, although an uncertain number will probably prove to be duplicates. In publishing lists of the varieties thus introduced the professor remarks:

> Our experiments with the pear mainly date from the time of our visit to east Europe, in 1882.
>
> With some of the varieties of central and east Russia our progress has been slow, as the scions had not been packed properly for so long a journey. Yet we now have specimen plants of most of the varieties specially attracting our attention as likely to prove valuable for culinary or dessert uses, and we have sent out for trial many plants of the most promising sorts.
>
> Our soil is not favorable for the pear; hence we used our first planted trees in a rough way, by taking off all the new wood each year for scions. This treatment, combined with the severe weather of the last two winters, has given us correct notions as to the relative hardiness of varieties.

At the annual meeting of the Iowa Horticultural Society in January, 1887, Hon. C. L. Watrous, reporting for the vicinity of Des Moines, Iowa, says:

> Of pears there are not enough trees to count. Young trees of Seedless seem healthy and free from blight. Whether they will bear fruit, or what may be its quality, we know not, but live in hopes.

Andrew Peterson, of Carver county, southern Minnesota, during the summer of 1886, had several varieties of Russian pear and apple from his native country, Sweden; but, judging from appearances, he deemed those from Russia the most promising for Minnesota. In January, 1887, he reported the Russian pear trees as showing no injury up to that date; while of sixty varieties imported from Sweden one only is sufficiently hardy for Minnesota.

Professor Porter, of the Minnesota Agricultural College, reports a few Russian pears as on trial at that institution, near Minneapolis, where they give promise of much value.

The seedless pear (*Bessemianka*) is also reported to be on trial at Ramsey, McCook county, Dakota.

A few pear trees grown from seeds brought from Russia by the Mennonites, are said to be growing in southwestern Minnesota.

Professor Budd, in January, 1887, said:

> I believed six years ago, and am stronger in the belief now, that east Europe has many sorts of pear, cherry, and plum which would give perfect satisfaction in the north half of Iowa, and some in Minnesota and the north half of Dakota.

It is feared by many that the transplacing of Russian fruits to the much lower latitude of Iowa may greatly affect their season of maturity, and that it may even injuriously affect their quality, and, by possibility, their hardiness; but the season of ripening may be deemed less important with this fruit

than with the apple. These influences will therefore be more fully considered in connection with that fruit.

In advance of a thorough trial, Professor Budd expresses the conviction that a very considerable number of the varieties imported will prove hardy as far north as central Iowa, while a few of them, among which he names Seedless, Gakovsk, and others are considered to be adapted to a wider, though yet indefinite, range northward. Careful and extended experiment, such as he is understood to have already in progress, can only surely determine the correctness of these suppositions. Meantime he suggests a resort to the artificial crossing of the best and hardiest of the older and well-known varieties upon the most promising of these foreigners, with the hope of improvement possibly in both quality and hardiness.

Speaking with reference to southwestern Iowa, he remarks:

With regard to Chinese pears, those who have condemned them get their trees from New Jersey or about Philadelphia. From such experience we are all inclined to condemn Chinese pears. On the college grounds they came through all right. I do not mean the Sand pear, but the Snow pear. Some of them I can recommend for this part of the state.

We have Snow pear trees from northwest of Pekin. Eugene Simons sent fifteen varieties of Snow pear from China to Metz, France. I was there when these were bearing and the pears ripe. Some of them are hardy enough for this part of Iowa; and I do not know how much further north they will endure the climate.

The Professor, on another occasion, says:

"Our pear, coming from southern Europe, is subject to blight here, but not there; which shows that they are not adapted to our country. We can start from seedlings and work up our pears. But even this is not necessary. We have a sadly misused pear tree on the college farm that made during the past year, from 3 to 5 feet of growth, which is entirely hardy and an abundant bearer. This pear has stood everywhere, without any blight, in northern Dakota, near the Rocky mountains and all over the northwest. We also have other pears which are hardy and fruitful.

In the Prairie Farmer of September 17, 1887, the professor says:

On general principles, I can say that Bezi de la Motte, St. Ghislain, and Flemish Beauty will be likely to do as well as any of the old sorts. Of the newer pears from Russia, the Seedless and Gakovsk are as promising as any for home use or market.

It is understood that the last two varieties have not yet fruited in this country. If so, it must be inferred that the foregoing conclusion, involving their productiveness and the quality of the fruit, as well as the vigor and hardiness of the trees, is based mainly upon his knowledge of their performances in their original locality. Except upon a statement of the reasons for such conclusion, in such case it must be assumed to be rather suppositional than conclusive.

A society report from southwestern Iowa, made in 1886, says the pear crop there is a failure, most of the trees being nearly dead.

Mr. Denlinger, of Dubuque county, is reported as having on trial the Arctic pear, a Russian variety, which in 1885 made a growth of 3 feet. He also had the Keiffer on trial.

In 1886 the Dubuque society recommended the Longworth pear (a variety very little known) as worthy of trial, also the Seedless and Gakovsk, two of Professor Budd's importations from Russia.

Circumstances would indicate that these recommendations were probably made rather on account of the apparent hardiness of the trees than from a definite knowledge of the quality of the fruit as produced in this country.

An additional indication of the uncertainty of the more common varieties

of this fruit even in eastern Iowa, occurs in a paper by John Evens, read before the Union Horticultural Society in 1886, as follows:

I have planted many pear trees, mostly standards, but have not fruited very many. Could get them to grow well for a few years, or until they were old enough to bear, and then the blight would take them. I have had the best success with Bartlett, Flemish Beauty, Sheldon, Tyson, Buffum, Seckel, White Doyenne, Anguoleme, and Lawrence.

Secretary Hammond, of the Illinois State Horticultural Society, names Flemish Beauty, Anjou, and Tyson as having proved hardy in the northern portion of that State.

Dr. T. H. Hoskins, of northern Vermont in the American Garden for September, 1887, says of the new Russian pears:

Whatever may be the individual or class merit of these pears as dessert fruit (and we are not likely to find many, if any, equal to the best of our old varieties among them), they are yet remarkably interesting as a class, not only for the superior hardiness against cold and drouth, but also from the fact that they introduce a distinctly new strain of blood, so to speak, and one which, by crossing upon those we already have, is likely to give us some superior varieties. The firm, glossy foliage, not so thick and firm as that of the Chinese, but yet tending that way, indicates a strong resistant power, not only against heat and dryness, but also against insects and fungi. In the many years I have been trying in vain to discover one pear which I could grow successfully in northeastern Vermont, one of the most discouraging things I have noted about all of them (except Keiffer and Le Conte) has been the defective character of the leafage. Indeed I think that if it were not for this insurmountable difficulty we already have pears hardy enough to grow much farther north than they are with success. Without healthy leaves there cannot be thoroughly matured wood; and it is the weakness consequent upon this which I think has prevented my success with such "almost hardy" pears as Onondaga, Clapp's Favorite, Jackson, Flemish Beauty, and Grand Isle. They endure, as it is, all but our severest winters, and therefore it seems to me that if we could give them a better leaf we could grow them successfully. Now it happens that some of the Russian pears reported to pe best in quality are also the hardiest and have the best foliage. A cross of Seedless, Sapreganka, Dula, Tonkovietka, or Pasovka upon our hardiest sorts named above might confer upon the seedlings that better leaf which is so greatly needed. I trust that some enthusiastic pear-growers may be sufficiently interested in the matter to be willing to make these crosses and grow the resulting seedlings to fruitage. This can only be done by those so situated as to be able to grow and fruit both kinds, which we of the "cold North" are unable to do.

This last conclusion is but partially true, since even at the "cold north" these new iron-clads may be grown to fruitage and the bloom fertilized with pollen from milder climes.

How far north the pear may be successfully grown in America is a problem the solution of which can only be fully accomplished in the remote future. Although there is a popular notion that a plant may be gradually brought to endure a climate more exacting than that to which it was originally adapted, experience has long since shown that the capacity for such variation, so far as varieties are concerned, lies within very narrow limits. The process through which important results of this character are to be accomplished must rather be the more tardy one or reproduction and selection, either artificial or natural, through which all the wide adaptations of both animal and vegetable life have been wrought.

By the light of science, aided by intelligent manipulation, the otherwise tardy process of natural selection—the survival of the fittest—may, beyond a question, be greatly hastened. Doubtless, mainly through natural processes, these Russian fruits have been brought to an adaptation to that climate not originally inherent in the species; and their introduction to the trying climate of our central prairie region thus affords to us a vantage-ground—an advanced starting-point—from which results desirable to us may perchance be sooner

reached, since it may be fairly assumed that their surroundings here of climate and soil can not be completely identical with those whence they were taken; and, if so, that new characteristics, only to be acquired through reproduction and selection, are likely to be found needful for their proper adaptation to the new surroundings.

Viewed even in this light, the labors of Messrs. Budd and Gibb must be deemed to be of great value to the pomology of the north, since even should these introductions fail to realize the sanguine hopes of the introducers, they will surely afford the foundation, otherwise wanting, upon which the more certainly and rapidly to build a satisfactory superstructure in a nearer future.

THE APPLE.

The apple of Europe and America (*Pyrus malus*) was introduced in North America from Europe by the early settlers. It is believed to have sprung from the wild crab of Europe, and was extensively cultivated by the Romans, who are supposed to have introduced it into England, whence it was brought to this country. The Siberian crab (*Pyrus baccata*), in various improved forms, is more or less common in this country, especially in regions in which superior hardiness is requisite. A kindred species, known botanically as *Pyrus prunifolia*, is also a native of Siberia. China also has an allied species, known as *Pyrus spectabilis*.

Our wild and uneatable native crab (*Pyrus coronaria*) is common in the northern United States, and a species known as *Pyrus rivularis* occurs west of the Rocky Mountains. The dwarf, or Paradise apple, used mainly as a stock for dwarfing the apple, is considered to be a avariety of the common apple.

1. In treating the subject with more especial reference to the apple, it appears more convenient to consider the region in question as divided into districts. In so doing it seems proper to commence at the east, designating northern New York, Vermont, New Hampshire, and Maine as the northeastern district.

While the Champlain valley is found to be more congenial to fruit culture that most other regions in that latitude and vicinity, the favored location is of but limited extent. Throughout northern New York, Vermont, and New Hampshire generally the climate is quite too severe for the great mass of popular apples, fameuse here being one of the most satisfactory of such, although even this is by no means exempt from occasional injury in winter, while its tendency to scab and crack is a serious drawback upon its usefulness. There is in this northern region an apparent improvement in the texture and glossiness of its foliage, which may be supposed to the more perfectly adapt it to a dry climate, as well as to increase its ability to fully mature its wood in preparation for the occasionally exceptional severity of winter. Even with such preparation, however, it occasionally fails to withstand the trials of a crucial winter, and for these reasons there is here as elsewhere an anxious casting about for a hoped-for substitute.

Several recent varieties have been tested by Dr. T. H. Hoskins, of Newport, Vermont, and others, among which Scott's Winter, at present, is thought to be the most promising, at least for the region in question.

The importations by the Agricultural Department at Washington, and the more recent ones by the Agricultural College of Iowa, have been watched

with great interest here, and many of the varieties have been or are being tested. Mr. Charles Gibb, of Abbotsford, Quebec, was the associate of Professor Budd in his expedition to central and eastern Europe for the purpose of studying varieties and climates, and it is understood that he has since made a second visit to that region upon the same business.

For the purpose of, as far as practicable, adapting the, to us, unpronounceable pomological nomenclature of Russia to the needs of English-speaking people, the American Pomological Society, at its meeting at Grand Rapids, Michigan, in 1885, constituted Mr. Gibb a committee of one to revise and, when needful, to Anglicize the names of these introduced varieties; an onerous and perplexing task, which he has now completed; his final report having been made at the recent meeting of that society at Boston.

The pomology of the sea-board portion of the state of Main is so affected by oceanic influences that it does not differ very widely from that of southern New England. The more northern interior is yet a new and comparatively unimproved region, in which fruit culture is yet in a comparatively crude state. It is understood, upon the authority of Dr. Hoskins, that there exists there an extensive tract of lake country well adapted to the cultivation of the apple—it being moderately elevated, with convenient access by river navigation to the sea-board. Its pomology, when developed, may be expected to assimilate somewhat closely with that of the adjacent inland province of Quebec, which does not differ very widely from that of the extreme northern portions of western New England.

2. The district of the Great Lakes includes central and western New York, and thence westward to and including the lower peninsula of Michigan.

So varied are the local influences of the great lakes westward of eastern New York and thence to Wisconsin and Minnesota, modified as such influences are by the direction of prevailing winds, that a climatic division of this region upon parallels of latitude become impracticable.

In central and western New York, and equally in the lower peninsula of Michigan, these influences are so far equivalent to the oceanic influences which modify the climate of southern and eastern New England, that their pomology is practically indentical, and may therefore be considered as mainly without the scope of the subject under consideration.

3. The Wisconsin lake district includes a comparatively limited region in Wisconsin, lying along the western shore of Lake Michigan, which derives a very perceptible climatic advantage from such proximity, which would doubtless be fully the equivalent of that realized upon the eastern shore, but for the fact that the prevailing winds of that region are westerly, bringing an increased tendency to drought and to paroxysms of cold in winter which reach the region without the mellowing influences of the open waters of Lake Michigan; thus creating a climate intermediate between that of the Upper Mississippi valley and that of the lake region proper.

4. The Lake Superior district, including the upper peninsula of Michigan, together with a strip of northern Wisconsin along the south shore of Lake Superior. Although extending northward beyond the parallel of 47°, this district is yet so favorably affected in climate by the surrounding lakes, that it escapes some of the severity of the climate of regions upon that parallel further west.

Although fruit culture has so far received but slight attention there, the experience already had indicates, as may have been inferred from its lacustrine

surroundings and the direction of prevailing winds, especially in winter, that the climate becomes less desirable for such purpose as we proceed westward until we pass beyond the lake influence, and come within the typical climate of the western plains.

C. D. Lawton, of Lawton, Mich., who has spent much time in the upper peninsula of Michigan, states that fair apples are grown there, and that there are many fine trees which sometimes bear well. There is abundance of plums, when frosts do not catch the bloom in spring. They are mostly wild red plums, although the cultivated varieties seem equally successful where tried.

Pears do pretty well also; at least he has seen trees loaded with excellent fruit, which matured nicely.

He never elsewhere saw Early Richmond cherry trees more heavily loaded with fruit than there, wherever they have been planted. The branches needed to be propped up to prevent breaking under the loads of fruit. Currants, goos berries, raspberries, blackberries, and strawberries abound.

Although this is a cold country, it has much good soil well adapted to root crops, as well as to many of the hardy fruits, which will doubtless be successfully grown as soon as agriculture shall become a staple industry.

At the Chippewa county fair in 1880 a fine display of apples was made, grown from trees of hardy varieties obtained from a Minnesota nursery. In Delta county the last state census reports a ten acre orchard of bearing peach trees. Marinette, the half-breed granddaughter of an Indian chief, is said to have planted the first apple orchard in Menominee county, which is still in bearing. C. D Lawton has seen, at L'Anse, Baraga county, fine apples of Fameuse, and some of Russian and other hardy varieties, as well as in abundance of other hardy fruits. Trees from the head of Lake Superior, including Oldenburg, Wealthy, Siberian crab, and others were planted in this county in 1862, which are yet doing well and producing fair crops of fruit. Mr. Lawton also reports hardy apples and other fruits successful in Ontonagon county. The state census of 1884 reports 94 acres of apple orcharding in the upper peninsula.

Owing doubtless to the influence of the surrounding waters, the orchards of the peninsula are exempt from blight, or at least so nearly so that the malady attracts no attention.

5. Since westward of the districts heretofore described there are few if any local influences which essentially modify the climate, the southern prairie district will consist of northern Illinois, and the south two-thirds of Iowa, all of Nebraska, and the south half of Wyoming.

6. The intermediate prairie district will include the south half of Wisconsin (westward of the Lake district), the north one-third of Iowa, the south one-third of Minnesota and Dakota, with the north half of Wyoming.

7. The northern prairie district includes northern Wisconsin, (omitting the Lake Superior region), the north two-thirds of Minnesota and Dakota, and all of Montana.

BLIGHT AND LACK OF ABILITY TO WITHSTAND THE HOT DRY AIR OF THE SUMMERS OF THE WEST AND NORTH.

In the earlier days of apple culture in the northern United States, what is now known as blight seems to have been unknown, or if known, to have been confined to the pear. Even at the present day apple-tree blight, where

known at all from Michigan eastward, has not proved specially troublesome. Only further west, under greater extremes of heat, cold, and aridity, has the malady proved serious and even fatal.

A singular, and to some at least an unexpected, circumstance is, that it becomes even more virulent and fatal as we go northward. Practically unknown in Europe, it in many cases proves fatal to varieties introduced from that country in our interior American climate.

Apparently akin to the blight so often fatal to the pear, like that insidious malady, it has so far eluded the discovery of either the cause or cure; although the comparative exemption of the east and the Lake region of the west including the cold but moist region of upper Michigan together with the observed fact its outward manifestation usually occurs during the heat of the day, strongly indicate that both heat and aridity may be essential to its effective existence. It may also be reasonably inferred that a lack of hardiness in winter may not infrequently be due to the lack of maturity consequent upon loss of foliage from blight in summer.

HARDINESS IN WINTER.

Just what peculiarities of composition and structure go to constitute the quality of wood-growth, known as hardiness, seems yet to be an unsolved problem. It is nevertheless quite well understood that in the case of the apple tree, now under consideration, it becomes necessary that the season's growth shall have been thoroughly perfected; that the maturing processes shall have been completed, and that the whole be done well in advance of winter; in other words, that a hardy tree must be one whose growth is quite sure to be thoroughly ripened well within the proper season.

Aiming to secure results of this character for his state, as well as for the north generally, Peter M. Gideon, of Excelsior, Minn., some twenty-three years since commenced the process of reproduction and selection, using the Siberian crab as the basis of his operations. The following is extracted from his report to the Minnesota State Horticultural Society in January, 1887, as superintendent of the State Experimental Fruit Farm, which, although perhaps over enthusiastic, yet gives a correct idea of the processes employed:

It is with pleasure that I comply with your request to give my views on Russian and seedling apples. The seedling has been my hobby for the last sixteen years, and the success attained gives me hope that not far in the future the cold northwest will be one of the leading apple growing districts of North America.

Twenty-three years ago I planted a few cherry-crab seeds, obtained of Albert Emerson, Bangor, Me., and from those seeds I grew the Wealthy apple; in seven years it fruited, and that fruit convinced me that the true road to success was in crossing the Siberian crab with the common apple, and on that line I have operated ever since, with results surpassing my most sanguine expectations. I did not suppose that in the short space of sixteen years, the time since the Wealthy first fruited, that I should have more than twenty first-class apples, as good as the world can produce, in succession from the 1st of August to March, and in hardiness of tree surpassing all known varieties of the common large apple. But it is done, and in the doing, the problem is solved as to what to do and how to do it, with the material at hand with which to attain yet greater results. At the outset it was test and try; but now that the problem is solved, it is onward, with great results certain.

When I say we have twenty first-class apples, that does not include all that are worthy of cultivation by any means. And now, with such results and only a few thousand trees fruited at the end of sixteen years, what may we not expect at the end of the next sixteen years with 20,000 or 30,000 choice selected trees from the very best of seed which are not yet fruited, and the seed of over 100 bushels of choice apples planted this fall, all to fruit in a few years. Then on planting the seed of the best each year, soon

the choice varieties will count into the hundreds, and the great northwest will be the fruit paradise of America.

To get the desired cross we plant the selected varieties in close proximity, so that the natural flow of pollen will the more surely do the desired fertilizing, and the seed thus produced is planted, the most promising of the seedlings selected and set in orchards for fruiting, and after fruiting the best in tree and fruit is selected from which to grow seeds to try again, and so on; at each repetition I find there is a gain. The young trees that fruited this year for the first gave a larger percentage of first-class than any lot ever fruited before.

By crossing and judicious selection we retain the hardiness of the crab in the tree without the crab thorns, and on top grow large apples without the astringency of the parent crab. And yet by the commingling of the two natures we get an exquisite flavor not found in any other class of apples, especially so when made into sauce. But our triumph is not yet completed. We must—we can, fill up the balance of the year with a continued succession of luscious apples. There is no question as to the certainty of such a result. The past is a guaranty that it can be done.

But the proper cross can not be got in Minnesota—a fact clearly demonstrated in the extensive and expensive trials that have been made in the last nine years in the state orchard. And here let me state that the seedling is inclined to ripen its fruit at or near the time the parent apple did from which the seed was taken; hence the need of seed from long keepers to grow the same. There are no long keepers of the best quality yet found that are hardy enough to fruit in Minnesota; but we can take our best hardy seedling farther south, where the long keepers can be grown and there get the cross, and then bring our seed here to grow, and test the hardiness of the tree and the quality of fruit. We want first-class apples, and to get them we must use first-class parentage, and even then scullions will be numerous, from the fact that all varieties of apples are mongrels of many degrees of crossing, and the various relations will crop out in a multitude of forms. But past success is a guaranty for the future, that out of the many some will be good. Our seedlings will average in quality with Hyslop and transcendent; but those of first-class, such as we propagate, stand about one to five hundred, as hardy as Duchess and Wealthy, and of the extreme hardiest about one to fifteen hundred.

Two years ago this winter was the first time the Duchess and Wealthy were seriously hurt, and a like fate befell all the Russians on our grounds, so that not a Russian set an apple on our grounds the next year, whilst alongside of them our seedlings carried a fair crop, some of them profuse, and this year all bore heavy crops; showing beyond a question that the crab infusion is to be the foundation of successful fruit culture in the northwest. The state orchard yielded about 100 bushels of apples this year, all of which being off our own seedlings; all else of value failed two years ago this winter. This fall we planted the seed of over 100 bushels of choice apples, to grow for experimental purposes.

Among the numerous varieties thus originated by Mr. Gideon he names Lou, August, Florence, Cherry Red, Excelsior, September, Martha, October, Wealthy, Gideon, Peter, and January as especially desirable, and as supplying a succession from the 1st of August to March.

Feeling the importance of being able at the earliest possible moment to supply an ample assortment of varieties adapted to the climate, not only are prominent fruit growers watching carefully such local seedlings as come to their knowledge, but horticultural societies also are aiding the work by the appointing of committees and in various other ways.

At the annual meeting of the Minnesota State Horticultural Society, in January, 1887, a black-list, consisting of semi-hardy varieties "that it may be considered especially dangerous to recommend for planting in large quantities," was adopted, as follows: Mann, Bethel, Walbridge, Fall Queen (Haas), Pewaukee, Alexander, Borsdorf, Northern Spy, Salome, Utter's Red, Fameuse, Wolf River.

At present many are probably looking earnestly to the newly-imported Russian apples to supply the deficiency; *but whatever shall be the measure of their success, actual trial alone can demonstrate their ability to meet and supply so extreme a want.*

The Iowa Agricultural College, from the outset, seems to have made an earnest effort for the development of the horticulture, and especially the pomology of the state. An early step in this direction was the planting of an extensive orchard, comprising the varieties at the time considered hardy in the state. The increased severity of subsequent winters began to tell upon it, and when it began to show serious signs of failure, another plantation was made of iron-clads, to be top grafted with such varieties as were reputed to be specially hardy. Among these were a considerable number of local seedlings, which had acquired special reputation for hardiness. These were interspersed with some selected Russian varieties, thus affording a comparative trial of the two. In the summer and fall of 1887 many of these last were bearing fine crops, while, as stated by Professor Budd, the recent exceptional winters had almost wholly swept away the supposed hardy natives interspersed among them, while the remains of the older orchard were being dug out and burned.

Doubtless, under the influence of discouragements akin to those already described, Mr. A. G. Tuttle, of Baraboo, Wis., imported scions of Russian apples probably as early as 1866 or 1867, which he proceeded to propagate, test, and disseminate. To these he subsequently added varieties from other and later importations, so that he now has a very considerable orchard exclusively of Russian varieties in full bearing.

A visit to this orchard in August last found several of the earliest varieties already past season, while others were ripe or rapidly approaching maturity, affording apparent ground for the claim that, owing to change of latitude, or other cause, there is among them a deficiency of long keepers. However this may be, the trees which had withstood the trials of the recent severe winters were almost universally sound and healthy, excepting that a very considerable number of them gave evidence of the effect of blight upon the younger branches during the past summer.

The healthy condition of this orchard (and the same is true of at least another in the vicinity) was in strong contrast with that of other trees upon the same premises, except of such of our native varieties as have usually been considered very hardy, such as Fameuse, Willow, Ben Davis, Grime's Golden, and others, many of which showed serious, if not even fatal, injury, doubtless the effect of the trying winters already referred to.

The U. S. Department of Agriculture also, in 1870, made an importation of scions from Russia, of which a list of numbered varieties is published, and the scions widely distributed for trial. The Russian names were so difficult of pronunciation, that even yet they are very commonly referred to by numbers.

An early test of a very considerable number of these, including perhaps some of their own importations, was made by Ellwanger & Barry, of Rochester, N. Y., by the planting and fruiting of them in their trial grounds.

An examination of these in fruit, in company with W. C. Barry, early in September, 1883, showed nearly all these, even then, fully ripe or already over-ripe; and the quality, without exception, proved to be so low, that the general conviction was that their chief value must be supposed to consist in their ability to transmit their probable hardiness to a progeny of new originations of higher quality.

In 1878 or 1879 the authorities of the Iowa State Agricultural College deputed Prof. J. L. Budd to arrange for the importation of trees, plants, and scions from localities in central and eastern Europe in which, from similarity

of soil, climate, etc., he might hope to obtain varieties adapted to the conditions occurring in Iowa and other portions of the northwest.

In pursuance of this purpose, the professor, in company with Mr. Charles Gibb, of Abbotsford, Quebec, made a lengthened visit to central and eastern Europe, extending their trip as far as the valley of the upper Volga, where, in most essential particulars, the climate is nearly akin to that of the valleys of the upper Mississippi and Missouri. As the result of such visit and examinations, beesides other fruits, shrubbery, forest, and ornamental trees, no less than nineteen importations of apples were made between May, 1879, and January, 1885, from various localities in Russia, Portland, Germany, and Austria.

These, together with those secured from the importations of others, have been extensively propagated at the college, and the product widely disseminated, at a nominal charge, for trial throughout the northwest, so far as their success seemed probable, but under an arrangement providing for careful reports of results.

Complaint is made by President C. G. Patten, of the Iowa State Horticultural Society, and by others as well, that some of the Russian apples are slow growers—a peculiarity which may with some of them prove to be constitutional, having, as they had, their origin at the extreme north, where, doubtless owing to the shortness of the growing season, together with the unusually arid climate, the tree under continued propagation from seed assumed a permanently dwarfish condition, not likely to become changed by the transmission of the variety to a different climate—a fact likely to prove equally true so far as hardiness also is concerned; although it must be conceded that in this particular there may be, at least, apparent exceptions, since at Des Moines, on the grounds of Hon. C. L. Watrous, were found a considerable number of what are considered to be among the hardiest and most desirable of the Russian apples, trees of which, four or five years planted, when cut through, were found to be more or less black-hearted, and many of them quite past the possibility of successful growth and permanent usefulness. Similar cases of obvious winter killing in the cases of older bearing trees of Russian apples were also seen upon the grounds of A. W. Sias, of Rochester, Minn., as well as in another extensive orchard in that vicinity, and also upon the grounds of President Patten.

A change of latitude, accompanied, as it must necessarily be, by a change of climate, and especially in going southward, by lengthening of the growing season, must necessarily change the season of ripening, at least in the case of a winter fruit. This is a well known result of such migration of our native fruits, which must prove equally true of these importations, although the extent of such variation can only be surmised in advance of actual trial.

There is also in America, and doubtless likewise in Europe, an unmistakable modification of the character of fruits, doubtless due to modified climate, when transferred inland, even without change of latitude; but just how much of such change may be due to greater aridity, higher or lower average temperature, more violent extremes, deficient moisture in the soil, or to variations of soil, is a problem too complex for satisfactory solution under these varying circumstances; while a change in the season of maturity and possibly the variation of the quality of fruit may be anticipated, and the probable direction of such variation foreseen, its amount, whether in season or quality, can only be determined by actual trial.

While, therefore, there are in many minds grave doubts as to the soundness of the opinions put forth by Professor Budd and others respecting the sufficiency of the Russian apples to meet and supply the present lack, such doubts seem mainly to turn upon the question, *whether, under so extended a transplacing, they are likely to sufficiently retain their original long-keeping qualities.* In this connection it is perhaps due to the professor to state that, while he does not deny the objectionable modification of the earlier importations of Russian apples as to the season of ripening, he urges that these were west Russian or sea-board varieties; and that the varieties from the interior, where the climate is more nearly that of the prairie regions, have been but recently imported, and that they yet lack time to show results. He insists that among these there is good reason to anticipate a sufficient supply of long keepers.

Since these experiments are being conducted at the south (latitude 42°), the objection of pre-maturity may be expected to become less and less as we go northward, where the chief question becomes that of sufficient hardiness.

The blight of the apple tree, if not wholly unknown in New England and New York, is at least so little known as scarcely to excite remark; while in Michigan it rarely attacks a tree below the growth of the current year, and not even that to such extent as to effect serious injury. As we go westward the malady becomes increasingly troublesome beyond Lake Michigan, increasing in virulence westward, and especially northward. At 20 miles from the lake, in Wisconsin, it occasions more or less injury; while at Baraboo, midway across the state, it becomes increasingly troublesome, occasional trees being nearly or quite ruined by it. In northern Iowa and southern Minnesota it is quite as prevalent and injurious. Still further north, at Excelsior, Peter M. Gideon finds it very troublesome upon crab seedlings, while his orchard of Russian apples has been utterly ruined by it.

From all the circumstances it seems highly probable that there may at least be a climatic predisposing cause. If so, there would probably be between the apparently similar climates of central North America and eastern Europe some occult difference which has so far eluded observation, since this malady, so prevalent and destructive in the former, is said to be practically unknown in the latter.

The number of varieties included in these several importations of apples can not be less than 350. If, among these, a dozen, or even a half dozen, satisfactory long keepers shall occur, in addition to to the earlier ones already tested, the undertaking will doubtless be felt to be amply justified, to say nothing of the means acquired for the origination of a better, because hardier race of fruit in the future.

Mr. Lyon here gives a tabulated list of about 400 Russian apples, as reported by Chas. Gibb to the American Pomological Society, indicating the degree of their success in the several districts, and continues:

It is quite generally conceded that these Russian importations have yielded several early varieties of apple fully equal, if not in some respects superior, to any of our older native varieties of similar season, and that these are hence likely to prove valuable even in regions in which their superior hardiness is not specially important.

The most serious complaint respecting these importations as a whole is found in the fact that in the latitude of southern central Iowa, to which they come mainly from a region lying from 8° to 12° further north, the transfer

to a more southern and longer summer so hastens the maturity of their fruit, that the most of them become late summer and autumn fruits, failing partially, if not wholly, of a winter supply, which would be more specially desirable.

Although the full import of such change can only be determined upon the general distribution and fruiting of these introductions, which must yet require several years, this claim (which receives more or less confirmation from the fruiting of some of the earlier introductions) finds much support from the behavior of our native varieties, when thus transferred, even for short distances, within our own country.

It is urged, on the other hand, that while southern Iowa and Nebraska can depend with more or less certainty upon their ability to produce a supply of this fruit from some of the hardiest of our American varieties, further north these utterly fail, and that in such localities, even including whole states and territories, the question, practically is, apples or no apples, while with their shorter seasons the objection of pre-maturity partially or wholly disappears.

It is also very forcibly urged that the objections are being made upon results from the earlier importations, which mainly came from near the sea-coast, where the climate differs widely from that of the steppes, whence the later and mainly untested importations have come; also that the alleged prematurity can not be properly estimated by degrees of latitude, but rather by isotherms; and that from this standpoint, if we trace the lines of equal summer temperature (as a guide to determine the relative seasons of ripening), the season of central Iowa will be found to correspond with that of the region in southeastern Russia, 10° or 20° further north, whence the mass of these later importations came.

In urging this consideration, Professor Budd insists that "so far as the winter apples of south central Russia have yet fruited in Iowa, they prove as good keepers as in their native home. In like manner, our samples of fruits and our reports from our many trial stations north show that the apples from provinces in Russia farther north than Saratov mature almost exactly in accordance with the lines of summer heat traced by Professor Dove across the two continents."

Should the conclusion be accepted that the season of maturity is dependent rather upon thermal lines than upon parallels of latitude, it appears equally probable that variations of flavor or quality are similarly affected. Although this may lack the authority of a determinate conclusion, it may be supposed to warrant the inference that the recognized deficiency of quality in the sea-coast varieties first imported was the result of causes not to be predicted of those more recently introduced, which may, in such case, be expected to more nearly retain their pristine characteristics. For these reasons, if for no others, it would seem wise to give to these the benefit of a full and fair trial before sitting in judgment upon them.

Here follow several pages of quotations from growers throughout the Northern States, giving their experience with Russian and our own hardier varieties of apple.

THE QUINCE.

The common quince (*Cydonia vulgaris*) is indigenous in southern Europe and eastern Asia. It is said to have first attracted attention in the island of Crete, from the ancient name of which its botanical title is derived. It is suc-

cessful in New England, and westward to and including Michigan; but even within the influence of the great lakes it is not successful to any considerable distance north of latitude 43°, while it succeeds but indifferently, if at all, west of Lake Michigan.

The Japan quince (*Cydonia Japonica*) is similarly hardy, and is grown chiefly for its brilliant flowers, which appear very early in spring. There are several varieties, differing slightly in color; some of which, when of mature age fruit freely. The ripe fruit may be used like that of the common quince.

THE BLACK WALNUT.

The black walnut (*Julgans nigra*) is one of the largest of northern forest trees. Its limit northward is probably not much, if any, beyond latitude 44°, although it is being planted for timber and shelter even farther north. Reports from northern Wisconsin, Minnesota and Dakota indicate that, in those regions, its permanent success must be regarded as problematical; dependent, possibly, upon a judicious selection of soil and aspect.

It is successful in southwestern Iowa; while in central Wisconsin it has been found to grow well for a few years and then fail. It is said to grow and fruit well in southern Minnesota, as well as in other portions of Dakota. It is found to be more satisfactory at the extreme north, when grown from northern seed, a fact that is believed to be true of plants generally.

The English walnut* (*Juglans regia*) is grown largely and with profit in some of the Pacific states, but fails at the east and is too tender for the extreme north.

THE BUTTERNUT.

The butternut (*Juglans cinerea*) has a somewhat more extended range northward than the black walnut. It is perfectly at home, if not actually indigenous, in Michigan up to latitude 45°, and is abundant as a forest tree in portions of southern Minnesota in that latitude. Although not supposed to be indigenous, it is successfully grown in portions of Iowa, and there seems good reason for the hope that it may be found successful as far north as the national boundary, possibly even further.

THE HICKORY-NUT.

The genus *Carya* consists of several species, of which *Carya alba* is very widely distributed, and may be considered to be the northern hickory-nut proper.

Carya sulcata, the western shell-bark hickory, has a nut of large size, with a very hard, thick shell. It is indigenous from Pennsylvania to Illinois and Kentucky. In Michigan its extreme northern limit is reached in the third tier of counties in the lower peninsula.

Carya olivæformis, the pecan is said to be indigenous along the Mississippi river as far north as southern Iowa, which is believed to be its extreme limit northward.

*The proper name of this nut is *Madeira nut*, because it came originally from the island of Madeira, in Portugal, and is in no sense English.—H. E. VAN DEMAN.

Besides the foregoing, *carya tomentosa* the mocker-nut or white-heart hickory; *Carya glabra*, the pig-nut or broom hickory, and *Carya amara*, the bitter-nut or swamp hickory, are indigenous and more or less common, although of little value save as useful timber. Their limit northward can not be said to be determined, save that Messrs. Wheeler and Smith, in their Michigan Flora, remark that "No member of this family gets much north of latitude 43°."

In southern Minnesota, however, near the latitude of Saint Paul (45°), the hickory (*Carya alba*) and bitter-nut (*Carya amara*) are reported to be successful, probably as artificially planted trees.

THE CHESTNUT.

The American chestnut (*Castanea vesca*) finds its northern limit in Michigan at about latitude 43°, although it is apparently hardy much further north, probably throughout the lower and possibly in some portions of the upper peninsula.

West of Lake Michigan this tree is not known to exist as an indigenous growth, although when planted on suitable soils it proves hardy and successful.

Chinquapin (*Castanea pumila*) is a native of southern Pennsylvania and Ohio, and on south, and is only known further north as an introduced curiosity.

The European or Spanish chestnut (*Castanea vulgaris*) bears a much larger nut, though less sweet than the American. The tree is tender at the north and west, except in specially favored localities.

The Japanese chestnut is a comparatively recent introduction, apparently quite similar to the Spanish, although it is claimed to be an earlier bearer, with even larger fruit. It will no doubt prove tender, at least north of latitude 43°.

PROMISING NEW CHERRIES.

BY PROF. J. L. BUDD, OF IOWA.

In Bulletin No. 2 of the Iowa Experiment Station, 1888.

In the summer of 1882 the writer had a fine opportunity for studying the character of tree and fruit of the European cherries from the valley of the Moselle in east France, eastward to the Volga in Russia.

In the spring of 1883 we imported one-year-old trees of the varieties which we decided to be most promising for trial on the prairies of the northwest.

These trees were set in orchards and have had hard usage, as they have been exposed to the recent test summers and winters, that have killed out the trees, young and old, of the grade of hardiness of the Early Richmond and English Morello, and in addition they have been cut mercilessly for scions in autumn and buds in summer.

A better opportunity for determing the relative hardiness of trees and perfection of foliage has not been given in the history of prairie settlement.

With this severe trial we are now pleased to report that many of the varieties have endured the tests as perfectly as our native plums, such as De Soto and Wolf, and have proven quite as hardy in fruit buds.

During the season of blossoming the past spring we had severe frosts, yet twenty or more sorts fruited, some of them very heavily.

We are also pleased to report that the fruit so far has come up to our European estimate in quality and color, but not in size on account of the strong growth of new wood induced by heavy scion cutting in autumn.

Spate Amarelle.—Much grown for dessert and culinary use in east Poland and north Silesia, where it is noted for its regular and bountiful crops. Tree smaller than English Morello, with pendulous habit. Our trees from five to six feet in height were bending with the weight of the fruit this season. Fruit medium to large, color dark purple when ripe. Flesh and juice colored. When first colored red the fruit has a bitter taste. At this stage of growth it is excellent for canning, and when fully mature it is desirable for dessert use. Season about the 20th of July.

Schattan Amarelle.—The word "schattan" is said to mean shadow. Hence we shall send it out as Shadow Amarelle. The name comes from the mirror like reflection from the shining skin. Much like the above variety in size, shape, quality and season of fruit. Trees were laden this "off" cherry year.

Gros Lang Loth.—We have sent this out as "Large long late." A small growing variety coming into bearing in the nursery. It is known in Poland and Silesia as "Double Shadow Amarelle" but is not identical with Brusseler Braune as stated by Leroy. Fruit, large, roundish, truncate at stem end, nearly black when ripe. Juice colored. Pleasant sub-acid flavor when ripe. Season of English Morello.

King's Amarelle.—Tree larger than the above and less pendent in habit. Fruit round, truncate at both ends. Flesh white, soft, juicy, but when fully ripe the juice is slightly red. Pit very small. Ripens with Early Richmond.

Amarelle Bouquet.—A small growing tree with fruit much like Richmond in season and quality but with more grape sugar.

Cerise De Ostheim.—Tree some larger than the above, with pendulous shoots even when young. It fruits early and is hardier in tree than what is known as Minnesota Ostheim, and bears larger, better, and earlier fruit, pit small, flesh and juice red, tender, juicy, and when ripe pleasantly sub-acid.

Orel.—We have given this name to a dwarf variety, from Orel, Russia. It belongs to the Vladimir race, with small leaves and close habit. It comes into bearing when from three to four feet in height Fruit larger than Montmorency, nearly black when ripe and very mildly sub-acid in flavor. Promises to be very valuable for the north.

Shubianca.—Another variety of the Vladimir family with small leaves and close habit. Fruit smaller and later than the above, black, and excellent in quality.

23 Orel.—As yet we are not certain as to the proper name. A neat, round-topped tree with firm, thick leaves. It comes into bearing early and seems very hardy in fruit bud. Fruit much like Richmond in color, season, and quality.

Doppelte Natte.—Tree of larger size than the above with more upright habit. It has not held its leaves this season better than Montmorency but it is ordinarily good in foliage. It has stood the recent winter perfectly. The fruit this year was perfect and agrees with Dr. Hogg's description. Fruit large for its class; skin dark brown or brownish black. Flesh very red and juicy, and when fully ripe of rich, aromatic flavor. This late year it ripened July 20th.

Griotte Imperial.—A small tree and an early bearer. Foliage better than Richmond but this year not perfect. Fruit large, dark red, inclined to conical, flesh and juice red. Flavor pure and free from bitter even when immature. Mildly sub-acid when ripe.

Brusseler Braune.—A variety much prized on the sandy plains of East Poland. A larger grower than Richmond, with good foliage. Fruit large, nearly round; purplish red in color, juice slightly red, flavor pure and quite acid. As it contains much grape sugar it is valuable for canning and drying. Later I think than English Morello.

Lutovka.—A fine, round-topped grower with strong shoots and good foliage. Much grow in Poland, north Silesia, and south Russia, for making "Kirschwasser." Fruit large, yellowish red when ripe, flavor pure and sprightly; season late. Will be valuable for dessert and culinary use.

Bessarabian.—Our favorable report of this variety of 1885 we are glad to repeat. It will endure more abuse of tree than most of our forest trees. Our original tree has been cut for buds and scions for five years taking off all the new growth. Yet the tree is sound to-day. Fruit large, dark red, firm fleshed, and when ripe very mildly sub-acid. It promises to make a long-lived tree of considerable size, and to prove a regular bearer of choice fruit.

Sklanka.—A handsome, round-topped tree with pendent branches and best of foliage. Our trees standing on rich, black soil, where the Richmond utterly failed even prior to our recent test winters, are as perfect as box elders. Fruit large, skin yellow and red. Flesh yellow, firm, very mildly and refreshingly sub-acid. Pit very small, season of the Montmorency.

Frauendorfer Weichsel.—A strong-growing tree with weeping shoots. Tree very hardy and foliage good. It is described by the leading horticultural writers of west Europe, and it seems strange that it was not previously introduced. Much grown in Poland and north Silesia. Fruit large, dark red, truncate. Flesh tender, juicy, sub-acid, and good for any use.

Strauss Weichsel.—Another fine tree with good leaves. Fruit large and nearly black when ripe. Flesh juicy, refreshing, and nearly sweet. Season a few days later than Richmond, very promising.

Lithuar Weichsel.—Much grown in Livonia in southwest Russia, for drying and cherry wine. A good, hardy, strong-growing tree. Fruit smaller than Richmond, but with smaller pit, and thicker flesh. Skin nearly black, flesh quite acid, colored dark red, and with much grape sugar. Most valuable for culinary use.

Griotte Du Nord.—As introduced from North Silesia this is not identical with "Ronald's Large Morello" as stated by Downing. A good tree with very good foliage. Fruit large, nearly black, flesh firm. Matures about the 20th. of July In East Europe it is grown on north walls for very late use.

Juniat Amarelle.—A neat, round topped tree of the Griotte type. Fruit much like Richmond in size, color, and season, but firmer in flesh, and better in quality.

24 Orel.—The name is not yet known on account of loss of invoice when the one-year-old trees were imported. A fine grower with large, thick leaves, strong buds, and large shoots. Fruit about the size of the English Morello, dark red, firm, colored flesh, mildly acid, season of the late Richmond.

27 Orel.—Another strong-growing, hardy sort of great promise. The few first specimens indicate a late season, but they were taken before they were ripe enough for testing.

26 Orel.—This is the "Lianzkaja Black" of east Europe which we will send out in the future as "Orel Sweet." It appears to be hardy in tree and fruit bud, but may not do well as far north as some of the preceding. The single original tree has been sadly abused by continued scion cutting, in summer for buds, and in autumn for grafting, yet it is in good condition with pefect foliage. Fruit medium in size, black, with very small pit. Flesh dark colored, and decidedly sweet. Very promising as the hardiest sweet cherry in our collection.

25 Orel.—This was spoken of in the Bulletin of 1885 as one of the Valdimar varieties. But it proves to be a Griotte much like 23 Orel, but some later in fruit and larger in size of tree.

Heart-Shaped Weichsel.—This is given in eastern European catalogues as "Herzformige Weichsel." It is an evident cross between the sweet cherries of the east and the dukes. It is admitted as a lawn tree in east Europe on account of its symmetrical habit of growth and handsome, striped leaves. The first impression is that the tree is not in perfect health on account of its remarkable foliage. Fruit large, heart-shaped, purplish black in color, and nearly sweet. Highly prized for dessert use in east Russia, where most of the sweet cherries do well. It may not succeed well north of the 42d parallel.

George Glass.—Under this name we have a cherry from Marshal county, Iowa, where it was introduced from northeast Germany. In leaf and habit of growth it much resembles Bessarabian. Its fruit also shows a near relationship to that variety. Very promising.

The following varieties are hardier with us than Early Richmond, and the

foliage is quite as perfect as any of the above noted sorts. But on our trying grounds they have shown in the stem some slight indications of winter injury, and cannot be recommended for trial north of the 41st parallel. The descriptions of fruit are from our European notes, mainly.

Abbesse De Oignies.—Of the Red Duke family, grown in east Russia, on favorable soils in north Silesia, and southeast Russia. In no case have we known the leaves injured by rust or mildew. Even the present unfavorable seasons the foliage of our budded trees is perfect. Fruit large, round, dark red. When ripe mildly sub-acid.

Red Oranien.—This is given by Hogg and Leroy as a synonym of Carnation. But as we have it from north Silesia it is of the Red Duke family, and very unlike the Carnation in leaf, habit of growth or fruit. As it endures the spring frosts in north Silesia, and east Poland, its promising for trial in south Iowa. Fruit in season and quality much like the preceding.

Amarelle Bunt.—Another variety of the Red Dukes much prized in north Silesia for dessert use and cooking. A fine grower in orchard and nursery and far hardier in tree on our grounds than Richmond or English Morello, mainly, I think, on account of its more perfect foliage. The fruit is highly prized in the markets of Warsaw, Poland.

Duchess De Angouleme.—Of Red Duke family. Foliage perfect and a fine grower. A heart-shaped fruit of large size and excellent quality.

Gros Gobet.—This has been classed with the Montmorencies, and even with the Kentish, but it is plainly crossed with the east Europe Dukes. Fruit large, red. Flesh white, quite acid, and best for canning. Ripens about the 2 th of July with us.

Red Muscateller.—A cross with the Red Dukes, with neat habit and good foliage. Common in north Silesia on dry soil. Fruit large and said to be of good quality for dessert and other uses.

Double Glass.—First seen in north Silesia. A fine grower with perfect leaf. A large fruited variety of the Red Dukes likely to prove valuable south of Des Moines.

Vilne Sweet.—A variety sent us from Vilne in southwest Russia. As tested at Vilne the fruit was large, early and sweet. A good round topped grower with best foliage. We regard it very promising for trial in south Iowa.

GENERAL NOTES.

Deep Setting.—It is general conceded that dry ridge soil with porous subsoil is best for the cherry. On such soil the trees set in orchard should be put down from four to six inches deeper than they stood in the nursery. Eastern trees are always budded on tender roots and we are compelled to root graft on the Mazzard roots, or bud on the Mahaleb. By setting deep, roots will be thrown out from the scions, or above the bud, in two or three years. Indeed, the Russian and East German sorts often throw out roots from the scions the first year after setting the root grafts in nursery. When rooted from the scion in the nursery the seedling root can be cut away, and the tree put in the orchard on its own roots, permitting rapid multiplication by sprouts and root cuttings.

Heading Low.—Even in west Europe low cordon and bush training of the cherry is becoming common in many parts. In east Europe, in sections remote from large bodies of water, all stone fruit trees are headed low. In

the Volga region the cherry is grown in bush form, with several stems like the currant or gooseberry. Experience has also favored the very low stems, or even bush form in all the prairie states. Often the stems are fatally injured when the twigs show no discoloration. Fortunately, many of the east Europe varieties favor the shading of stems by their pendent habit of growth. But even with these it is best to have low stems, the lower the better.

YOUNG TREES IN THE ORCHARD.

As a rule we find that parties receiving the one-year-old cherry trees sent out from the college for trial, put them in nursery rows with view to setting them in the orchard when they attain the proper size. A little thought will exhibit the fact that it is far better to set them where wanted in orchard. The little trees have all the fibrous roots, and can be rapidly and safely transplanted. By raising the bark at several points, on the part of the little stem above the point of union with the stock, the emission of roots from the scions is favored, and the height of the stem and the form of top can be established with little trouble. If growing where wanted, specimen fruits can be secured on many sorts on trees which our friends think are about the proper size for transplanting.

NURSERY PROPAGATION.

As we are compelled to use tender seedlings for cherry propagation, we are anxious to impress the fact that root grafting the cherry is far better for the planter than propagation by budding. The roots grafts are set down to the top bud of the scion, thus placing the tender root considerably below the surface, and favoring the emission of roots from the scion. When set still deeper in the orchard such trees are not liable to root killing. As root grafting the cherry does not seem to be generally practiced, the mode of procedure that has given us an almost perfect stand with forty varieties all on Mazzard root, this season, may be useful. The scions were cut before severe cold weather last fall and packed in dry forest leaves in a box in the cellar. If packed in sand, earth, or moss, we find they absorb too much water. The scion is put in the Mazzard seedling at the crown by the mode known as "side grafting," the main requisite being to make the wedge on the scion only slightly, if at all, thickest on the outside. The usual instruction in regard to making wedge thickest on the outside is overdone. The whole pressure coming on the bark and the cambium layer gives no room for the young cell growth that favors union of stock and graft. We pack the graft, after tying and waxing in earth, sand or moss, taking care to leave the main part of the scion exposed to the cellar air. A dirt-covered cave is best for storing the grafts and it must be kept cold. The temperature is regulated by opening the cave in the early part of the evening, when cold, and keeping it tightly closed during the day. Light freezing does no harm, but if warm enough to start the buds before they go in the nursery they rarely make a profitable stand. Keeping the buds dormant is the main essential to perfect success. With started buds, the change of temperature, and moisture of the earth, when planted out in the early spring, will rot the buds of the scion.

LATE GRAFTING OF THE CHERRY.

All writings upon the subject favor very early grafting of the cherry in the open air, and the use of strictly dormant buds in grafting under cover. These instructions are well founded, but they hinge on the principle that the cell structure of the wood of the stock and scion must be in the same condition. If root and scion be started about equally they will unite quite as well as has been stated by Mr. Henry Avery and others. To illustrate: Last spring, late in April, it became necessary to take up several valuable cherry trees loaded with fruit buds. We cut off all the scions down to the two-year-old wood, and set them on Mazzard seedling roots in the graft room. The grafts were put in the nursery a few days later and over ninety per cent. of them have made strong growth. In this case the buds were started, on one variety, so as to exhibit the points of the embryo leaves, yet the roots taken from the cellar had started fully as much. If the seedling had been kept dormant in the ice house I do not think a single scion would have united with them. This principle applies to all top-working in the open air of apple, pear, cheery, plum, etc. If the work is deferred until the buds on the stocks are well started, the scions should be about equally advanced. In late spring grafting we have failed almost completely with the scions kept dormant, and have succeeded perfectly with those cut as needed in the open air.

MIXED PLANTING.

Observations in Europe and this country favor the belief that alternating varieties in the cherry or plum orchard favors regular and continued fruitage. A variety that might prove to be a very poor bearer when depending on its own pollen supply, may be found regularly fruitful when intermingled with other sorts. In our climate, if the weather during the blossoming period is hot and windy, a variety may mature and waste its pollen before the stigmas are ready to receive it. In such the pollen of adjoining sorts may perform the needed work with the aid of the insects or the breeze.

THREE FRIENDS TO HORTICULTURE,

BEING BRIEF BIOGRAPHIES OF

HON. EDWIN WILLITS,

ASSISTANT SECRETARY OF AGRICULTURE, WASHINGTON, D. C.

ROBERT C. KEDZIE, M. A., M. D.,

PROFESSOR OF CHEMISTY, AGRICULTURAL COLLEGE, MICH.

ALBERT J. COOK, M. S.,

PROF. OF ZOOLOGY AND ENTOMOLOGY, AGRICULTURAL COLLEGE, MICH.

THREE FRIENDS OF HORTICULTURE.

EDWIN WILLITS, M. A.

That Michigan should furnish the first Assistant Secretary of Agriculture, under the new status of the national department of agriculture, was gratifying in great degree; but that Edwin Willits should be chosen and our Agricultural College deprived of his valued services detracted not a little from the satisfaction engendered by state pride and knowledge that a deserving man had received his deserts. What concerned horticulturists still further was the loss from the college of an official who had been their friend and recognized their interests more fully than his predecessors.

If Michigan horticulture owes much to the Agricultural College, and there can be no doubt that it does, it owes much also to Mr. Willits, for he was its friend when friends were few. From 1860 to 1873 he was a member of the state board of education, and during his first year succeeded in changing the policy that body pursued toward the college, and submitted the plan adoption of which caused the formation of the state board of agriculture and the reorganization of the Agricultural College upon a basis of independent existence. Says one of his biographers, upon this point, "He foresaw and was among the first to advocate the necessity of the change, and it seems like a curious instance of that compensation which time sometimes brings about, that, after the lapse of more than a quarter of a century, he should be placed at the head of the institution whose true policy he did so much to shape in its early days." It was largely by the aid of President Willits that the department of horticulture was advanced to its due relative position at the college, and furnished with needed accessories and encouragement. It was consideration of these things, as well as the marked wisdom and success of his adminstration of college affairs in other respects, that led the Michigan State Horticultural Society, at its meeting in March, 1889, to pass resolutions warmly eulogistic of Mr. Willits and his work and congratulatory to President Harrison upon his selection for assistant secretary of agriculture.

Born at Otto, Cattaraugus county, New York, April 24, 1830, Mr. Willits has had a varied career, one embracing several different occupations, but nearly all in the line of educational work. His early life was spent in the county of Washtenaw, where he prepared himself in the public schools and by private study for entrance to Michigan University, whence he graduated from the literary department in 1855, subsequently receiving from the University the degree of M. A. Study of the law with Isaac P. Christiancy, at Monroe, provided for Mr. Willit's admission to the bar in 1857, and he followed the practice of law for several years, but ere long followed the bent of his genius and won high repute both as a teacher and a superintendent in the schools of

Adrian and Monroe. For thirteen years, from 1860, he was a member of the state board of education, and from the first was prominent in its work. His activity in politics was by no means slight, nor the public positions he occupied few. He was successively prosecuting attorney of Monroe county, postmaster at Monroe city, and member of the state constitutional commission. He was also three times elected member of congress from the second district, receiving large majorities each time and running "ahead of his ticket." In national legislation he was as prudent and industrious as in other matters, several times distinguishing himself both in debate and origin of legislative measures. During his terms in congress he was favored by many for the office of United States senator and received votes for that office in two or three contests in the state legislature. These two were given him entirely without his seeking. The profession of journalism also is proud to number Mr. Willits among its membership, he having for several years, with marked ability, conducted the Monroe Commercial. He was not long allowed to rest from public duties after close of his six years' service in congress, for in 1882 he was called by the state board of education to the charge of the Michigan State Normal School, which position he resigned only to accept the presidency of the Agricultural College, which office he assumed upon the 19th of August 1885.

Soon after the beginning of his administration, President Harrison appointed Mr. Willits assistant secretary of agriculture, the selection having been first suggested by the scientists of the department, who were so impressed by Mr. Willits, when in Washington the preceding year, on College business, that they united in requesting his appointment. Under such exceptional conditions, only acceptance was natural or possible, and Mr. Willits resigned his presidency, and in April, 1889, assumed in Washington his new duties. He was at once, by an order of Secretary Rusk, dated April 26, 1889, assigned much of the most important work of the department, being placed in charge of the botanical division and section of vegetable pathology, the pomological division, the Microscopical division, the chemical division, the ornithological division, the forestry division, the entomological division and the silk section, and the office of experiment stations, having of all these the general control and direction of their scientific policy, the whole involving an annual expenditure of more than a million dollars and involving great responsibilities.

That all this important labor will be well performed there is abundant warrant in the many successes of Mr. Willits life, the result of natural qualities and acquired knowledge and experience which have stamped him as one of the strong men of the nation.

ROBERT C. KEDZIE, M. A., M. D.

What farmer or fruit grower in Michigan does not recognize in the portrait of Dr. Kedzie the face of a friend as well as that of a genial, frank, and courteous man, keen in thought, industrious in research, tireless in action, the whole realm of his activities controlled by rare intelligence and a great fund of that which is given charity to most men—common sense? There are those, of course (and more's the pity) who do not know Mr. Kedzie as a personal friend, but surely there is not one man among all the kinds of tillers of soil, at all conversant with the lore of his calling, but recognizes him as a distinguished benefactor. Of all the men who have done grand work at our Agricultural

College, probably no other one is better known or held in higher regard than is Dr. Kedzie by the farmers of Michigan. We well recall the first series of farmers' institutes held in Michigan, of which valuable system of schools for farmers he was the originator, in which Dr. Kedzie's invaluable lecture on manures was only equaled by that on lightning rods, in which, after exhaustive scientific treatment of the subject and careful instruction how to make the very best possible lightning rod, his final advice was like the scriptural passage which enumerates a tantalizing variety of oaths but summarizes with the injunction, "swear not at all." In various ways have Mr. Kedzie's labors as professor of chemisty been beneficial to farmers, and scarcely less to fruit growers, but notable instances are his analyses of manures, soils, forage plants, as well as his several contributons on peach yellows, to the reports of this society, (some of which were the very earliest information obtainable on the subject to Michigan fruit growers) and those on other horticultural subjects. Laterly his experiments with the growth of plants upon the northern pine plains have been useful in the same direction.

Dr. Kedzie's labors at the Agricultural College have been nearly co-extensive with the college itself, all but the first ten of its more than 400 graduates having been in his classes. He has seen the college grow from two inferior buildings to its present fine proportions, and helped mightily to secure its firm establishment from an almost hopeless beginning. The whole faculty has changed during his quarter of a century of service, but he remains, aged indeed, but in full vigor still, like the great oaks beneath whose shade his years have clustered no faster then his honors.

But Mr. Kedzie has other fame than that of a schoolman. Obtaining from Oberlin College, at the age of twenty-four years, his degree of Master of Arts, he two years later graduated in medicine at Michigan University, and in 1850 established himself in practice at Kalamazoo, going thence, soon after, to Vermontville, where he remained as a physician until the opening of the war of the Rebellion, when he became surgeon of the Twelfth Michigan Infantry. In 1867 he became a member of the Michigan legislature.

His distinguishments in the medical profession comprise membership in the Michigan State Medical Society, of which he was president in 1874; of the American Medical Association of whose section on State medicine and public hygiene he was chairman in 1876; and a member of the American Chemical Society. He was president of the Michigan State Board of Health for a number of years, until he declined renomination; also president of the American Public Health Association in 1882. He has issued, for popular use, many papers on public and household hygiene, whose great value is proved by their extensive reproduction and circulation, some of them having been translated into European languages. He also originated the scheme of sanitary conventions, on the same plan of his farmers' institutes, which is now annually in operation with highly satisfactory results.

Last year Prof. Kedzie was elected president of the American Association for the advancement of scientific agriculture, a deserved recognition of his service in this direction. The practical value of his knowledge of chemistry as applicable to agriculture, was illustrated one day last spring, within the observation of the writer. An Ottawa county vineyardist said to him, "Prof. Kedzie, do I need to buy ground bone for my grape vines, having at hand plenty of wood ashes?" A full explanation of the properties of both fertilizers was promptly and cordially given, and the grape grower remarked after-

ward, "That one answer will save me fifty dollars per year." Such examples of the value of Dr. Kedzie's services to the horticulturists and farmers of this State could be cited almost without end; and not the least of their virtues lies in the ungrudging, familiar, and intelligible way in which his invaluable advice is given.

The close of his work will necessarily come not a great many years hence; but in his present vigor of both mind and body, and his cheerful, genial, inspiring presence, as well as his willing and ceaseless industry, the whole people of Michigan have cause for thankfulness.

A PEN SKETCH OF PROF. A. J. COOK.

BY DR. F. W. GOLDING.

How frequently, when tracing the genealogical records for information concerning some noted character, we find the statement, "His father was a farmer." Such is recorded of Washington, Lincoln, Webster, and a host of others, and the same must be said of the subject of this sketch.

At an early day the elder Cook settled near what is now Owosso, Michigan, in a heavily timbered country, where by hard labor and wise management he created from, the primeval forest, one of the finest farms in the state

There August 30, 1842, Albert J. was born, there he passed his childhood, and there, too, was laid the foundation of his education, while attending the schools in the vicinity. Being very fond of flowers and animals, (as was his mother), while yet a boy he made a collection of the plants and insects of that vicinity, taking great delight in studying and arranging them.

In 1859 he began a full course of study at the Michigan Agricultural College, where, after four years' careful preparation, he was graduated, in 1863, receiving the degree of B. S., the records showing an almost perfect rank in mathematics and the sciences.

After completing his studies, he turned his face westward, reaching California the following year, where he was soon engaged in teaching. Remaining in this work until 1866, he returned to Michigan, soon after being called to the assistance of his *alma mater*, where he has been continuously up to the present time, more than twenty-two years, occupying the chair of Entomology and director of the Entomological laboratory.

Prof. Cook was drawn toward the study of Entomology through his love of nature, and being of a practical turn of mind the economic side of all questions relating to the sciences was always uppermost in his thoughts, the study of bees being particularly interesting to him. His published writings on this subject alone are of sufficient importance to place his name among the most eminent of naturalists, while as an economic entomologist he stands second to none.

Michigan, unlike her sister State of Illinois, has never fully realized the benefits that would accrue to the agricultural and horticultural interests of the commonwealth, by the establishment of the office of state entomologist, though the subject has been agitated for several years by members of this society. Had such an office been created, in all probability Prof. Cook would have been called to fill it. Though receiving no official appointment, he has been the acting State entomologist for many years, being entomologist

to your society since its organization. Each year are to be found in your transactions, and those of the State Board of Agriculture, valuable illustrated papers on practical entomology, from his pen, which will bear a favorable comparison with the official reports of most of our salaried State Entomologists.

Since being connected with the college, Prof. Cook has taken special courses of study under Drs. Louis Agassiz, H. A. Hagen, and O. W. Holmes, after which he received the degree of M. S., from his *alma mater*.

Prof. Cook has been a voluminous writer, his articles being extensively copied and well received. They are to be found principally in Rural New Yorker, New York Tribune, Country Gentlman, Prairie Farmer, Colman's Rural World, and the various bee journals. Valuable articles on bees and economic entomology were published in the "People's Cyclopedia," and the articles and lectures referred to before, as having appeared in the Michigan State report, are too well known to require more than mere mention at this time. But the crowning effort of his pen was his "Manual of the Apiary, or Bee Keeper's Guide," of which the unprecedented number of over 14,600 copies have been sold since 1876. The encomiums bestowed upon it by the press and qualified apiarists have been of such a character as to place the work among the classics.

Prof. Cook was married, June 30, 1870, to Mary H. Baldwin, of Dayton, Ohio, two children blessing their union—Bertie and Katie. The children have made fine collections in oölogy and entomology, and Clarence Weed, a rising young entomologist, has seen fit to acknowledge assistance from them. Here is an illustration of a peculiar taste being transmitted through three generations.

The life of a College professor is not one to be envied, the duties being so manifold and of such an exacting character as to permit of little time for special work; yet Prof. Cook has, for more than twenty years, continuously advanced his reputation as a teacher, and found time to prosecute his favorite studies successfully.

[Besides the writings referred to by Dr. Goding, Prof. Cook has published "Maple Sugar and the Sugar Bush," a very complete and fully illustrated treatise, the only one on this subject ever published. Five thousand copies have been issued. His well known work, "Injurious Insects of Michigan," of which 3,000 copies have been published, is now being revised and enlarged and will soon appear. His little work, "Silo and Silage," the result of his own work and experience, was scarce issued before 2,500 of the 3,000 edition was sold, and a new edition will very soon be issued. But there are still more of Prof. Cook's good works, and not the least of them, in behalf of Michigan pomology, which deserve mention here. He was the first to prove the efficacy and safety of the use of arsenites for the codlin moth: to recommend the kerosene and soap mixture, so valuable as an insecticide; and the soap and carbolic acid, now recognized as the best specific against borers and bark lice. All this would seem to be sufficient of benefaction to his fellow men, for one man to confer; but it is not in Prof. Cook's nature to rust out the latter part of a life, the pure, strong metal of which has been kept so bright, and there is little doubt but that his greatest work is yet to be done.—E. C. R.]

REPORTS OF LOCAL SOCIETIES,

FOR 1888,

COÖPERATING WITH THE

MICHIGAN STATE HORTICULTURAL SOCIETY.

GRAND RIVER VALLEY HORTICULTURAL SOCIETY

REPORTED BY W. N. COOK, SECRETARY.

OFFICERS 1889.

President—Charles W. Garfield, Grand Rapids.
Vice President—Joseph A. Pearce, Grand Rapids.
Secretary—Thomas L. Brown, Grandville.
Treasurer—E. Chase Phillips, Grand Rapids.
Ex. Board—S. S. Bailey, East Paris, W. N. Cook, Grand Rapids, J. Sailor, Grand Rapids, W. L. Calkins, Grand Rapids.

The society has convened eleven times during the year, at the homes of its members, suiting the dates to the condition of fruits and the wishes of those entertaining the society. The attendance has averaged over one hundred at each session. Papers of interest have been read at the various sessions, and the social feature of the meetings has been wonderfully attractive. President Garfield, owing to disability, was absent from a number of the meetings, but his chair was acceptably filled by Vice President Pearce.

A paper by Asa W. Slayton given at the October meeting, at Cedar Springs, is appended hereto, also the president's annual address.

The annual meeting convened at Burton Farm, the home of the president, and was an exceptionally fine meeting. Admirable addresses were given by S. S. Bailey, Col. P. V. Fox, Mrs. Lucy Brown, E. L. Briggs, Thos. L. Brown, and others. It was decided to continue the plan of holding meetings at the rural homes, during 1889, and the following scheme was adopted by the executive board:

February meeting, at residence of John Graham.
March meeting, at Wyoming Grange Hall.
April meeting, at residence of Henry Smith.
May meeting, at residence of H. C. Hogadone.
June meeting, at residence of E. Manley.
July meeting, at residence of C. W. Garfield.
August meeting, at residence of E. U. Knapp.
September meeting, at Western Michigan Fair.
October meeting, at Talmadge Grange Hall.
November meeting, at Harrington Grange Hall.
December meeting, in city of Grand Rapids.

The society continues its allegiance to the State society, and proposes to acquiesce with any arrangement the parent society may organize for the continued progress of the horticultural interests of the state.

PRESIDENT'S ADDRESS.

In conforming to the regular custom of presenting a formal address at the annual meeting, I shall not follow any beaten pathway, neither shall I be very dignified or systematic in my method; but rather shall chat familiarly, as has been my custom from month to month, of some matters that seem to me of importance in connection with our organization—jog your memories, as it were, upon some things that in the multiplicity of cares you may have forgotten.

We are pretty easy with regard to our annual fees. We do not wish to keep any one away who does not feel able to contribute the small amount of his share toward aiding the society machinery, and keeping it in good working order; but possibly we may have been lax in gathering what justly belongs to us. One thing is certain, we have no fund in the treasury, the interest upon which will enrich our officer in charge, and we do not desire to have more than we need for actual expenses. But experience has taught us that we need to use about what a dollar a year from each family will aggregate; and my suggestion is that this money be gathered at the opening of the year. Possibly it might be a good scheme to give the secretary a percentage of the dues collected, in lieu of all other compensation, and thus furnish an additional incentive to securing promptly the settlement of the membership fees.

The financial affairs of our society may be conducted in a very simple manner, for there are not many transactions to be recorded. But because the receipts are exceedingly limited, and the disbursements light, is no excuse for a lack of method in management. Would it not be well to have all money received paid into the treasurer's hands, and give him no discretion in disbursement, except upon written order of some authorized officer of the society? In this manner the treasurer will, at the close of the year, hold vouchers for every dollar he has paid out, and an auditing committee will have little to do in settling for the year's transactions.

It occurs to me we have adopted the most sensible plan of holding meetings yet devised for an organization of this kind, and I thing it will be continued. There are many fine things connected with the ownership of an attractive hall in which to hold meetings and exhibits. It would be a very satisfactory condition of affairs to have gathered sufficient funds to endow our society so that it need not beg for memberships or "farm out" its meetings; if we were rich, had a fine hall of our own, a large income, and all the requisites for carrying on the society upon a broad scale, we could not get more actual comfort out of our monthly gatherings than we now do, and it is really a question whether the net outcome would be so attractive as it is now, with our cares at minimum, and no responsibility of property. We may not be able to have our names in Bradstreet's reporter, but for those who are identified with the society for the comfort there is in it, this sort of notoriety has no charms.

I take it the mission of our society is to bring those who love the art of horticulture near to each other, that they may enjoy the association without adding to their responsibilities. We meet to have a good time and recreate

in the presence of Flora and Pomona without the accompaniment of sacrifices or unnecessary pomp and show. Avoiding any stiff formalities, we shake hands and exchange experience. We act upon the plan that we are in this world to help one another and reap as large a measure of satisfaction as possible from our environment. "Live and let live" is our motto, and if there is any horticultural good that comes to any one of us, it becomes the property of the whole. In carrying out this idea, we can not afford to have jealousies, or invidious comparisons, and our society should be perfectly free from them. The promotion of kind feeling and aiding each other in securing the largest reward from the soil and the most wholesome satisfaction from the prosecution of our employment, should be the aim of our society.

We are all experimenting, but in a disjointed way, and often our results are misleading. In order to reap the highest benefit from any line of experiments made by the state experiment station, I have arranged to make a test of any varieties desired by the station, upon Burton Farm, the tests to be made in the name and for the benefit of our society. I want the society to take sufficient interest in this work to suggest desirable tests to be made, and to counsel with regard to the management of the trials in hand. We still owe allegiance to our parent, the State Horticultural Society, and should not fail to do our part in its support. We need the valuable annual reports for our members and should be prompt in our contributions toward maintaining the high character of these documents. Our secretary should be authorized to prepare an abstract of our proceedings, that we may appear upon the pages of the forthcoming volume as an aid to the society that has done so much in promoting Michigan's horticulture.

Although we have suffered from the change of occupation of Mr. Skeels, who was selected as our official reporter, still we cannot lay any blame at his door. I trust the society will continue to fill this office with some person fitted for the work, to whom the newspapers can go with confidence for accounts of our proceedings, and through whom we can hope to be correctly interpreted by the press.

The future success of our society depends upon economy of management, simplicity in our arrangements, and interesting the young people in the objects at which we are aiming. A society like ours cannot exist long if there is a continuous struggle to make both ends meet. By spending little we can gather enough funds without extra effort to carry us along, and the matter of finance may be dropped out of our minds. But the question of expense is often little thought of in the management, and money is voted for various purposes that could well be subserved in some other way. If by convening at our own houses hall rent is saved, and we have just as good times, why spend money for a hall? If by dividing the labor of caring for the details of management we can avoid paying any money for the work, and it is just as well done, why not economize in this way? But the success of all this lies in such simplicity of arrangement as to make the labor light. In meeting at the homes of our friends we should expect to take care of ourselves, and reduce the labor and trouble we make to the least amount possible. It is only by this means that our scheme can be made to work for years without becoming irksome to some. And by all means, to ensure permanence to our work, and a constantly increasing interest, we must secure the coöperation of those whose hair is not silvered and on whose faces we can look without noting the care lines. It is legitimate for us to keep young, and absorb cheer-

fulness by associating with the young, and interesting ourselves in their matters. It is far better to do this than to expect them to enter enthusiastically into matters that naturally command the attention and thought of the older ones. In the arrangements for another year let this thought be given prominence. And finally shall we not, from the outset of the new year, plan to attend these monthly meetings and enter heartily into the exercises? The recreation will aid digestion, beget enthusiasm in horticulture, and add zest to our lives. The value of life in this world lies in what we can get out of it; and these meetings, if we can enjoy them without too much sacrifice in other directions, are avenues, the traversing of which can but add to our measure of enjoyment, and thus enable us to absorb more fully the intention of the power that makes for happiness as well as righteousness.

PROPAGATION AND CULTURE OF THE PEAR.

As the members of this society are little, if any, engaged in the nursery business, but much in producing fruits, I shall have very little to say about propagating the pear. I have grafted the pear on both the common apple and crab apple roots, and by setting them deep, so as to root from the pear scion, they have made productive and durable trees.

In the spring of 1857 I set a pear orchard of 200 trees, on my farm in Grattan, Kent county, an experiment then considered somewhat hazardous. There were 30 Bartlett, 30 White Doyenne, 20 Flemish Beauty, 20 Louise Bonne, dwarfs; and less of others, to make up 16 varieties. Two-thirds of the land was a heavy loam, the remainder, sandy, and there I set the Flemish Beauty. The land had borne but three previous crops. It was well plowed and thoroughly harrowed.

I had a man dig good, liberal holes, another careful, patient man to set the trees, while I trimmed roots and tops and distributed. The after culture was an annual pruning in the spring, just as the buds were swelling, as much hoeing and clean cultivating as I would give a hill of prize corn, and a good washing with soap suds once or twice each year. In 1859 many of the trees blossomed, and in 1860 the fruit was allowed to mature on several of them. One tree, an Onondaga, produced 80 pears, measuring a full bushel. Another, a dwarf Bartlett, not larger in diameter than my forefinger, was so heavily laden that, one morning, I found the top resting with its burthen on the ground, and thereafter it was supported by a stout stake. Such loaded trees! they were beautiful sights, truly; but what did they cost? Well, none of the trees allowed to so overbear came into full bearing again until the fifth year after.

In the fall of 1860 I took first premium at the Kent county fair for varieties of pear, exhibiting thirteen kinds. I had had no blight, and was enthusiastic, confidently asserting that I could take the naked ground and produce a hundred bushels of pears much sooner than a hundred bushels of apples could be grown.

On my return from the war, it was found that the dark clouds had settled somewhat on my pear orchard, many trees showing the browned and blackened leaves of the pear blight. I went at them in midsummer, with knife and saw, cutting off and burning all to below the dried leaves and shriveled bark. Some recovered and are alive and productive now, while some died for good. I remember that of one tree, an Onondaga, the whole top, nearly,

was affected so that I had to cut it square off just above the lowest limbs; but it recovered and made a good tree. As in a flock of sheep, or among people, all are not destined to reach maturity, so in a pear orchard, some of the trees will die of foot-rot, or measles, or mumps; while others, with just the same care, will reach prolific old age.

Besides picking pears at from $1.50 to $3 per bushel, these are some of the lessons which I have harvested: I can buy good pear trees, delivered by the tree agents, at seventy-five cents, one dollar, or one dollar and a half, according to size; or I can buy equally as good trees direct from the nursery at twenty-five, thirty, and thirty-five cents each, and transportation is cheap. I say not a word against agents. If you employ one you pay him.

A loamy or stiff loamy soil, not wet, is best; quite sandy soil does not favor longevity in the pear.

INGHAM COUNTY HORTICULTURAL SOCIETY.

PREPARED BY JAMES SATTERLEE.

The programme of this society was, for the first half of 1888 as follows:

Saturday, January 14—Gardening for women in doors and out. Mrs. A. Wise.

Saturday, February 11—The ornamentation of Lansing streets. Led by James Satterlee.

This is a live topic to the people of Lansing, and should command general attention.

Saturday, March 10—A talk on insects injurious to ornamental plants. Professor Cook.

Saturday, April 14—Discussion on strawberries. Led by W. E. West and R. H Holmes.

Saturday, May 12—The flora of Lansing and vicinity. Professor Beal.

Saturday, June 9—The annual flower show, detailed announcement of which will be made at the proper time.

The meetings are held at 2 P. M., standard time, on the second Saturday of each month, in the pioneer room in the state capitol. The room is reached by the elevator. Everyone interested is invited to be present and to take part freely in the discussion, whether a member or not.

L. H. BAILEY, *President.*

JAMES SATTERLEE, *Secretary.*

The June flower show was quite a success, calling out a large collection of cultivated plants and bouquets of wild flowers.

The meetings of the latter part of the year were discontinued on account of the absence of the secretary and resignation of the president.

At the annual meeting for 1889, Prof. L. R. Taft was elected president; Mrs. S. R. Leete, vice president; R. F. Holmes, treasurer, and J. Satterlee, secretary. A programme for the first half year has been adopted, and the interest in the meetings is good.

The number of members for 1888 was nineteen, and $9.50 has been sent to the state society.

GARDENING FOR WOMEN IN-DOORS AND OUT.

PAPER BY MRS. A. WISE, READ AT JANUARY MEETING OF INGHAM COUNTY SOCIETY.

To speak of the advantages of gardening as an occupation for women, in these times, when flowers are so universally cultivated, and when almost every residence lot has its little garden plot and every house its window garden, seems almost a needless effort. It is one of the most hopeful indications of

growing refinement and good taste among our people, that love for the beautiful is constantly increasing. We look back and recall the desolate surroundings of only a few years ago, the rough log cabin, the wild, untamed natural shrubbery, the stretch of dreary woodland, and the still more unattractive aspect of stumps and weeds which greeted the eye on every hand. Out of all this barrenness have come the beautiful, tree-embowered avenues, the green, sloping lawns, and the flowers which are everywhere to be seen. Truly, the wilderness of Michigan has blossomed as the rose. And with the growing opportunity for the cultivation of the beautiful in every department, the desire to possess and enjoy flowers has become an almost inseparable characteristic of every home loving woman and girl.

The advantages of flower gardening as an occupation for women, are almost too obvious to require mention. Nothing can be more conducive to good health, and to the development of that sunshiny spirit which makes the gladness of every home. The labor of the garden affords a degree of invigorating exercise which is exactly adapted to counterbalance the confinement of household duties, and to furnish a much needed antidote to the excitement of social pleasure. An hour or two every day spent in work among the flowers, would save countless doctor's bills, and bring health to many a complaining invalid.

It would be strange if we did not value flowers, because they are capable of adding so much to the beauty and attractiveness of home. The neatly kept flower beds, resplendent with brilliant colors, the cottage embowered in climbing vines, the delicate perfume of rose and lilac, the constantly changing picture of brightness, warmth, and color, are attractions to every one. It should be the ambition of every woman to make her home the most lovely spot on earth, and nothing will help to do this more than flowers. Boys and girls alike will learn to appreciate and value them; and when the winter comes and desolation reigns without, the good house-wife knows how to keep it summer still within by gathering into nook and corner the relics of the summer's glory.

In attempting to beautify the external surroundings, the first requisite is a well graded lawn, kept in a neat and flourishing condition. This, like the background of the artist's picture, is the foundation for all future effort. It should not be, as is so often the case, crowded with trees, neither should it be too much cut up by flower-beds; but, although we need to avoid too great disturbance of the lawn, there is nothing more beautiful than beds of flowers or foliage plants cut out of its surface. It seems strange that so easy a method of gardening should be so little in vogue among us. Many a broad expanse of green which presents the finest opportunity for a brilliant display of flowers or foliage, is left untouched, while a heterogeneous collection is huddled together in a shapeless mass near the house. All who have visited the Agricultural College grounds, within the last two or three years, must have admired the skillful arrangement of form and color which makes their gardens so beautiful. It is not expensive to plant such beds. Many seedlings, such as verbenas, petunias, etc., may be utilized at a trifling expense. Geraniums afford a beautiful variety for this kind of planting, but the most useful plants for this purpose are coleus, alternantheras, centaureas, and sedums. A special advantage of this is that they are never troubled by insects of any kind. A few plants may be taken up in the autumn, before chilled by frosts, and kept in some warm place until spring, and from these you can readily propagate, if you do not wish to buy them of the florist

Climbing vines may be used to great advantage, not only to cover unsightly objects, but to relieve the garden from stiffness. We cannot find a more graceful and beautiful vine than the clematis, of which some of the choicest varieties are perfectly hardy. The wisteria is equally hardy and very desirable.

But time would fail me to speak of all the hundred different ways in which flowers may be made to beautify the grounds. Belts of shrubbery may be planted in suitable places, with good effect, and a constant succession of bloom may be had during the season, with but little labor. The spireas, deutzias, and weigelia are among the best of this class. The hybrid perpetual roses will dazzle the eye in June and July, and there is scarcely a month during the summer that you cannot find a supply of blossoms. There is no difficulty in keeping them through the winter, if in the fall you bend down the branches and place a piece of sod on them; then cover with straw and the plants will grow stronger every year.

Too much cannot be said in favor of the monthly rose. No flower is so interesting. It is continually in bloom, and its fragrance is unsurpassed. The pansy also is a flower we cannot dispense with. It exceeds all others in its great variety. No class of flowers has been so improved by careful fertilization. Plants put out in April will bloom all the summer, but they require fertilizing and a plentiful supply of water to produce large flowers.

The first requisite for success in gardening is a love for the work; the second is common sense, and the third untiring watchfulness. Of course the plants must be fed well or they will dwindle and grow sickly. Many persons leave plants in the same ground year after year, and then wonder why they do not bloom more. Frequent top-dressings of well decayed manure, are necessary, or some of the artificial fertilizers that are prepared for the purpose may be used to good advantage.

A very important point is to keep the garden well sprinkled or watered in some way, and to keep a healthy growth. Then you will not be much troubled by insects of any kind. The rose slug is sometimes troublesome, and a good plan is to syringe the bushes with whale-oil soap early in the season, when the leaves are just opening. I have also found hellebore very good.

When the field of labor is transferred from the garden to the house, greater watchfulness is necessary. One of the greatest obstacles to success with house plants is the dry and overheated atmosphere of our living rooms; but light sprinkling every day will help very much. The number of plants that will give good satisfaction in the house is small. Geraniums are always valuable and easy to manage. Roses require great care, but will repay the trouble. Abutilons are always in bloom, and there are also fuchsias that will give good returns. The calla lily must not be forgotten, for when well-grown it is one of the most noble looking plants we have, and very little trouble. Rich soil and plenty of water are necessary, and then they will bloom freely. The eriphyllum is a very good winter bloomer, and a great many begonias bloom all the winter. Among the best of the latter are rubra, robusta, Saundersonii, and multiflora. In early winter the chrysanthemums cannot be surpassed and are worthy of great attention. Later in the winter we have the bulbous-rooted plants, producing their lovely and fragrant flowers. Among the most desirable for early bloom is the freezia, and a little later the narcissus, hyacinth, and many others.

The novice in floriculture should be careful not to undertake too much at the beginning. It is far better at first to cultivate a few only, and these of the easily grown sorts, than to make more extensive efforts. Occasional reverses must not be allowed to discourage, for failures are necessary to the acquirement of that experience which alone can bring success. Patient effort and care will never fail to produce their reward.

SOUTH HAVEN AND CASCO POMOLOGICAL SOCIETY.

OFFICERS FOR YEAR 1888.

President—C. J. Monroe.
Vice President—A. H. Cook.
Secretary—Wm. H. Payne.
Treasurer—R. W. Linderman.

This society keep up weekly meetings except during the busy season from July to November; but during that time, usually in August, it has been customary to hold three or four out-door meetings, gathering at the home of some fruit-grower, going systematically through his orchards and criticising his modes of planting, care, trimming, and culture, then gathering at the house to listen to the report of the "viewing" committee; and in the discussion which follows, the grower has a chance to defend his modes and give his reasons. Then the baskets are brought out and a late good dinner ends the day. The society numbers this year over one hundred members, and when they are all out with their wives and invited guests, we have pretty much all that is known here of practical fruit-growing.

The season opened briskly for us, in making preparations for the State Farmers' Institute, held here Jan. 23–25, and the annual dinner of the local society to be held at the same time. The institute was a success in all points —the attendance was large, the interest intense, and a great impetus was given to the study of pomology and the best modes of culture, handling, and marketing of fruit. The meetings of the society immediately following this event were devoted to discussion of papers read before the institute. The first was "The Ideal Apple for Market," by J. G. Ramsdell, when it was agreed that forty feet each way was the proper distance to set apple trees; five or six of the best varieties are enough; then, with good cultivation, pruning, manuring and spraying to destroy the codling moth, the orchard would be both productive and profitable; that while the ideal apple was not yet in sight, the best six varieties for this section would be Baldwin, Red Astrachan, Northern Spy, Oldenburgh, Wagner, and Maiden's Blush.

At the next meeting was discussed the paper on "The Ideal Peach for Market," by A. S. Dyckman. After a vigorous discussion, each one was called upon to present a list of the best eight varieties, with this result: Hale's Early, Jaques, Hill's Chili, and Smock received a unanimous vote. Then, in their order, came Barnard, Snow's Orange, Gold Drop, Lewis' Seedling, and Switzerland. Several more had a few votes each and strong recommendations, but the others were tried and true. It was also recommended that the Hale's Early be planted only on high and dry ground, as it is then

less liable to rot, and it matures before the dry weather sets in; that the Crawfords could not be raised on low or moist ground, and if planted at all it must be on high, dry ground; that peaches would do better on sandy soil, as it is quicker and moister in a drouth, but that most varieties would do well on clay ground thoroughly drained and tiled.

The next meeting discussed a paper on "The Ideal Pear for Market," by J. Lannin, during which the following points were brought out: That the pear, while one of our finest fruits, was subject to blight, but on the whole pear culture was as profitable as peach raising; that the pear prefers a strong, dry, heavy soil; the ground should be well drained or tiled, heavily manured and cultivated, or, if left in grass, heavily mulched; but trees will blight in either condition. The codling moth is partial to the Flemish Beauty, while Clapp's Favorite rots at the core if not gathered at the proper time, which is, as with all other pears, when it will part readily from the twig when gently lifted. This pear should be placed in a dark room to mature. As the experience of many members, in growing pears, was limited, there was a wide difference of opinion as to best varieties. All admired the Bartlett, but as other varieties were wanted they were recommended in this order: Bartlett, Flemish Beauty, Seckel, Sheldon, Anjou, Clapp's Favorite, Bosc, Louise, Howell, and Vicar; and for three varieties of dwarfs, Duchess, Louise, and Howell.

The next discussion was on a paper by C. T. Bryant, on "The Ideal Plum for Market." Whether owing to soil, location, moisture in the air, mildew, fungi, or curculio, the experience of members was that they could get a crop only once in four or five years, and it would not do to plant plums for market with the expectation of making them profitable; but if a person wished to take the chances of occasionally having some, or for his own use, he should plant on high and dry ground, first Bradshaw, then Damson and Union Purple.

The next meeting discussed the paper on "The Ideal Grape for Market," by O. Beebe. Most members thought grape vines were set too closely, and 8x10, 10x20 and 16x16 feet were recommended. It was shown that grapes were profitable for market but to get the best results they should be set on high, dry soil, and trained up and pruned so as to get the best effect of circulation of air and sunlight among the fruit. It was recommended by many that all grapes be laid down during the winter, because it pays to do so. The trellis system found the most favor, although many used stakes. The best of care will be amply repaid in dollars and cents. The Concord, Worden, Niagara, and Brighton were the favorites.

The next meeting discussed a paper by A. G. Gulley on "The Ideal Strawberry for Market." That there is money in strawberry culture was unanimously agreed, but the amount per acre was dependant somewhat on prices obtained, but more on the care and attention bestowed upon them. Strawberries are valuable, in the succession of fruit, as bringing in the earliest returns and a little money when most needed. Strawberries can worked and marketed before the peach season commences, and will grow on land not adapted to the peach. They should be mulched just as soon as the ground freezes. Like all other fruits, if fed liberally they will produce liberally. After the second or third crop, turn under just as soon as berries are picked, set out a new bed each year and turn under one each year. The favorites were the Cumberland, Wilson, Crescent, Sharpless, Bidwell and Miner, while

Jas. Vick, Jessie, and Jewel were well spoken of but not so well tested. The fruit should be picked by reaching below the berry with thumb and finger and cutting the stem with the thumb-nail. On the next meeting the topic of "English Sparrows and How to Destroy Them" was taken up and discussed. It was claimed the sparrows were driving off the birds that destroyed the worms and insects, and refused to do their work, so that these insect pests were increasing, and it was resolved to take prompt measures to destroy the sparrows by shooting, trapping, and by placing poisoned seeds where they congregate, but out of the way of domestic fowls.

During the year discussions were held on the merits of high and low pruning, the evidence going to show that the trees should be pruned high enough for the horse to pass under, and the top open enough so that the sun could enter and color and flavor the fruit. On pruning black berries and raspberries, there was some difference of opinion. More inclined to think they should be pinched back at from two to three feet high and the laterals cut back in the spring to within six inches of the stem. Currants and gooseberries should be trimmed so as to make a good shaped bush, open to the air and sunlight. Grapes, if stocky, leave four buds; if slender, two. Do not let too many limbs grow, and pinch back to give stockiness and better fruit. Cut suckers when they start, unless to renew the old vine. In setting trees, prepare the ground in the fall. In the spring, just as soon as the ground is dry and warm enough, set the trees 20x20 feet, if peaches or pears, and twice that distance if apples. A peach tree should be trimmed up like a whipstalk, and all the broken or bruised roots cut with a sharp knife, leaving the smooth cut on the under side of the root, for the sprouts to strike downward, as little rootlets will spring from the bark all along the cut. Plant eight or ten inches deep, or two inches lower than in nursery rows. If set too deeply they will not do well, as the roots need light and air. Take good care for the first two years. Do not cultivate later than middle or last of August, as the stimulant will cause late growth and winter killing. Trees should be cared for about the same as corn.

On the 30th of April, Professor Erwin Smith of Michigan University, who had been gathering statistics and studying yellows in Maryland and New Jersey, met with us and we had a discussion about yellows. He stated that he had visited hundreds of orchards where yellows was prevalent, at the east,and exhibited photographs and drawings which were recognized as just the same as the Michigan yellows. He also stated that they held that there were two kinds of yellows, and that poverty of soil was a prime cause; and he wished to obtain the opinions of the experienced growers of this section. The consension of opinions, of those present, was that what caused yellows, or how communicated, no one yet knew; that in its modes of spreading it was a law unto itself; that richness or poverty of soil, new or old, made no difference; that all varieties were alike subject to it, and that the only remedy yet devised was the axe. Cut the infected trees, pile the branches around the stump, and in the spring, when removed, plant another tree in the same place, if you like, and it will not be affected. Do not draw loads of green branches from the affected trees through the orchard. Bees appear to carry the contagion to the blossoms. Yellows is gradually dying out in this vicinity, and is reported less and less each year. There will be no relapse, for the cure is radical.

On the 4th of June the first notice was given of the appearance of the strawberry midge in this vicinity. It is described as a very small insect, about the

size of a flea, and quite as lively. They are first of a yellow color, which changes later to brown. They work in the blossom. Some of the strawberry beds had one-third of the fruit destroyed. Some had used soap suds and a kerosene emulsion, without effect, and had not dared to use poisons for fear of leaving some on the fruit. A committee was appointed to study the habits of this midge, with magnifying glasses, and note the result and report. They seem to be spreading, but how seriously they will be felt remains to be seen.

The discussion of the results of spraying was continued, and the society recommended procuring spraying pumps for neighborhood use, to spray apple trees, and to try the effect on peach and plum trees.

The discussion of the best modes of packing, shipping, and marketing fruit, and the problem of transportation, which has occupied the society *ad interim*, all the year, seems likely to end in some kind of fruit growers' union for mutual protection, and more so as the crop this year was enormous, and poor in size and quality, on account of dry weather, with corresponding poor prices and loss to growers. Still the year has shown marked improvements in many respects, and as our motto stands high, the next year will show further advancement.

ALLEGAN COUNTY POMOLOGICAL SOCIETY.

OFFICERS FOR 1888.

President—Wm. Peet.
Vice President—Chas. Manwaring.
Secretary—G. H. LaFleur.
Treasurer—Allen Wood.

This society held monthly meetings during the past year, but no regular programme for the year was adopted. We have considered such topics as to the season and the locality in which the several meetings were held seemed best adapted.

The society meets in different towns in the eastern part of the county. The social manner in which the forenoon is usually passed, and the picnic dinners are among the pleasant features of these gatherings.

In accordance with an invitation from the fruit growers of the town of Otsego, the Allegan county pomological society met at the grange hall in that township. There was a good local attendance. Preparations had been made to serve a bountiful dinner to a crowd of hungry grangers and fruit growers. Great credit is due the ladies who contributed to the dinner, and by their presence added largely to the interest of the meeting.

The meeting was not called to order until dinner had been served. In the absence of both president and vice president, Brother Hart, master of the grange, occupied the chair with an ease and ability which demonstrated the educational influence of the grange. The pomological society is under great obligation to the grangers of surrounding towns for the interest they have manifested in our success, and for courtesies extended to us by way of invitations to hold union meetings in their halls. These meetings have always been instructive and enjoyable.

A. T. Stark delivered the following unique address of welcome:

When God placed man in the garden of Eden, the perfection of the divine bill of fare included nothing but fruits. History tells of the vast improvements made in the quality of all kinds by culture and by the propagation of new varieties. In his natural condition, man, it seems, did not need flesh or cereal to support his health and strength. The changed condition of artificial living seems to demand them. The cultivation of fruits requires continued residence in one locality, hence the cultivation of those habits of industry and economy conducive to the highest state of thrift and cultivation. Descend one step in the scale of civilization, fruits drop out of the bill of fare. Their place is imperfectly supplied by the cereals, and those vegetables most easily grown. Descend still lower, cereals and flesh make the food; another step, flesh alone supports the Esquimaux, the Tartar, and the

Indian. "Hog and hominy" formed the tissue of men who could perpetrate the crimes of Libby and Andersonville, whose purple stain time can not erase from the page of our history. Let us look at it this other way, and say that man ran wild as a savage; that of necessity he is at first a hunter; then a herdsman; that deprived by circumstances of his natural diet, fruit, his appetite becomes depraved and he craves alcoholic stimulants and tobacco for a relish or to quiet a craving for something not within his reach. Occasionally we see relics of barbarism in the persons of men otherwise civilized. Offer them a fine peach or a bunch of grapes, they will look away and say in a kind of disgusted manner, "Thank ye, I have just taken a *chaw of terbacker.*"

But to return to our hunter transformed into a herder. The country rapidly fills with settlers. He can not occupy land enough to support a hundred families. He finds in spite of himself that he must abandon his business or raise less but better stock in a smaller compass. His ideas enlarge by contact with his neighbors, and by the addition of grain and vegetables to his diet. He joins the grange; he is induced to cultivate fruits by a member of a pomological society. His mind expands, his morals improve, he becomes a teetotaler. His children eat fruit and so do not crave tobacco; he grows more and more civilized; he is converted to Christianity; he joins the church; he finally becomes an accepted contributor to the Andover Review. What a wonderous change! Fruit, the leading factor in civilizing and Christianizing the world! How devoutly should we wish to support its culvation and use.

As a society for promoting its culture, how sincerely does Otsego grange welcome you! The tendency of our time seems to be toward the division of production, whether agricultural or manufacturing, into single lines. Within the memory of some of your members, everything that was needed in the family, that possibly could be, was raised, prepared and manufactured on the farm. Every family was a manufactory. This state of affairs necessarily caused an immense amount of labor. Man worked, worked hard from sun to sun, while woman's work was never done. The new condition of things makes it possible for one to accomplish as much as ten did formerly, and with comparatively little exercise of muscle. A hard day's work reaped an acre of grain. Now an easy day's work puts ten in better condition than the one. Ten yards of cloth are woven, ten pairs of socks knit, easier and quicker than one was then. A farmer raised hogs, cattle, sheep and horses; he kept bees, and made his own sugar; he grew wheat for himself and to sell; his wife made butter and cheese for sale and for home use; his only vehicle was the farm wagon, and in it could be easily loaded all the tools and implements deemed necessary to run an 80-acre farm. The virgin soil responded freely to his efforts at cultivation. His few trees comprising his first orchard, surprised him by the loads of luscious apples, peaches, and all other fruits of this latitude. Sheltered as they were by the surrounding forests they thrived and produced abundantly with but little care where now even the trees themselves would not live, to say nothing of bearing fruit.

Now all is changed. The successful farmer, from this time on, will be a specialist. The reasons for this are many and obvious to all careful observers. The changed condition of soil, climate, and markets, price of labor, etc., make it necessary to use the most improved machinery and tools. To raise half a dozen kinds of produce on an ordinary farm, and leave a net profit, one

must have a half dozen lines of tools. Many a man is a bankrupt from trying to do this. A specialty makes it possible for everyone to own a complete line of tools, to successfully carry on his branch of business. The specialist's hogs do not eat his lambs, his colts do not get on a barbed-wire fence, his cows do not browse his apple trees. The specialist gets a better price for his products, for he knows the demands of the markets and meets them. He produces a better article than his neighbor, the mixed farmer. The specialist's pigs grow large in bone and muscle, in comfortable quarters, during the winter; they increase in weight at slight expense on clover in the summer; they are topped off with old corn, ground and cooked, and in August, at the top of the market, they bring the highest price, in a lump, so it can be felt and the money goes to pay off the mortgage or to lengthen the bank account. The specialist's Hambletonian colt brings him $1,000, while his neighbor's brings $250. The specialist's potatoes are a mine of gold, while the bugs and the drought make buyers of the mixed farmers. Curculio and borer and yellows and moths and worms and bacteria, sting and bore and kill and devour and annihilate the trees, and the fruit and foliage thereof, belonging to the mixed farmer, while the specialist wears diamonds, as do his sisters and his cousins and his aunts.

This being very desirable, we welcome you as a society seeking to bring about this state of affairs among us. It is becoming proverbial that the pomologists and their wives and daughters are the best dressed of all our citizens. They well know that fruit is the cause of this and they rejoice and are proud of the knowledge; but did it ever occur to them that fruit is the cause of all of us and all our ancestors wearing any clothes at all? George Coleman has the authority of the holy scriptures for saying that

Adam and Eve were, at the world's beginning,
Ashamed of nothing till they took to sinning,
But after Adam's step (the first was Eve's)
With sorrow big they sought the fig,
To cool their blushes with its hanging leaves—
Whereby we find that when all things were recent,
Till folks grew naughty they were barely decent.
This dress may date its origin from sin,
Which proves beyond a shadow of dispute
How many owe their livelihoods to fruit;
For fruit caused sin and sin brought shame,
And all through shame our dresses came.
Now had not woman worked our fall,
How many who have trades and avocations
Would shut up shop in these our polished nations
And have no business to transact at all?

Thus we find, on looking the matter over, that about all there is in or about us that is good is caused by fruit. Therefore, as a society having for its object the culture of luscious, health-giving fruits, we bid you thrice welcome.

This was followed by a paper by Mr. LaFleur concerning fruit growing in general.

The society was organized for the mutual benefit of all the members. The design is that it may become a school in which all may receive instruction in all the branches pertaining to fruit culture. The method adopted to receive and impart instruction is that each member give the result of his experience and observation with the various kinds of fruit grown by himself or his neighbors. To become successful in growing fruit it is as important that we learn some of the fundamental principles upon which success depends, as it is to become versed in any trade or general business. The larger part of fruit growers are already in possession of the land upon which they are now or expect to be engaged in growing fruit. The first thing to consider is what kind of fruit is best adapted to his particular farm or ground to be occupied. This can be learned by the experience of others who have tested these things. Having settled this question, then select that kind of fruit which is most likely to be grown with profit. This understood at the outset will save a vast amount of labor, time, money and disappointment. Whatever you conclude to plant, the next thing to consider is what particular varieties are best to plant. Those who have had personal experience or large observation are the safest counselors. Such persons are usually among the men who attend and help to maintain pomological and horticultural societies, and will gladly give you the benefit of their knowledge. The best methods of cultivation and management, or in other words such methods as have proved the most successful with experienced cultivators, will be explained and recommended and here the beginner may learn more in a meeting like this than he can learn by experiment in many years, and at a great deal less cost.

When one has become satisfied upon these points, other questions will come up to be settled. First, are your surroundings such as will enable you to place your fruit upon the market without too much risk or expense? Is the quality such that the public will buy it? Hardiness, productiveness, and quality are the three essential points; color, size, and keeping qualities are next to be considered. Another matter of very great importance is the present and probable future demand. There is one thing more that should not be overlooked. Can the fruit under consideration be grown universally throughout a large portion of the country, or is the area limited upon which it can be produced? After having examined and satisfied yourself that your fruit combines all the good points necessary for success, there still remains another question, one which is of as much importance as any or all the others. Are you composed of the right material to become a successful fruit grower? Have you the taste, the energy, and gumption to carry you by and tide you over difficulties and disappointments and conquer success if within the possibilities? If so you have a rare combination of conditions that cannot fail of reaching great and good results if you attend and support your nearest horticultural or pomological society and take an active part in its discussions. A citizen of Michigan may well be pardoned if he claims that the Peninsular state combines as many favorable conditions for the growing of as great a variety of fruits as any state in the Union. This will give large latitude for the selection of whatever may suit his individual tastes or his judgment of what may be the most profitable to grow. The cry of overproduction dates back to a time prior to my recollection, and may still be heard, and in all probability will continue to be sounded in the ears of enterprising fruit growers for generations to come. The man who has made himself familiar

with the history of fruit growing from the time the early settlers planted the seeds brought with them from their former homes, has seen these small beginners increase steadily from year to year, until the amount of fruit grown and shipped is now almost beyond our comprehension. Almost every farm has an orchard, small fruit garden, or vineyard. Something of an idea may be gathered from the report of the shipments of fruit from along the west part of the state.

The vast territory west of the Mississippi that is being settled upon and improved for agricultural purposes, will soon treble the present number of inhabitants, and within a life time will be the home of more people than the entire population of the United States now is; and each year will add to their financial ability to purchase the vast amount of fruit which will be grown within this State. He who would raise the cry of overproduction is evidently near-sighted and can only see the condition of things within a limited space, a very small part of this wonderfully great and growing country. He should go to Chicago, thence to St. Paul, and continue his journeyings west and south, over that immense tract of prairie country, until he is almost lost in amazement at the magnitude of the great northwest. After comprehending something of what is to be—that this great tract will be covered with cities and towns and the entire land densely populated as the eastern country now is—then let him remember that over that great country, teeming with wealth and agricultural productions, the merciless blizzard with icy hand annually sweeps, rendering fruit growing so impossible that even the Russian ironclad apple trees go down before its fury, refusing to yield fruit or blossoms. The millions who are to inhabit that country will grow rich out of the agricultural products adapted to the soil and climate there. Does it seem reasonable that the limited area upon which fruit can be profitably grown will produce such vast amounts as to more than supply the millions of the northwest, until it shall be a drug upon the market? The probability is that millions of people there will long for the luscious fruit which they cannot buy.

I am often asked what kind of fruit will pay the best in this part of the State. It is well to remember that the larger part of the fruit to be sold in the future must necessarily be shipped long distances to reach the markets of the far west. The apple is probably one of the fruits that can be shipped to the extent of this western land. The apple is king of fruits and can be converted into more kinds of food than any other. The chances are that there will be more money made from apples than any other kind of fruit grown in Michigan. It is a universal favorite with the people. Its consumption is only limited by the supply and the ability of the people to buy, both of which will increase as the years go by. Where we now have one acre planted to apples, twenty acres will be needed to meet the demand. He who will plant an apple orchard of good varieties and leave it to his boy, will leave him something that will be a source of revenue for a lifetime. There is also a growing demand for American apples in Europe. [Statistics to prove this were read.] I have more faith in the apple orchards of Michigan than I have in any other orchard fruit. Pears may also be grown with success, and if of the right varieties and handled properly, they can be shipped long distances and usually bring good prices. While the apple is a staple production for food, the pear is a luxury and may be dispensed with. Where peaches can be grown to advantage they are very profitable, and sell for fabulous prices

sometimes. The fruit cannot stand long shipment, and must be consumed as soon as ripe; yet its excellence insures its ready sale and consumption within the distance of its shipping limit. Should the supply of peaches be largely increased, shipping facilities will be improved, which will insure their shipment to more distant markets. Plums and quinces are grown to advantage upon ground adapted to them, and large sums of money are received annually by those who grow them to any extent.

A. D. Botsford: I read the reports of these meetings. I see that the fruit growers are not all agreed upon the best varieties of apple for market. Most of the kinds named were good but some of them certainly could not be grown with profit as market apples. The location, soil, and taste of the person all may have some influence in the statements made by these different persons.

Mr. Phelps: In my experience the Baldwin is among the best. The R. I. Greening is one of the best of the long and well known varieties in quality, and where the conditions are right with proper management can be made reasonably productive.

The Jonathan has many good points. The tree is a fair grower and hardy and certainly productive; for family use it is among the best. Apples should be hand picked when ripe or ready to gather, and placed where they can be kept dry and cool. Later on they should be sorted carefully, placing sound apples in barrels which are to be kept late into the winter and until even late in spring. By this careful method of sorting and packing late in the season one may have apples the year round. Apples for last of winter and spring use should be kept in cellar as near the freezing point as possible. In this way one can have fresh, crisp apples till late spring.

Samuel Webster: The Baldwin is a good bearer, but the quality is not the best, and it is sometimes affected with dry rot. Red Canada is of excellent quality and keeps well and bears about as heavily as most varieties. Any apple which will retain its freshness and flavor for a long time has one good point in its favor.

M. N. Hart once had some apples which were packed in barrels badly frozen. He placed them in a cool cellar and let them thaw slowly. They came out all right. Buyers complain that apples often rot on their hands before they can dispose of them, consequently they dare not pay high prices for them. I think from my experience that very much of this is the result of dishonest packing or ignorance of what constitutes a good merchantable apple. The grower, the commission man, and the consumer all suffer loss through improper packing. If we grow good varieties of apple and put them on the market in good sound condition, well graded, we are almost certain of good paying prices. I will name four good apples which have done well with me: Baldwin, Northern Spy, Jonathan, Red Canada.

John Keniston: I think the Baldwin one of the best. The Northern Spy is a good apple, but it takes a long time to come to bearing.

Mr. Phelps: Is there any method by which we can secure a crop of apples annually from same trees? Had heard one man say that he could secure a crop of apples every year.

J. F. Brest: I have observed that in a given number of apple trees of the same variety standing on ground of like quality and location, part of the trees bear much more regularly than the others. I have found this to be so in many other orchards besides my own. By taking scions from the best bearers and grafting into other trees, found that the result was to secure more

uniformity in bearing. I have grafted trees with scions taken from both good bearers and poor bearers of the variety, and find that each maintains the character of the parent tree. I have grafted with what is termed water sprouts and find that it will take a much longer time to come into bearing than when scions were taken from bearing trees.

Mr. Strait: I understand that nurserymen use scions taken from young trees in the nursery row. Perhaps the nonbearing condition of apple orchards might be partly from such practice.

Arthur Stark: I have trees topgrafted from scions taken from other trees. They commenced bearing the third year and have been bearing since. The trees were 25 years old when grafted. If one has trees of inferior kinds, and they are in sound condition, they can be topgrafted to some good variety. If the work is well done and the trees are properly cared for, and all the old tops trimmed off in proper time, you can change the tops to good varieties that will come into bearing soon.

A. D. Botsford. A principal advanced and susceptible of proof should be pushed to a termination which would place it beyond question, especially if it involves truths of importance that the public should understand. This idea advanced here today in relation to the use of scions from bearing or partial bearing trees, as well as the use of scions cut from the nursery row either for topgrafting or rootgrafting—if based upon facts should be thoroughly tested and settled. Upon this may depend much of success of fruit growers of Michigan.

Mr. Stuck: I have used water sprouts or suckers in top grafting apple trees for an experiment. They were eight years coming to bearing.

I expect to plant some apple trees in the spring. How can I secure trees true to name that will be abundant bearers. Shall I buy nursery trees of the varieties I want or should I get hardy stock and have them topgrafted to the varieties I desire to have in my orchard.

J. F. Brest: I should select good, strong growing trees from the nursery row. Should not ask the nurseryman what kind they were, as I have no confidence in what they might tell me. Should select scions from bearing trees and topgraft them.

A. D. Botsford: There are some honest nurserymen, as honest as the average of men in other business matters.

Samuel Webster: When I buy trees of nurserymen near home have been fortunate in securing good trees and usually true to name. Sometimes mistakes will occur, but I don't think they are intentional on the part of our home nurserymen at least. I had rather trust them than traveling agents who are strangers to me.

Arthur Stark: I don't think all the mistakes made in varieties can be charged to nurserymen. In large nursery grounds there are a large number of men employed to perform the work. These men were liable to make mistakes. The proprietor could not oversee everything. I think we are more certain of obtaining varieties true to name when we patronize small home nurseries.

Mr. Phelps: Will Mr. LaFleur name some of the best varieties of winter apple for market?

G. H. LaFleur: I suppose you mean by best varieties the kinds that pay best to grow for market. I will confine my list to well known and thoroughly tested varieties, which have come under my observation for this part of

Michigan. As we are more interested to know what varieties are best adapted to our own immediate section, I will name: Baldwin, Stark, Hubbardston, Northern Spy, Jonathan, Red Canada. I have named these kinds as being adapted to this section and safe to plant out for an orchard. There are several other valuable kinds, which are fairly successful, but having some weak points.

A voice: Why leave out the Ben. Davis?

The Ben. Davis tree is hardy, fairly productive, and a good keeper, but the fruit has one very weak point which when the public find out they will refuse to buy it. It is inferior in quality as grown in Michigan.

MEETING AT HAMILTON.

Accepting an invitation to meet at Hamilton, a dozen or more members of the Allegan county society were on hand at an early hour, Aug. 16, but were not met by as many people of the locality as they had hoped to see. The purpose of the meeting was to give information about cultivation of small fruits to a number of persons who are about to begin in the business, as lands thereabout are well suited to that purpose. There was a fair attendance in the afternoon, and after entertainment at dinner of most of the visitors, in the homes of some of the most hospitable villagers, President Peet called to order and introduced the first speaker.

A. J. Warner: Small fruit growing is a subject of large magnitude, and while my experience leads me to practices which might not be invariably best for others, yet in a general way the principles are well established. Cultivation of fruit is profitable as to finance and beneficial as to the health of the cultivator. The country about Hamilton is favorable to small fruits, especially grapes, while berries would do well, and pears also. Fruit growing pays in combination with general farming. Fruit brings money easier and the pleasure of its culture is much greater. I have 300 or 400 vines bearing grapes this year. Will they be profitable? Well, I find well grown fruit always salable and always yielding profit in greater or less degree. As to varieties, grow what the public demands. You cannot form and control the public taste. Gluts sometimes occur, and we must expect them and bear the consequences; but on the whole there is money in fruit growing.

Pres. Walter Phillips of the West Michigan Fruit Grower's Association: Overproduction exists only as to poor fruit. The market is always good for the best fruit of every kind. Allegan county, by soil, climate and location, is peerless in the whole north and west as a fruit region. There is money in the larger fruits in all parts of the county, but here there is money in small fruits also, especially grapes. I have in my vineyard forty-one varieties of American grape, but would recommend only three or four of them for general cultivation. Six points are to be considered—hardiness, earliness, abundant bearing, popularity—showiness, keeping and vigor of vine—capacity to resist insects, mildew, cold, etc. I would choose Worden and Moore's Early for black—the latter is a shy bearer but always sells high, and Worden is a long keeper; for red, Brighton, and for white, Niagara only. The Niagara bears abundantly (five to six tons per acre have been yielded successively, on heavy soil, and it does proportionately well on lighter soil). It bears early—the third year. I have seen, in the vineyard of H. H. Hayes, in Ottawa county, fourteen tons hanging on the vines of two and one-half acres, and

not an imperfect bunch in the whole—that is, no loose bunches. The Niagara is at the head of the list for profit.

A. J. Warner commended the Niagara for fruitfulness, compactness, and profit.

Mr. Phillips, replying to a question as to cultivation: I prefer the Kniffin system. It is best to set the vines in October. Draw the earth up well about them and mulch, pulling off the latter in spring. After growth of three inches or so has been made, pull off all shoots but one, and train it to a stake; when this is four or five feet high, nip off its tip, also removing all laterals; cut back, for next year's growth, to three or four buds and repeat this process for the third year, keeping off all laterals but one to run on lower wire. The vines should be nine feet apart each way and the trellis have two wires, the first two and one-fourth feet from the ground, the second the same distance further up. Cut back the laterals to five buds—that is enough for the first crop. In the fourth and succeeding years seven or eight buds may be left. Don't let the vines run to wood—it saps the vitality of the roots.

Mr. Phillips lately explained that after the above process had made so much wood that the laterals met or passed one another on the trellises, the grower should begin back again with some of the new branches that start each year.

A. J. Warner: I cut back to four or five buds and get forty pounds per vine.

H. A. Sears: I have heard from Lawton complaints that the Niagara is tender and must be laid down in winter.

Mr. Phillips: I can not say that is untrue at Lawton; but it is certainly untrue here and in Ottawa county.

M. T. Smith: I wish to make a plea for the Concord. It will yield as many pounds per acre (I had eight tons last year) as any other; yet the Niagara seems to be the more profitable and in demand. Take care of fruits, grapes especially, and they will take care of you. Care should be taken in setting. Trim the roots back to live wood—say to a foot in length. My method is to train a cane to a stout stake, cutting off at the hight of about five feet. By continuous cutting back the vines will stand like trees, as mine do now that were planted in 1870. New wood is thrown out each year for fruit, and this I cut back to three or four buds each year, occasionally going back to some axillary bud when the branches become too long. Pinch back all bearing vines to one leaf beyond the fruit, doing this just as the fruit is setting. The remaining leaves grow very large and become sufficient for development of the fruit. Delaware grapes do not pay. I grow them only for myself, and let them run. They do not bear pruning.

G. H. LaFleur: The Niagara is reasonably hardy. Where it does not seem so, some other cause than the natural vitality of the vine will be found to make the trouble. There is no question of its hardiness in this section, under proper treatment. Wood ashes are the best manure for grapes.

Chas. Manwaring sketched the beginning of fruit growing around Allegan and told how he went to Kansas to find a better fruit region, but found they could there raise only Early Richmond cherries and strawberries. He too late discovered Michigan to be vastly preferable. Early tests were made here with Delaware and Concord. They proved good then, but Niagara must displace them for profit. Moore's Early he would plant only for private use. Scarcely too much ashes can be applied to grapes, but barnyard manure tends to produce too much wood. Five to ten shovels full of ashes may be given each vine each year.

W. Phillips: Ashes are not equaled by any other manure. They make sound wood and perfect fruit.

M. T. Smith: I had thought there was such a thing as overproduction; but upon going to market and seeing the quality of what causes glut, I fully understood the truth of the saying, "Good fruit always sells well." There is more money in grapes at 2½ cents per pound than in wheat at $2 per bushel. [Here! here!] People are learning to eat more grapes than formerly, so there is a larger demand each year.

Discussion of pears was taken up, and W. B. Andruss, who had twenty varieties on exhibition, was called for and talked familiarly of their merits.

Clapp's Favorite is just right to pick now. Put the fruit on a floor, cover with blankets, and in a few days it will color and ripen better than if on the tree. Anjou is one of the best—keeps till February. Bartlett is well enough for a late pear, but there is more money in Clapp's Favorite. The best three for profit are Bartlett, Clapp's Favorite, and Bosc—on clay loam.

Mr. Phillips: On sand I would include Flemish Beauty.

Mr. Andruss: It will crack in dry weather.

Mr. LaFleur: These are all good sorts, though Clapp's Favorite is not a good keeper. The conviction is growing that the later we can have good fruit the more money we can make from it. Anjou and Lawrence are for this reason desirable sorts.

Mr. Andruss: I meant summer pears. For later I would include Anjou.

Mr. LaFleur: In their order, I consider these the best pears for general planting: Clapp's, Bartlett, Flemish Beauty, Anjou, Nelis, and Lawrence.

Mr. Phillips: What about Sheldon?

Mr. LaFleur: An excellent pear. On sand the Sheldon, Clapp's Favorite, Anjou, and Flemish Beauty are good.

Mr. Andruss: Vicar of Wakefield on gravelly loam, makes an excellent winter pear.

Mr. Warner was called out on strawberries and said: From a patch of Crescent, three rods by sixteen, I sold $15 worth of berries this season and a large supply for family use. Such small plats of berries, well cared for, yield handsome profits, while for family supply they are invaluable. So with raspberries and other small fruits. They take some labor but the result justifies it.

Mr. Phillips: For profit I prefer Wilson in hills and Crescent in the matted row. Of black-cap raspberries, Mammoth Cluster and Gregg are best; and of reds, the Cuthbert. Tyler and Souhegan are good black-caps for early crops.

Mr. Andruss: I like Marlboro (red) for light soil but Cuthbert is preferable for heavy land. I grow of blackberies the two Wilsons, Lawton, Kittatinny, and Missouri Mammoth, but like the Lawton best. It is not ripe when first it turns black, and usually is picked too soon.

Mr. LaFleur: Practical men will differ according to their preferences and results on their several soils, but their advice is of more value than that of all peddlers and non-residents. Be careful not to make mistakes, as it takes years to correct them. Better wait a season or two, ask, observe, learn; read intelligently and investigate always. Here at Hamilton you who contemplate beginning in pomology should form a society and meet for discussion, or join the Allegan society, get the State society's annual report, and subscribe for and take the best horticultural papers.

Answering to a call, G. H. Siple of Hamilton said his brother and himself had 3,000 bearing peach trees, and this season a full crop. Some hardy sorts, such as Amsden, Waterloo, and Chili, bear every year, but for most kinds he thought the region unfavorable.

Mr. LaFleur: If peaches do not succeed here with such cultivation as the Messrs. Siple give, it is evident that they can not now be raised. But the blackberry (Snyder especially) will do well, as will other small fruits, including currants and gooseberries. Probably, too, the Russian apricot will succeed (I shall set 400 next spring), as it is hardy in the extreme temperatures of the west. Grapes will be profitable, certainly, for they have already been tested by Mr. Taylor. Several good sorts have been mentioned, the Niagara especially. A Milwaukee commission man said he could have sold tons of them last fall at a shilling per pound had they been obtainable. They can be kept three months and then placed on the market. Apples, also, will pay, and must not be neglected. I would rather have ten acres of Baldwin apples than ten acres of peaches, for profit year by year, and they will last longer. The Baldwin will do well on light soil. Do not plant too many kinds. I would not set more than six sorts of apple if I were required to cover the whole county, and then only three for the most part. My preferred sorts are Baldwin, Stark (none better than this), Spy, Jonathan. I would set as stocks upon which to graft these, Talman Sweet, Astrachan, Spy, Duchess, and Ben Davis.

Mr. Andruss: Astrachan is the best stock I ever grafted into.

Mr. LaFleur: I do not dispute you. At the east men pay $1,000 per acre for land upon which to grow grapes, because it is near good markets. Here we are close to the best of markets, and all this cheap land will produce some sort of fruit at a profit.

Several speakers, in course of their remarks, commended very highly the Allegan Gazette as a horticultural paper of most excellent quality, Mr. Phillips going so far as to declare it the best one in the whole country, for Michigan fruit growers, because it contains the experience, opinions, and practice of Michigan pomologists, which necessarily are peculiar to themselves and obtainable in no other publication.

LENAWEE COUNTY HORTICULTURAL SOCIETY.

OFFICERS FOR 1889.

President—H. C. Bradish,
Vice President—Peter Coller,
Secretary—D. G. Edmiston,
Treasurer—B. I. Laing.

Executive Committee—
- J. W. Helene,
- A. Sigler,
- D. Woodard,
- E. W. Allis,
- Mrs. M. S. Trine,
- Mrs. Nancy Harvey.

The year 1888 has been one of prosperity to the horticulturists of Lenawee county. We held a meeting each month during the year, three of which were held in the supervisor's room of the court house, two in Dean's opera house, Adrian, one in the city hall, and the remaining six at the homes of members.

The meetings have been well attended, usually having from eighty to one hundred present. It is customary to hold two sessions and the ladies serve a picnic dinner, when a general social time is enjoyed.

For a number of meetings at the first of the year the ladies held a session in an adjoining room to discuss household topics, which plan was finally abandoned and the ladies' session is now held in connection with the general meeting. The question box has been an important aid in bringing out many timely suggestions.

In connection with the March meeting was held the thirty-seventh anniversary, with exercises appropriate to the occasion. June was devoted to the strawberry and rose. A fine display was made and premiums awarded. The afternoon hours of the August meeting were given up to the children. The society was highly entertained with recitations and songs. It was decided the December meeting should consist principally of a flower and fruit display, and with that object in view the members assembled, bringing the best from orchard, vine, and conservatory. Five tables were laden with fruits, and two with flowers, making a display that any county might be proud of. There were on exhibition twenty-two varieties of grape; Mr. Sigler had ten varieties of foreign grape grown under glass; and there were on display sixty-three plates of apples, also a fine assortment of winter pears. On this display premiums were awarded.

Subjoined are several papers read at the annual meeting.

MARY C. ALLIS, *Secretary.*

OUR SUCCESS.

If we stop to consider for a moment, and contrast the present with the past, we will be surprised at the strides made in horticulture and its pertainings in thirty-seven years. At that time but little was known of the curculio or its habits. Now we pretty well understand his movements, and have him fairly well under our control. The black knot, a great barrier to plum growing, we have learned (with a little diligence and a sharp knife) can be kept under subjection. The codlin moth, though holding sway for many years, can in a great measure be made to succumb, while numberless insects, which infest plant and tree, are kept in check with proper applications. We have also become quite successful in battling against bacteria, grape rot, mildew, and rust and many other enemies to the pursuit of horticulture.

Great success has been attained in the last few years in the production of new varieties. Munson of Texas claims he can, with a good deal of certainty, give the result of the cross when made.

This society, when first organized, flourished finely for a few years, then settled back into dullness or stupidity, oscillating, as it were, between life and oblivion, and perhaps from several causes, among which were the death of several of its active workers, and removal of others to distant lands. The destruction of many of our finer fruits by the cold winters was another source of discouragement. But for all obstacles strewn in its pathway, the society is now stronger and more successful than ever.

PETER COLLER.

EARLY INFLUENCE OF LENAWEE COUNTY HORTICULTURAL SOCIETY.

In those early days of '51 and later, the influence for good of such men as were to the front in our society could not but be felt. Without stopping to allude to any who are yet alive and with us, I think I may be pardoned for naming some of those who have passed beyond the river, such as Dr. D. K. Underwood, Samuel Lothrop, Asa Cornell, B. F. Strang, Jesup Scott and Mr. Linnell, also two or three now living at other places, as Judge T. M. Cooley, William and Frank Scott. As already intimated, the energy and devotion to horticulture of such men as these (and others, both men and women that I have not space to mention) could not be otherwise than helpful to all concerned. Old members who are still living can testify that the knowledge disseminated and the good work done was truly wonderful. Tree planting of all kinds, both fruit and ornamental, was stimulated to a degree beyond all former experience, and a general desire was soon manifest for a better knowledge of all sorts of fruit. The merits and demerits of the different kinds of apple, pear, cherry, peach, plum and quince, were discussed as never before; grapes, currants and the different berries received equal attention, and flowering plants, shrubs, roses and shade trees also came in for their share. Even the desirability of a fine park was most seriously discussed. It has been said that the influence of a good word or deed is never lost. Most certainly is this true of horticulture, and especially so in the case under consideration, as the grand results of the energy and enthusiasm shown in those early days are still seen on all sides in the profusion of the finest fruits and flowers, in the almost endless rows of flourishing street and

roadside trees, in our beautiful cemetery; but best of all, perhaps, in the society as we find it at this day, a vigorous and healthy child, inheriting many, if not all, of the good traits of one of the best of parents.

If time permitted I should be glad to mention some other matters not contemplated in the original plans of the organization. People of all stations in life were brought together—high and low, rich and poor, educated or not, so that some of us who were somewhat sharp-cornered, it may have been, were no doubt smoothed down a little and helped by contact with those of better opportunities.

And so, in closing, my desire is that we of this later day, who have such a splendid inheritance from the fathers and mothers of our society, may profit by their example and go on and up, not only willing to be benefited ourselves, but ever ready to impart to those who for various reasons, cannot join with us, as I fully believe there are but few open doors that offer better opportunities of benefitting our fellows than the pursuit of horticulture. So may our society not only be one of the oldest, but also one of the best and most useful in the State.

B. H. STEERE.

A HISTORY OF THE SOCIETY.

A short time ago I was asked by the chairman of your executive board to prepare a short history of this society, and although he did not positively limit me to six minutes of time in which to give you its history of thirty-seven years, yet he hinted very plainly that only about that time could profitably be devoted to that subject; and as I always think it better to take a hint in preference to anything worse, this history must be very concise.

Thirty-seven years ago tomorrow (the 15th of March, 1851,) a few gentlemen interested in horticulture met at the office of R. H. Whitney, and after canvassing the question at considerable length, of the culture of fruits, flowers, and vegetables, which at that time was attracting considerable attention, it was proposed to form a horticultural society, and Langford G. Berry was called to the chair, and F. R. Stebbins was chosen secretary *pro tem.* Dr. Underwood, R. H. Whitney, B. F. Strang, Langford G. Berry, and George W. Merrick were made a committee to draft a constitution, and report at the same place in one week, which duty they performed; and then and there, on the 22d of March, 1851, the Adrian Horticultural Society had its birth—and I always feel like honoring the men and women who, in that early day, could look forward and see the good that necessarily must follow a combined effort to introduce and propagate new and valuable fruits, flowers, and vegetables. I would like to give the names of all who in its early days gave aid and encouragement, by their attendance and exhibits of the best products of their gardens.

Foremost among the active members are the names of Strang, Cornell, Steere, Underwood, Lathrop, Scott, Smith—"but hold!" names roll up before me, too numerous for mention. Yet I cannot withhold such familiar names connected with this society as Mrs. A. J. Comstock, the Misses Dean, and Ormsby, Mrs. Cooley, and Mrs. Dr. Webb. Others, perhaps equally active and interested, occur to my mind, who added largely to the society by their presence and exhibits of fruits, flowers and vegetables.

As the society progressed in interest from year to year, and new members were added to our ranks, a good deal of emulation occurred among us, and each one tried to excel the other in the laudable effort to raise the earliest, the largest, and if possible the best of its kind, and many made specialties of some fruit or vegetable, to see to what perfection of size or earliness it could be made to attain with extra care, nursing and fertilization.

About 1853, or may be the year before, the Victoria pieplant was introduced here, largest of the rhubarb family then grown. As it was found to respond quickly to high culture and nursing, many members took the craze, and pieplant was raised in large quantities and of mammoth size. In the summer of 1855 stalks were on exhibition by D. K. Underwood weighing two pounds and 12 ounces; and the same by B. F. Strang, and several others, about the same weight. But Judge Barber took the pie on July 20, with a stalk weighing three pounds and thirteen ounces. Then the rest of us dropped out. While I am on specialties I must tell a little note of the well-remembered and valued friend of this society, Samuel Lothrop. Mr. Lothrop always had a nice garden. It was the pride of his heart, and it always did him good to be a little ahead of others with his fruits and vegetables, and he usually got about the first on the exhibition tables. One spring about this time, the 15th of March, Mr. Lothrop decided in his own mind that he must have the first green peas this year if care and nursing would do it. He dug shallow trenches, fertilized high, and planted his peas with great care. He then procured strips of "factory" cloth to cover over them cold days and nights, and took special care of them during the entire spring. His German neighbor, the other side of the fence, who was a good gardener, watched the trench digging with some interest; and, being puzzled to know the meaning of it, called out one morning over the fence, "O! Mister Lothrop, what for you doing mit dem ditches?" Mr. Lothrop explained to his neighbor his intentions. The German shook his head and said, "We don't grow peas till May, Mister Lothrop;" and, as Mr. Lothrop told us afterward, his German neighbor planted on the 2d day of May and had green peas within two days as soon as he did, and he wanted us to answer the question, did it pay? We thought the experiment answered the question.

For several years during the fifties this society was noted for placing on her exhibition tables the best collection of cherries of any place in the state; but the trees proved too tender, as a rule, and soon succumbed to severe winters or other climatic influences, and are, with many other good things, outside of profitable culture in this latitude. Among the varieties then grown here, which gave us much satisfaction, were Black Tartarian, Black Eagle, Black Heart, Elton, Sparhawk's Honey, May Duke, Napotian, Bigarroux, Gov. Wood, Ohio Beauty, and many other choice varieties could be mentioned, which found a place during their season upon the tables.

Peaches were at the time very plentiful and were considered a valuable crop at a dollar per bushel. The failure to have an annual crop was the exception, not the rule as now, and there were some fine specimens exhibited from time to time. I will mention a few to show what was grown here then. Luther Bradish presented a Crawford's Early, weight 11 ounces, measuring $10\frac{2}{3}$ inches; James A. Johnson, a seedling, weight $11\frac{1}{2}$ ounces; A. M. Baker, Crawford's Late, 11 ounces, and Israel Perrington of Macon, with a basket of such beauties that we wished we lived in the corner of his orchard, or held our meetings there.

Strawberries, raspberries, gooseberries, grapes, plums, pears, quinces, and about every kind of fruit worth growing here, had their special friends; and last, though not least, vegetables of every name were brought to a high degree of perfection in the hands of members of this society.

In 1875 the State Horticultural Society accepted an invitation to hold their June meting in this city, as the guests of this society, which meeting was held in the opera house, on the 23 l, 24th, and 25th of the month. At the close of the last session a very flattering vote of thanks was tendered this society for the very efficient assistance rendered by us to the state society.

But I must hasten to a close, or the gavel will drop before I have a chance to mention two important changes which occured later in the history of the society. On January 19, 1881, the following resolution was adopted: "That this society become auxiliary to the State Horticultural Society, and the constitution of the Adrian Horticultural society be amended to conform thereto, with the proviso to withdraw at any time by a majority vote of this society." By this action persons joining this society and paying one dollar become at the same time members of the state society and entitled to all it privileges. On April 14, 1884, the following resolution was adopted: "*Resolved,* That the name of the Adrian Horticultural Society be changed to the Lenawee County Horticultural Society," with headquarters in the city of Adrian, and that the annual meeting, and all special meetings for business, be held in the city of Adrian.

I cannot close this short history without a word of tribute to the men and women who early began this work, and whose influence is still largely felt in every department of horticulture. The majority have passed on over the river, and for aught I know are to-day basking in the sunshine on its flowery banks; but their labor here is not lost, as the interest still taken in this society fully demonstrates.

DR. W. OWEN.

WASHTENAW COUNTY POMOLOGICAL SOCIETY.

OFFICERS FOR 1889.

President—J. D. Baldwin.
Vice Presidents—J. J. Parshall. Wm. McKreery. J. D. Allison.
Secretary—Jacob Ganzhorn.
Corresponding Secretary—Emil Baur.
Treasurer—John Almand.
Executive Committee—W. F. Bird. C. C. Clark. J. D. Fuller. B. C. Nichols.
Climatologist—Prof. W. M. Harrington.
Ornithologist and Entomologist—Prof. J. B. Steere.
Hygienist—Dr. A. B. Prescot.

Botanist—Prof. Volney Spaulding of Michigan University.

The society kept up regular monthly meetings, besides a number of extra sessions. During the winter we were favored with an interesting paper on the effects of forests on the climate and rainfall, whether or not effected by forests, etc. The paper was ordered to be sent to Secretary Garfield for publication, with report of the forestry convention held at Grand Rapids last winter. Prof. V. Spaulding interested the society with a paper on vegetable pathology. Mr. Erwin Smith of the department of agriculture, Washington, gave his researches on peach yellows, its early history, where first found, its spread and devastations it caused up to the present time, its appearances in the different parts of the country, etc. Mr. Smith illustrated his subject with photographic views of diseased peach trees, and the different stages of yellows. We have no yellows in our county as yet, and we do not look for any to come.

The spring and summer meetings were largely devoted to transportation of fruits by freight, including berries, shipping by express having proved inadequate, too expensive, and further made undesirable by a lack of proper handling in loading on board of cars. So far our shipments by freight have been confined from Ann Arbor to Detroit. A fruit car was fitted up for this special purpose, with shelving. The car was ready for loading during all the day, and such a privilege is highly appreciated by the fruit men.

We have a standing committee on transportation to attend to anything coming up incident to this business. The society has also spent much time

in considering the feasibility of organizing a fruit exchange, but the matter has not yet taken shape.

Reports on the fruit prospects in the spring were very flattering. Results, however, did not justify the expectations. Young peach trees failed to set the fruit. Rains failed to come in raspberry time, though this crop was fair. The blackberry suffered more. There never was such a fall drouth known in the history of the State before. The want of rains left peaches very small, thus cutting a small crop smaller. Cherry and pear crops were light. The grape crop was good, though some vineyards suffered considerably from rot. The fall weather proved too cold for making grapes sweet, and therefore this fruit sold very slowly in the markets. The apple crop was good in quantity but ruined by the co llin moth. The bulk of this crop had to go to the evaporators and cider mills.

With the exception of the apple, all the fruits grown here will be considerably planted in this county in the coming spring. The peach will likely take the lead.

At our last county fair, there was a grand display of grapes, overshadowing all other fruits in appearance. It elicited more praise than any other fruit, the Niagara and Woodruff Red shining out supreme. The exhibit of pears was good. As high as twenty varieties were shown by single exhibitors. There were many entries of apples, and the specimens fair, but too wormy to be considered first-class as an exhibit. Our fruit men must not falter in a struggle with the codlin moth, or the excellence of the apple will be lost to us. There is another important subject that confronts us in this connection. It is the giving out of the favorite old varieties. We must either learn how to restore these to former perfection, or experiment with newer sorts. Probably the better course to pursue is to do both.

Exhibits of fruits in season at our meetings continue to be a pleasing feature to attendants. We also often have flowers. Our meetings are now and then enlivened with reports by members on their visits to distant states, relating observations on fruits, etc.

JACOB GANZHORN, *Secretary.*

CLIMATAL EFFECTS OF FORESTS.

The problem of the effects of forests on climate and weather is not a new one; it has been discussed for upward of 300 years* yet in this long interval no universal agreement has been reached on the subject. The Germans are indeed entirely positive that in their country the effects of forests are very evident, and Herr von Bebber in 1877 formulated the unmistakable effects into sixteen propositions. †These propositions are:

I. The forest lessens the extremes of heat and cold without making any notable change in the mean temperature.

II. The forest air is always relatively damp, and hence the presence of the forest tends to the preservation, and somewhat to the increase, of the humidity of the air.

III. The tendency to precipitation, and hence the probability of rain, is increased by the presence of the forest.

* The oldest reference known to me is the order for forest police of Salzburg in 1524. See Günther, Grundzüzi der Geophysik, II., 242.

† As above, p. 246.

IV. The rainfall is increased, especially in forest-covered mountains.

V. The evaporation is decreased and especially when the ground beneath is covered by dead foliage it is very much decreased.

VI. The covering of leaves tends to prevent the rapid flowing off of water.

VII. Forests protect and preserve the natural springs of a territory.

VIII. The ground water held by the forests fills the soil beneath.

IX. The forest protects from floods and prevents the formation of new stream beds.

X. With extensive disforesting weather extremes become sharper.

XI. Disforesting brings with it increased dryness and summer drouths.

XII. The frequency of rainfall, especially in the summer, decreases with removal of forests.

XIII. Removal of forests decreases the wetness of the soil and the abundance of springs.

XIV. The removal of the dead leaves causes too rapid evaporation.

XV. The removal of the dead leaves promotes overflow of adjacent cultivated lands and this is still worse when leaves and trees are both taken.

XVI. The amount of water in streams becomes more and more irregular as forests are removed.

So much for Germany. In France, where the subject has also received very much attention, a similar list could be made out with one or two additional specifications. France is especially subject to destructive thunder and hail storms, and it frequently happens that well cultivated vineyards and fruit farms, which have been brought to a high state of perfection at the expense of much labor and money, are, at the very time they are about ready to furnish an abundant harvest, utterly beaten down and destroyed by a sudden, severe, local storm. The owner sees, in utter helplessness, the work of years and the support of his family swept out of existence, and perhaps five minutes will suffice to do the work of destruction. Hail-storms have naturally received very much attention in France and, though much that is of importance has been learned about them, the only thing so far that will help the cultivator of the soil is this rule that destructive hail-storms are much less common in forests.

By some writers the effects of forests are given still more importance. Marsh, in his Man and Nature, and in his wake many others have tried to show that disforesting may change the climate of a country completely, altering it from a fertile region capable of supporting a large population to a desert waste. As they read history, Palestine is undergoing this change and has almost completed it. According to some of them the change has already been completed in northern Africa. Carthage, they say, was in a fertile region. Tunis is now largely desert. The Syrtes were once good harbors to a fertile inland; the desert now comes down to the coast and its drifting sands shallow the waters of the Mediterranean far to the seaward.

But agreement on the subject is by no means uniform. The idea that disforesting may make a general and permanent change in the climate is hotly contested inch by inch, and the victory now inclines strongly toward those who believe either that no such change has occurred as a matter of history, or that if it has occurred, it is due to other causes than disforesting. The meteorologists of India are remarkably active, and they claim that in that country the results of disforesting are entirely local and subordinate. The Scandinavians have always been meteorologists, so much so that the ancient

climate of their peninsula could almost be reconstructed from their myths. This interest in the weather there continues unabated, and some of the most eminent living students of the subject are to be found there. They claim that the results of disforesting are there entirely unnoteworthy. America is so new that it is not so much a question here as to what has happened as what will result from disforesting and reforesting. The subject has, however, already been much studied, but the conclusions seem various. Dr. Hinrich, the eminent meteorologist of Iowa, finds unmistakable evidence that in his State rainfall lines and forest outlines go together. It has been frequently claimed and almost as frequently denied that with the extension of settlement, and with it tree planting on the plains, increased rainfall and amelioration of climate have resulted. The question is not yet settled, but the balance tends to turn to the side of amelioration. Recently Mr. Henry Gauvett has attempted to show that no change of rainfall can be expected from change in forests.

I have stated as clearly as practicable the variations in conclusions in order to point out that the disagreements are more apparent than real, and that they result from not making a proper distinction—a distinction which I think we have only lately been in a condition to point out. This distinction is to be found in the three different elements of weather or climate.

One part of our climate or weather is of a general character, due to the inclination of the earth's axis, to the general character of the atmosphere, and, to a less degree, to the general distribution of land and water, mountain and plain over the surface of the earth. A second part of our climate and weather is the periodic, and more especially the daily variation of barometer, of thermometer, of relative moisture, of wind, and of cloudiness and precipitation. The source of these changes is to be found in quite as general conditions as the former, but the quantity of the changes is much more dependent on local conditions. The temperature on the average is warmest with us at 2 or 3 P. M., and coldest about 6 A. M., but the range of the change will be very different for different parts of Michigan, and even for different parts of Washtenaw county or of Ann Arbor.

The third element of our climate is to be found in purely local conditions. Elevation here plays a very important part. The weather of the east side of a mountain range may be very different from that of the west side. The weather of the deep valley may be quite different from that of its limiting ridges. On a still cold day in winter the temperature may change considerably with slight changes of elevation. In such weather the thermometer always stand higher at the observatory than in any other part of the city and between the observatory and the Huron river, half a mile north but perhaps 100 feet lower, we have frequently noted a difference of 12° or 15°.

Now of these three elements which would be affected most by local foresting or disforesting? Evidently not the general element. Our general weather is made up largely of large storm areas or cyclones followed by large quiet, clear areas or anti-cyclones, all traveling eastward with more or less regularity. These areas are usually first seen in the Rocky mountains or to the east of these mountains. Sometimes they come from the Pacific ocean or from Alaska. Very rarely they appear to originate nearer home. Their cause of origin and exact source are unknown but we are positive that they depend on general conditions, conditions of the whole earth or of very large areas. For instance two large areas of low barometer usually occupy, one the north

Atlantic, the other the vicinity of Behring's sea, and the cyclones often come from them. Again a large anti-cyclone usually lies over the central north tropical Atlantic just east of the African coast, and another varies in position from Mexico to our southern states, and the paths taken by our cyclones seems to depend much on these anti-cyclones. The positions, activity and motions of the great northern cyclones, the position and motions of the great semi-tropical anti-cyclones are undoubtedly due to general conditions, relative to the earth as a whole or to its general features of distribution of land and water. They cause the large features of weather and it is evident that they are beyond the reach of the comparatively small changes caused by man. Whether Michigan were covered with forest, or entirely cleared, would probably make no difference with them; their general features for Michigan would be the same. Indeed we may doubt if the foresting or disforesting of the entire United States or the presence or absence of the great lakes would make much difference with these general features.

There is however one element of a storm area which seems much dependent on the character of the territory passed over, and that is its intensity. A cyclone, in the limited scientific sense, is an atmospheric condition favorable to rainfall, but whether rain falls or there is only cloudiness without rainfall depends on the intensity of action in the cyclone and this intensity changes from region to region. Not even a cyclone can squeeze rain out of atmosphere in which sufficient moisture does not exist. Now it is a matter of scientific observation and of practical experience that forests are relatively moist, both because the roots and dead leaves tend to hold the water, preventing it from flowing away, and because the tree is a natural evaporating machine, through the thousands of mouths of which moisture is constantly pouring into an atmosphere not already too dry. Hence the cyclone finds in forest air the moisture it needs, and that of its functions which is most irregular and uncertain, viz.: that of precipitating moisture, is more probable over forests than over plains, and more probable over grassy plains than over deserts. This entirely agrees with Von Bebber's empirical conclusions III., IV., XI. and XII. In this too we also find one reason for the conclusions which relate the greater frequency of floods in regions which are disforested (conclusions IX., XV. and XVI). The rainfall being more frequent in forest areas is less likely to be so severe as to cause floods.

But it is especially in the periodic and local features of climate that the forest plays a valuable part. By the covering which it gives the soil the extremes of temperature are much reduced. Just as in the Artic regions they wear clothing to protect from the cold and in the tropics to protect from the heat, the clothing of forests limits that direct exposure to the radiation of the sun which gives us our hottest days and that re-radiation of heat into space which gives us our coldest nights.

Again the forest serves as a sort of break water to protect the residents in or near it from the action of high winds, and they serve as another sort of protector in a much more important sense. They protect and hold the water which reaches them, the shade of the trees protect from evaporation and it occurs but slowly except as this occurs through the leaves. Besides, the covering layer of dead leaves serves as a sponge to soak up and keep the water which reaches it, and still more to keep the water which passes into the soil beneath. Hence the conservation of moisture and that of springs in or near woods, and as they let this water escape only slowly and gradually, hence,

also, the uniformity and persistence of forest streams, No one can understand what the latter means unless he has stood on the banks of a stream on the plains or in the treeless part of the Rocky Mountains during a rain higher up the valley. The bed of the stream is dry; a rushing sound causes the observer to look up the stream; the rain which has just fallen is coming down with a rush; it passes rapidly and in a few hours or at most a few days the stream is again dry. Compare this with the perennial streams of our own woodlands which fed by springs protected by trees, continue almost unchanged from season to season and from year to year. Moreover this sudden rush of water brings with it, in a region recently disforested where the ground is not yet protected by sod, an immense amount of silt, sand, gravel, and rock, which spread over and ruin the cultivated fields further down. These are the most familiar parts played by forests and are known to all thoughtful men. I mention them here to point out that they are features of local rather than general character, but that they are local does not render them limited in area or unimportant in character.

But the next feature to which I wish to call your attention is less familiar to the general public, and also, unfortunately, less completely worked out by professed students of the subject. The features of weather and climate, especially those of summer weather which most interest and affect those who draw their support directly from the soil, are due more to what are called "local storms," than to general storms. A good illustration of these storms is the sharp, quick summer thunderstorm, and the no less sharp and quick, but much more destructive first cousin of the thunderstorm, the tornado. These phenomena are not integral parts of a cyclone or storm area, but are only indirectly connected with it. They are generally connected with some unsymmetrical feature of a cyclone,* such as an arm put out to southward, or a brood of small secondary whirls like a hen with her brood of chicks. To these local storms the most of our summer rains are due, and in some parts of the world all rainfall comes from them. These are the phenomena too, which the weather-predicter in his central bureau at Washington or Toronto or London is least able to foresee. These storms generally run low and are, therefore, especially sensitive to local conditions. The hail comes from them, and thus we find in France the fact that hail storms are somewhat guided by the outlines of forests, as they lie low they will be more likely to be influenced by moisture preserved by forests, and the increased rainfall in or near forests is probably much more due to them than to an increase in intensity in the general cyclone.

But the action of forests on these local storms is by no means clear, and it is here that there is an opportunity for profitable study for every intelligent observer of nature. It seems that some kinds of local storms may be increased in intensity by the presence of forests. So far as that increase is rainfall it is favorable for Michigan, for a cloudburst in a forest need not result in a flood in the adjacent streams as it would necessarily result in open land. And may I be pardoned for calling attention to this line of study of local storms and local influences? The study of the general weather is cared for by the general government and by professed meteorologists. The local conditions are however of the greatest importance, and this should be cared

* The cyclone is an area of general low barometer and its name is due to the circulation of wind in it. Its individual character may vary from so slight an intensity that it is barely recognized by instruments and not at all by the senses, to as great an intensity as that of the West Indian hurricane. The tornado is a small whirlwind of great intensity, but is not a cyclone.

for by the state governments. Hence the propriety of our local weather service, and in their work they require the assistance of, and can be aided by, every intelligent person. It is only by supplementing more general studies, by study in small regions, that we can now expect to make much advance in the knowledge of local storms, and these are of paramount importance to our farmers.

We can now perhaps see why there is such a general disagreement as to the influence of forests on climate. The chief effects being local in character they would be most appreciable when the local conditions are most favorable. For instance when the conditions were such that abundant moisture is generally present, the play of the forests would be subordinate. This is the condition of things on the Scandinavian peninsula, surrounded as it is on nearly all sides, and nowhere distant from large bodies of water. The clearing of the entire peninsula of forests would make but little difference in the supply of moisture. But in the continental position of Germany, especially more inland, the supply of moisture is less abundant, the change of temperature more excessive, and the conservative action of forests is more important. Again, the action of the forests would differ with latitude. In the tropics generally the greater uniformity of weather and the more extensive character of weather changes would make the covering of the soil of only very local importance, while in high latitudes, the slight variation in moisture and the general protection of the ground with snow would also tend to lessen the distinctive effects of forests.

It is only in middle latitudes that the effects would be important, and it is in continental positions that they would become most conspicuous. Michigan is in middle latitude, and she is well in the interior of a great continent. We may expect that she will prove to be quite as sensitive to the removal of her forest clothing as is Germany; and there is another feature of Michigan which may make us look forward with anxiety to her total disforesting. Considerable parts of central Michigan have a sandy soil; they are the so-called "pine barrens." They have the reputation of not being valuable for cultivation. What will they be when timber growth has been removed which now holds the sands together and protects them from the direct drying rays of the sun? There is some occasion for fear that their value may then become less than zero; that while they are now not without use, they may then become a menace.

MARK W. HARRINGTON.

Feb. 4, 1888.

FRUIT CATALOGUE FOR 1889-90.

FRUIT CATALOGUE OF THE MICHIGAN STATE HORTICULTURAL SOCIETY FOR 1889-90.

PREFATORY REMARKS.

In submitting the fifth revision of the Society's Catalogue of fruits, we take occasion to remark—

That several of the varieties included in the earlier revisions have so fallen into disuse that their longer retention, even associated with unfavorable notices, seems unnecessary. Several of these are therefore dropped from the lists, and, as a safeguard against their re-introduction, they are appended as a rejected list, without description or other characterization.

The chairman is again compelled to state that, with the exception of a report from Mr. D. G. Edmiston of Adrian, and the discussion of grapes and small fruits at the June meeting at Benton Harbor, he has been compelled to act from his personal knowledge of the distribution and success of varieties; a circumstance greatly to be regretted, since there is little room for doubt that full reports from the several districts would have supplied facts of great value to those who may have occasion to make selections from the catalogue.

The following persons are members of the committee to collect material for use in the next revision, to either of whom information may at any time be communicated:

1st District—H. W. Davis, Lapeer, Lapeer county.
2d " —Evart H. Scott, Ann Arbor, Washtenaw county.
3d " —D. G. Edmiston, Adrian, Lenawee county.
4th " —W. A. Brown, Benton Harbor, Berrien county.
5th " —Geo. C. McClatchie, Ludington, Mason county.

Each member is local chairman for his district, and is required to appoint three or more associates as aids in the collection of material for the next revision.

Such appointments should be promptly made, so that the collections may be commenced, and the desired information when obtained should be promptly transmitted to the general chairman.

T. T. LYON,
Chairman of Com. on Revision of Catalogue.

South Haven, January, 1889.

PLAN OF THE CATALOGUE.

The varieties are numbered at the extreme left, and also at the left of the page occupied by the column of remarks, to avoid confusion in tracing the connection. Synonyms are introduced in a few cases only, and *italicized.* In the case of names deemed objectionable, under the Rules of the American Pomological Society, to avoid the possibility of ambiguity, the objectionable portion of the name, when needful, is placed in brackets. In the column devoted to descriptions, the distinguishing peculiarities of the fruit, with its season and origin, are more or less fully given by the use of abbreviations; those applicable to the entire catalogue appearing at its commencement, and those applying locally at the heads of the sections to which they appertain. In each of the sub-columns headed use and value, the figures 1 to 10 express the gradations of value, for the purpose to which the column is devoted; the first two sub-columns (devoted respectively to Dessert and Cooking fruits), having reference, strictly, to the quality of the fruit separately considered; and the third or market column, to all the qualities, whether of tree or fruit, that affect the question of profitableness. Under the head of locality, a sub-column is assigned to each of the five districts into which the lower peninsula of the State is divided, such divisions being as follows, viz.: 1st district, the eastern tier of counties, from the southern boundary of the State northward as far as its capacity for fruit culture is known; 2d district, the mass of interior counties, omitting the tier along the southern boundary, and those adjoining Lake Michigan; 3d district, the southern tier of counties, omitting Monroe on the east and Berrien on the west; 4th district, the lake shore counties from the south line of Berrien northward to and including Muskegon County; 5th district, the counties adjacent to Lake Michigan and its bays, from the north line of Muskegon County, as far northward as their capacity for fruit culture is known. In these columns a * indicates that the variety which it represents is known to succeed in the district; ** that it is especially valuable, and a † that it is on trial and found promising. With the settlement of northern Michigan, and consequently increased knowledge of its horticultural capacities, at least three additional districts will be required; one extending from Bay County northward, along the westerly shore of Lake Huron; the second embracing the northerly portion of the present second or interior district, and the third including the upper peninsula; which, moreover, may, very probably, require a farther division into eastern and western districts.

In the column headed Use and Value, the gradations are arrived at by comparing fruits of a similar character with each other, as sweet apples with sweet apples; also fruits of a given season with others of the same class and season. Many kinds of very little value are added, for the purpose of showing by the low values given them, and by remarks in the column for that purpose that, though more or less grown in the State, their farther cultivation is not intended to be encouraged. The leading advantage to the fruit culturists of the State, sought in this Catalogue, is to supply all who may wish to plant with a distinct purpose in view, the means of selecting wisely, with reference to such purpose, from the varieties which have been properly tested in the State, and found best adapted to the special purpose they shall have in view.

NOMENCLATURE.

The nomenclature adopted is that of "Downing's Fruits and Fruit Trees of America"—latest edition; modified in compliance with the catalogue of the American Pomological Society, and its Rules of Pomology.

We have, in very many cases, in which redundant terms are retained by the revisers of the American Society's Catalogue, and in which present popular practice already indicates a tendency toward their elision, included the redundant or objectionable words in brackets, hoping thus to encourage the popular tendency in what may be considered a safe and proper direction.

SEASON OF MATURITY.

The season of maturity given is, as nearly as practicable, that of the second and third tiers of counties, reckoning from the south line of the State.

FRUIT CATALOGUE FOR 1889 AND 1890.

ABBREVIATIONS, APPLICABLE THROUGHOUT THE CATALOGUE.

Size.	Quality.	Adhesion.
l. large.	b. best.	c. cling.
m. medium.	g. good.	f. free.
s. small.	v. very.	
v. very.		

SECTION I.—APPLES.

ABBREVIATIONS FOR THIS SECTION.

Form.

a. angular.	o. oblong.
c. conical.	ob. oblate or obtuse.
f. flattened.	ov. oval or ovate.
l. lop sided or oblique.	r. roundish.

Number.	Names.	Description.						Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Alexander	v l	r c	g y r	g	Oct. Dec.	Rus.	2	10	6
2	American Beauty	l	r c	y d r	v g	Dec. Apl.	Mass.	7	5	6
3	American Golden	m l	r o b c	y b	v g	Nov. Feb.	Am.	7	7	7
4	American Golden Russett	s	r ov.	y ru	b	Oct. Jan.	Am.	9	6	2
5	American Pippin, *Grindstone*	m	ob	g r b	g	Dec. Dec.	Am.	1	6	2
6	American Summer	m	o	y r	b	Sept.	Am.	10	5	5
7	Anglo American	m	ob	y r	v g	Aug. Sept.	Can.	7	5	3
8	Aunt Hannah	m	r ob	y ru	g	Dec. Feb.	Mass.	6	6	6
9	Autumn Swaar	l	r c	o y ru	v g	Sept.	Am.	7	7	5
10	Autumn Sweet Swaar	m	c ob	y r	v g	Oct.	Am.	5	5	2
11	Autumn Bough	m	c a	y	v g	Aug. Oct.	Am.	5	5	2
12	Bailey Sweet	l	r c	y d r	v g	Nov. Mar.	N. Y.?	6	7	4
13	Baldwin	l	r c	y c r o	v g	Nov. Mar.	Mass.	6	9	10
14	Bars	l	r	y r ru	v g	Sept.	R. I.	7	4	6
15	(Beauty of) Kent	l	r f c	g y p r	g	Oct. Nov.	Eng.	5	8	7
16	Belle et Bonne	v l	r ob	y	g	Oct. Mar.	Conn.	2	8	6
17	Belmont	m	r f c	y v	v g	Nov. Mar.	Penn.	9	5	7
18	Ben Davis	m l	r c	y r	g	Dec. May.	Ken.?	3	5	9
19	Benoni	m s	r o b c	y d c	v g	Aug. Sept.	Mass.	7	6	6
20	Bentley's Sweet	m	r f l	y g r	v g	Jan. May.	Vir.?	4	6	3
21	Black Gilliflower	m	o c	g d r	g	Nov. Feb.	Am.	4	2	4
22	Blenheim (Pippin)	l	r o b c	y o d r	g	Oct. Dec.	Eng.	5	9	8
23	Blue Pearmain	l	r c	d p r	g	Oct. Feb.	Am.?	6	5	5
24	Bottle Greening	m	o b c	g y c r	v g	Jan. Feb.	Ver.	8	....	....
25	Broadwell	m	o b c	y b	v g	Nov. Feb.	Ohio.	7	7	4
26	Buckingham	m l	o b c	g y c r	v g	Nov. Feb.	Vir.?	6	7	7

FRUIT CATALOGUE FOR 1889 AND 1890.

ABBREVIATIONS, APPLICABLE THROUGHOUT THE CATALOGUE.

Season.

The usual abbreviations for months.

b. beginning.
e. end.
m. middle.

Origin.

The usual abbreviations for countries.

h. hybrid.
? doubtful.

SECTION I.—APPLES.

ABBREVIATIONS FOR THIS SECTION.

Color.

b. brown.
c. carmine.
cr. crimson.
d. dark.
g. green.
o. orange.
p. purplish.
r. red.
ru. russet.
s. scarlet.
v. vermilion.
w. whitish.
y. yellow.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
1	*	*	*	*	*	Tree vigorous, spreading, productive; very beautiful. For cooking, superior.
2	*	*	*	*	....	Vigorous, productive, annual bearing tree. Sometimes small and scabby from overbearing.
3	*	*	*	....	....	An old sort. Superior to many that are better known
4	*	*	*	*	....	Better farther south. Tree upright. Fruit often scabby and worthless.
5	*	*	*	*	*	Keeps a year. Cooks well, but otherwise scarcely eatable.
6	*	*	*	*	*	Slow grower, hardy. Fruit, when perfect, mild, rich, excellent. Very beautiful.
7	*	....	....	....	....	Tree vigorous, productive. Sweet apples are little wanted at this season.
8	*	....	....	....	....	Tree a slow grower. Fruit not specially attractive.
9	*	*	*	*	....	Hardy, vigorous, spreading. Excellent, but not productive enough for the market.
10	*	....	....	....	....	Tree and fruit desirable, but coming in with the bulk of the fall fruits lessens its value.
11	*	....	....	....	**	One of the best dessert sweet apples of the season.
12	*	*	*	*	*	For vigor, productiveness, size, beauty, and quality combined, this has few if any superiors.
13	**	**	**	**	*	Tree lacks hardiness. Fruit drops badly. Bitter rot in large specimens. Stands first on light soils in southern Michigan.
14	*	....	....	....	....	Good enough in tree and fruit, but has to compete with the mass of fall fruits.
15	*	*	*	*	*	An old culinary fruit,—now nearly superseded.
16	*	....	....	....	....	A vigorous and productive old New England apple. Little known here, and not valued where known.
17	*	**	*	*	*	Fruit often defective in this climate. Best for home markets. Suits the popular taste.
18	*	*	*	*	*	Vigorous, hardy, prolific. Fruit beautiful and handles well, but very poor in quality. Sells well in the market.
19	*	*	*	*	*	Tree upright, vigorous, very productive. Fruit too small on old trees.
20	*	....	....	....	....	Tree grows and bears moderately. Not generally known or highly valued.
21	*	*	*	*	*	Very mild flavor. Soon gets dry and mealy. Prized by a very few persons.
22	*	*	*	*	....	In vigor and productiveness, also character of fruit, this is very desirable for market and cooking.
23	*	*	*	*	*	Beautiful; but lacks both productiveness and quality.
24	*	....	....	*	....	Vigorous, spreading. Little grown in this State.
25	*	*	*	*	*	Vigorous, hardy, spreading, irregular, productive. A desirable sweet apple.
26	*	....	....	*	....	Little grown here. More popular farther south.

SECTION I.—APPLES—CONTINUED.

Number.	Names.	Description.						Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
27	Buffington (Early)	m	ob	y w r	v g	Aug.	Penn.	7	7	3
28	Burr's Sweet	m	o b c	y r	v g	Nov. Mar.	Mass	6	7	2
29	Cabashea, *20-oz. Pippin*	v l	r o b c	y r	g	Dec. Feb.	Am.	1	4	1
30	Canada Reinette	l	o b c f	g y b	v g	Dec. Apr.	Eur.?	8	7	2
31	Carolina June	s	o v c	d r	v g	Aug.	N. C.?	7	6	2
32	Chenango	m l	o c	w c	v g	Sept. Oct.	N. Y.	9	4	8
33	Chronical	m	r c	g y r	g	Dec. Dec.	Ind.	2	2	4
34	Clyde (Beauty)	l	r c a	g r	g	Oct. Jan.	N. Y.	6	7	8
35	Cogswell	m l	r o b	y r	b	Dec. Mar.	Conn.	8	7	8
36	Cole's Quince	l	r o b	g y r	v g	Oct. Dec.	Maine.	6	8	6
37	Colvert	l	o b c	g y r	g	Oct. Nov.	N. Y.?	4	7	7
38	Cooper	l	r o b	g y r	g	Oct. Dec.	Am.?	4	6	7
39	Cooper's Market	m	o b c	y r c	g	Dec. May.	Am.?	4	8	6
40	Cornell (Fancy)	m	o c	y c	v g	Oct. Nov.	Penn.	7	6	8
41	Cranberry (Pippin)	m	r o b	y s	g	Nov. Mar.	N. Y.	5	7	8
42	Cumberland (Spice)	m l	r c	y r	g	Dec. Mar.	N. J.	6	5	7
43	Daniel	m	o c	g y c r	v g	Sept. Oct.	Am.	6	4	2
44	Danvers Sweet	m	r o	y o	v g	Nov. Apr.	Mass.	5	7	5
45	Detroit Black	m l	r c f	d c r	g	Oct. Feb.	Can.?	6	4	2
46	Detroit Red	m	r c	d c r	g	Oct. Nov.	Am.?	4	3	1
47	Domine	m	r o b	g y r	v g	Dec. Apr.	Am.?	6	6	8
48	Drap d'or	l	r o b	y	g	Aug. Oct.	Eur.	5	5	1
49	Dyer, *Pomme Royal*	m	r	g y r	b	Sept. Oct.	Fr.?	10	8	4
50	Early Harvest	m	r o b	y w	b	July Aug.	N. Y.?	9	9	5
51	Early Joe	s	o b c	y r	b	Aug. Sept.	N. Y.	10	6	4
52	Early Strawberry	s	r c	y r	v g	July Aug.	N. Y.	8	6	7
53	English Russet	s m	r c	g y r u	g	Jan. May	Am.?	4	5	6
54	Esopus (Spitzenburg)	l	o c	y r	b	Dec. Apr.	N. Y.	9	10	4
55	Evening Party	s m	o b	w g r	g	Dec. Mar.	Penn.	8	4	2
56	Fallawater	v l	r c	y g r	g	Nov. Mar.	Penn.	4	4	7
57	Fall Jenetting	l	o b c	g y r	g	Sept. Oct.	Conn.?	5	4	4
58	Fall Orange	l	r	y r	g	Oct. Nov.	Mass.	4	8	8
59	Fall Pippin	v l	r f	y g b	b	Oct. Dec.	Am.	9	10	7
60	Fall Wine	m	r o b	r y	b	Sept. Nov.	Am.	8	6	1
61	Fameuse, *Snow*	m	r o b	g y r	v g	Oct. Nov.	Can.?	9	4	6
62	Flower (of Genesee)	l	r	y g w	g	Oct. Nov.	N. Y.?	4	4	6

SECTION I.—APPLES—CONTINUED.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
27	*	....	....	....	....	A desirable dessert apple. Not as generally known as it deserves to be.
28	*	....	....	....	....	Good grower, early bearer, productive. But little known.
29	*	*	*	*	*	Tree vigorous, tender; thin bearer; drops badly. Poor quality. Subject to bitter rot.
30	*	*	*	*	....	An old and often excellent apple; but now little called for.
31	*	*	*	*	*	Often small, scabby, and imperfect; quality excellent. Ripens in succession. Better farther south.
32	*	*	*	*	*	Tree vigorous, spreading, productive. Fruit of very delicate texture. Popular wherever known.
33	*	*	*	*	*	Negative in quality; will keep two years; moderate annual bearer.
34	*	*	*	*	....	Tree vigorous, upright, very productive. A desirable market apple.
35	*	*	*	*	....	The tree and fruit are both satisfactory, whether for the home or market.
36	*	....	....	....	....	Upright, spreading, productive. A desirable family fruit with a quince aroma.
37	*	*	*	*	*	Tree vigorous, hardy, prolific. Fruit large, showy, but not of high quality. Popular with the masses. Sells well in market.
38	*	*	*	*	*	Tree very vigorous, upright, spreading. Fruit even sized, very attractive.
39	*	*	*	*	*	Hardy, vigorous, upright, productive. Profitable.
40	*	*	*	....	....	Vigorous, productive. A desirable fruit for general purposes.
41	*	....	....	*	*	Tree a good grower, productive. Fruit much like the Maiden's Blush. Even more beautiful. Worthless at the extreme north.
42	*	*	....	....	....	Tree a good grower and great bearer. Its color and season are against it for the market.
43	*	....	....	....	....	Very peculiar in growth of tree, as well as color and flavor of fruit. Is better than it looks.
44	*	*	*	*	....	Strong grower and very productive. Deserves more attention.
45	*	*	*	*	....	Unproductive, showy, valueless. This is probably the Detroit Red of Downing.
46	*	*	*	*	....	There are probably several varieties grown under this name. None of them valuable.
47	*	*	*	*	*	Tree has long, stout, spreading branches, which are very liable to be broken by the heavy crops of fruit. Scabs on old trees.
48	*	*	*	....	*	Tree straggling, moderate grower, unproductive. Very little known.
49	*	*	*	*	....	One of the very finest dessert apples. A poor grower. Unprofitable as a market fruit.
50	*	**	*	*	*	Tardy, irregular bearer. Fruit often imperfect. Valued mainly for its earliness. Fails on old trees.
51	*	*	*	*	*	For the garden. With high culture the fruit is beautiful and excellent.
52	*	**	*	*	*	One of the most attractive dessert apples of its season. Ripens in succession. By some considered profitable.
53	*	*	*	*	*	Strong, upright, very productive, tender. Fruit very even sized, often small. Keeps easily a year. Poor quality.
54	*	*	*	*	*	Tree lacks vigor. Fruit much called for in the market, but rarely offered. Best on rich, warm soils.
55	*	....	....	....	*	Much like Rambo in tree and fruit. Very little disseminated.
56	*	*	*	*	*	Grows and produces well. Too poor in quality. Size its chief recommendation. Always sells well.
57	*	*	*	*	*	Tree vigorous, spreading, productive. Its season and color detract from its value.
58	*	....	*	....	....	The apple grown in this State under this name proves to be the one grown as "Newell" in Hillsdale county.
59	*	*	*	**	*	Tree strong, spreading, productive; liable to scab. Often keeps till spring. In central district lacks productiveness.
60	*	*	*	*	*	Grows and bears well. Fruit often scabby. Not extensively grown.
61	*	**	*	*	**	Fruit scabby and imperfect on old trees. Best on new, rich soils. Good at the north. Profitable where it succeeds.
62	....	*	....	*	....	Very productive, fruit always fair; otherwise not desirable.

SECTION I.—APPLES—Continued.

Number.	Names.	Descriptions.						Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
63	Flushing (Spitzenburg)	m	r c	g y r	g	Nov. Mar.	N. Y.?	6	6	7
64	Foundling	m l	r o b c	y g r	v g	Aug. Sept.	Mass.	7	7	6
65	Fourth of July	m s	r o b c	w y r	g	July.	Ger.	4	6	6
66	Garden [Comstock's]	m	r o b	w r	g	Sept. Oct.	N. Y.	3	9	5
67	Garden Royal	m s	r o b c	g y r	b	Aug. Sept.	Mass.	10	5	3
68	Garrettson (Early)	m	r c	y	v g	Sept.	N. J.	8	8	8
69	Genesee [Chief]	l	r c	w c r	g	Sept.	Am.	6	8	7
70	Gilpin, *Carthouse*	m	r o	r y	g	Dec. May.	Vir.	5	4	7
71	Gloria Mundi	v l	r o b	g y	g	Oct. Feb.	Eur.?	1	3	3
72	Golden Russet (W. N. Y.)	m s	r o b	y r u	v g	Dec. May.	Eng.?	9	5	10
73	Golden Sweet	l	r	g y	g	Aug. Sept.	Conn.	6	5	4
74	Gravenstein	l	r o b a	y r o	v g	Sept. Oct.	Ger.	7	7	7
75	Green Newtown (Pippin)	m	r	g br	b	Dec. May.	N. Y.	10	8	3
76	Green Sweet	m	r o b c	g y	g	Dec. Mar.	Mass ?	7	6	7
77	Grimes' Golden	m	r o b c	y o	v g	Dec. Mar.	Va.	9	7	8
78	Hartford (Sweet)	l	r f	y g r	g	Dec. June	Conn.	6	7	4
79	Harvest Redstreak	s	r f	g y r	g	July.	Penn.?	2	8	2
80	Haskell (Sweet)	m l	o b	g y r	v g	Sept. Oct.	Mass.	6	7	2
81	Hawley, *Dowse*	l	r o b c	y	v g	Sept.	N. Y.	9	2	5
82	Hawthornden	m l	r f	w y r	g	Sept.	Scotch.	3	8	8
83	Herefordshire (Pearmain)	m	r c	y d r	v g	Nov. Feb.	Eng.	8	6	1
84	Hightop Sweet	m s	r	y	v g	Aug.	Mass.	6	6	2
85	Hog Island Sweet	m	o b	y r c	v g	Sept. Oct.	N. Y.	6	7	3
86	Holland (Pippin)	v l	r	g y r	g	Aug. Nov.	Eur.?	6	8	4
87	Hollow Crown	l	r c	y r	g	Nov. Dec.	N. E.	5	7	8
88	Horse	l	r	y r ru	g	Aug. Sept.	N. C.?	5	6	5
89	Hubbardston	l	r o c	y r	b	Nov. Feb.	Mass.	10	5	9
90	Hunt's Russet	m s	r o b c	y ru r	v g	Jan. Apr.	Mass.?	7	7	6
91	Hurlbut	m	o b c a	y r	g	Oct. Dec.	Conn.	6	7	6
92	Indiana (Favorite)	m l	r f	y r	g	Jan. Apr.	Ind.	5	5	7
93	Jabez Sweet	m	r c	y	g	Dec. Feb.	Conn.	6	7	3
94	Jefferis	m	o b c	y c r	v g	Sept. Oct.	Penn.	9	6	7
95	Jefferson County	m	r o b	y r	g	Oct. Nov.	N. Y.	7	6	5
96	Jersey Sweet	m	r o v c	g y r	v g	Sept.	N. J.	8	7	4
97	Jewett's Best	l	o b r	y g r	v g	Dec. Feb.	Ver.	8	6	4
98	Jewett's Red	m	r o b	g w c r	g	Nov. Feb.	N. H.	7	6	5

SECTION I.—APPLES—CONTINUED.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
63	*	*	*	*	*	Strong, reddish brown shoots. Very productive. Sometime scabby. Not esteemed valuable, except perhaps at the north.
64	*	....	....	....	....	Moderately vigorous, spreading, productive; desirable in its season.
65	*	....	....	*	....	Strong, upright. May be valuable for its earliness.
66	....	....	*	....	....	A fine culinary apple. Cooks well when half grown.
67	*	*	*	....	....	Moderate grower. Upright roundish. Best dessert apple of its season.
68	*	....	....	....	....	Vigorous, upright, spreading. Very promising.
69	*	*	*	*	....	Strong, vigorous. The showy fruit is the chief attraction.
70	*	*	*	*	....	A good cider appfe, and passable for the table.
71	*	*	*	*	*	Vigorous; not productive. Size its only attraction. Worthless everywhere.
72	**	**	*	*	**	Hardy, vigorous. Shoots slender. Very productive. Brings a high price in late spring, if wintered in close packages.
73	*	*	*	*	*	A hardy, spreading, prolific tree. Very popular in its season. Tree tender at the extreme north. Often fed to stock.
74	*	**	*	*	*	A fine cutinary fruit. Tree a fine grower and hardy; lacks productiveness. Bears better at the north.
75	*	*	*	*	*	A weak, slender grower. Fails generally at the west. Unprofitable. Best on "opening" soils.
76	*	**	*	*	....	Tree vigorous, productive. Desirable. More than one variety grown under this name.
77	*	*	*	*	*	Tree spreading, vigorous, hardy, prolific. Fruit beautiful. Flavor fine, peculiar.
78	*	*	....	....	....	Moderate grower, hardy, productive. A good baking sweet apple.
79	*	*	*	....	*	Tree overbears and fruit becomes small. Flesh tender, acid. Unworthy.
80	*	*	*	*	**	Vigorous, productive. One of the finest of sweet apples.
81	*	*	*	*	*	Annual bearer. Fruit beautiful and good, but soon decays. A dessert fruit. A better keeper north.
82	*	*	*	*	....	Tree vigorous, spreading. Productive alternate years. A beautiful culinary market fruit.
83	*	*	*	*	....	Tree vigorous. Fruit excellent in flavor, but generally imperfect. Very unprofitable.
84	*	*	*	....	....	Tree upright, vigorous. Very productive. Fruit very beautiful and good.
85	*	....	....	*	....	Vigorous, prolific. Desirable, but very little known. Beautiful.
86	*	*	....	....	*	Like fall Pippin, except in quality and season; but not as good. Very little known.
87	*	....	....	....	....	Little planted. There are other and worthier varieties of the same season.
88	*	....	....	....	....	Should give place to others of better quality for this climate.
89	*	**	*	**	**	Should be in every orchard. A very good market variety. Of the highest quality.
90	*	*	*	*	*	Distinct from Golden Russett of N. Y., and the west. Not as valuable.
91	*	....	....	....	....	Very productive. Fruit fair, but not very attractive. Little disseminated.
92	*	....	....	....	....	Both tree and fruit adapted for market. Very little known.
93	*	....	....	....	....	Highly prized in Monroe county. Not widely disseminated.
94	*	*	*	*	*	A very productive and desirable dessert fruit for early autumn.
95	*	....	*	....	*	Vigorous, hardy, prolific. Is but little known.
96	*	*	*	*	*	Prolific. One of the richest early sweet apples. Tree tender in central district.
97	*	....	....	....	....	Tree spreading. Does not keep long enough for profit. Little known.
98	*	....	....	....	....	Moderate grower. Downing says—requires high culture. Little known.

SECTION I.—APPLES—Continued.

Number.	Names.	Descriptions.						Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
99	Jonathan	m s	r c	y r	v g	Nov. Feb.	N. Y.	9	7	9
100	Kaighn (Spitzenburg)	l	o o v c	w y r	g	Nov. Jan.	N. J.	5	6	6
101	Keswick Codlin	m l	o v c	g y r	g	Sept. Oct.	Eng.	2	10	8
102	Klaproth	m	f	g y r	v g	Aug. Oct.	Penn.	7	7	4
103	Lady (Apple)	v s	f	y r	v g	Dec. May.	Fr.	8	1	5
104	Lady's Sweet	l	r o v c	y r	v g	Dec. May.	N. Y.	7	7	7
105	Late Strawberry	m	r c	w r	v g	Oct. Dec.	N. Y.	8	4	5
106	Ledge Sweet	m	o b	w y r	g	Dec. Mar.	N. H.	5	5	5
107	Limber Twig	m	r o b	y r	g	Jan. Apr.	N. C.?	5	7	8
108	London	l	r c f	y r	g	Nov. Feb	Eng.	5	7	6
109	Lowell	l	r o v c	g y	v g	Sept. Oct.	Penn.?	7	7	8
110	Lyscom	l	r	g y r	g	Sept. Nov.	Mass.	7	3	5
111	Macomber	m	o b	y r	g	Dec. Jan.	Maine.	6	4	5
112	Maiden's Blush	m	r f c	y r c r	g	Sept. Oct.	N. J.	6	8	10
113	Mann	m l	r o b	y b r	v g	Jan. Apr.	N. Y.	6	7	9
114	Manomet	m	r o b	y r	v g	Aug. Sept.	Mass.	7	7	4
115	Marston's (Red)	m	r c	w y r c r	v g	Dec. Mar.	N. H.	8	7	6
116	May (Seecknofurther)	m	o b c l	g y r	g	Feb. June	Am.	1	1	7
117	McAfee (Nonesuch)	m l	r o b c	y r	v g	Oct. Feb.	Ken.	6	7	7
118	McLellan	m	r o b	y r	v g	Dec. Mar.	Conn.	9	7	8
119	Melon	m l	r o b c	y c r c	b	Nov. Mar.	N. Y.	10	8	7
120	Mexico	m	r o b	c r r y	b	Sept. Oct.	Conn.	10	6	5
121	Milam	m s	r	g r	g	Dec. Mar.	Am.	5	6	5
122	Miller (N. Y.)		o o b c	y r	v g	Oct. Nov.	N. Y.?	7	6	8
123	Minister	l	o c	g y r	g	Oct. Feb.	Mass.	6	7	5
124	Monmouth (Pippin)	l	o b c a	y r	v g	Nov. Mar.	N. J.	6	7	9
125	*Red Check Pippin.* Morris Red	m l	o v c	r r u	v g	Jan. Apr.	Conn.?	8	8	7
126	*Steele's Red erroneously.* Mother	m	r c	y r	b	Nov. Feb.	Mass.	7	6	7
127	Munson Sweet	m	o b	y r	v g	Sept. Feb.	Mass.?	6	7	7
128	Newtown (Spitzenburg)	m	o b c	y r	b	Oct. Feb.	N. Y.	9	7	5
129	*Vandevere of N. Y.* Nickajack	l	r o b c	y r	g	Dec. Apr.	. C.	4	2	6
130	Northern Spy	l	r c	g y r	b	Dec. Apr.	N. Y.	10	9	10
131	Oakland (Seeknofurther)	m	r o b	y r	v g	Nov. Mar.	Mich.?	8	...	8
132	Oconee (Greening)	l	r f	y b	g	Nov. Dec.	Ga.	6	6	7
133	Ohio Nonpariel	l	r o b	y r	v g	Nov. Dec.	Ohio?	8	9	9
134	Oldenburgh	m	r o b	y r	g	Sept.	Rus.	5	9	9

SECTION I.—APPLES—CONTINUED.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
99	**	**	*	*	**	Good bearer alternate years. Fruit small, very beautiful, and good. Popular.
100	*	*	*	*	....	Tree vigorous, straggling, productive. Old. Now little grown.
101	*	*	*	*	*	Cooks well, even when but half grown. Very early bearer. Very hardy and prolific.
102	*	....	....	....	....	Downing commends it as a promising market apple. This remains to be shown.
103	*	*	*	*	*	A beautiful little fancy apple. Brings large prices in market in eastern cities. Little known west. Sometimes scabs.
104	*	**	*	*	*	A fair baking apple. Desirable as a long keeper. Retains its juice and flavor.
105	*	*	*	*	*	Regular, early bearer. Chenango is often grown under this name.
106	*	....	....	....	....	Vigorous, productive, regular bearer. But little known.
107	*	*	*	*	*	Popular west and south as a long keeper. Distinct from Willow Twig.
108	*	....	....	....	....	Little known, with little to specially recommend it.
109	*	*	*	**	**	Strong grower, bears heavily in alternate years. Popular. Profitable.
110	*	....	*	....	....	Generally fair. Tree vigorous, upright, spreading. Not largely planted.
111	*	....	....	....	....	Annual bearer. But little known, and not likely to command special attention.
112	*	**	*	**	**	Spreading, vigorous, prolific. The most popular early autumn market apple. Rather acid for dessert.
113	*	*	*	*	*	Hardy, upright, annual bearer. Not much disseminated. A long keeper.
114	*	....	....	....	....	Vigorous, productive. Fruit excellent. Worthy of increased attention.
115	*	....	....	....	....	Moderate grower. A beautiful and excellent fruit. Unproductive.
116	*	*	*	*	....	Vigorous. Known in Eastern Michigan as Romanite. Only valued as a long keeper.
117	*	*	*	*	....	An old Southern variety. Not widely disseminated in Michigan. Unworthy.
118	*	**	....	*	....	Thrifty, upright, productive. An excellent variety for home and market. Bears alternate years.
119	*	**	*	*	....	One of the very best dessert apples. Tree hardy, with short, wiry shoots. Very productive alternate years.
120	*	*	*	....	....	Moderate grower, hardy, productive. One of the finest of dessert apples.
121	*	*	*	....	*	A hardy and somewhat popular apple farther west. Not common in Michigan.
122	*	....	*	....	....	Vigorous, productive. A promising fruit for market and general purposes.
123	*	*	*	*	....	Moderately vigorous, very productive. Not widely disseminated.
124	*	*	*	*	....	Vigorous, upright, productive. Is a good market variety.
125	....	....	*	....	....	Vigorous, stocky; leaves large. Buds prominent. May be an old variety. Also known in Fulton Co., Ohio.
126	*	**	*	*	....	Productive. An excellent dessert apple. Deserves more attention.
127	*	*	*	....	*	Tree spreading, vigorous, prolific. Fruit very perfect, even sized, and beautiful.
128	*	*	*	*	....	Requires warm soils. Sometimes scabs or cracks. One of the best apples when perfect.
129	*	*	*	*	....	A southern variety. Hardy, vigorous. Not profitable in this latitude.
130	*	**	**	**	**	Strong, upright, hardy. Tardy bearer. Fruit sometimes uneven and imperfect. Requires good culture and careful handling.
131	....	*	....	*	....	Popular in Oakland county. Less disseminated elsewhere.
132	*	....	....	....	....	A vigorous, hardy, southern apple. Does well in Eastern Michigan.
133	*	**	*	*	**	Very vigorous, productive. One of the most valuable late autumn apples.
134	**	**	*	**	**	Hardy, vigorous, very productive. Of little value except for cooking and market. Sells well; but soon decays.

SECTION I.—APPLES—Continued.

Number.	Names.	Descriptions. Size	Form.	Color.	Quality.	Season.	Origin.	Use and Value. Scale 1 to 10. Dessert.	Cooking.	Market.
135	Orange (Pippin)	m	r ob	o r	g	Sept. Oct.	N. J.	7	6	8
136	Ortley, *White Detroit*	m	r ob c	g y r	v g	Nov. Feb.	N. J.	7	4	2
137	Paw Paw, *Rubicon*	m	r o	y r	v g	Dec. June.	Mich.	9	5	5
138	Peach Pond Sweet	m	ob	y r	v g	Sept. Nov.	N. Y.	6	6	6
139	Peck's Pleasant	m l	r f	g y r	v g	Nov. Mar.	R. I.?	9	8	9
140	Pennock	l	r f l	r y	g	Nov. Mar.	Penn.	1	1	5
141	Perry Russet	m	r c l	y r u b	g	Nov. Dec.	N. Y.?	6	6	5
142	Pittsburgh (Pippin)	l	ob	y r	v g	Nov. Apr.	Penn.	8	8	9
143	Pomme Gris	s	ob l	r u r	b	Dec. Mar.	Eur.?	10	6	5
144	Porter	m l	o c	y r	v g	Sept.	Mass.	8	7	8
145	Pound Royal [Winter]	l	r o c	y w r	g	Dec. Apr.	Fr.?	6	5	4
146	Primate	m	r ob c	g w c r	v g	Aug. Oct.	N. Y.?	10	5	6
147	Pumpkin Sweet, *Pound Sweet*	v l	r	w g y	g	Sept. Dec.	Conn.?	2	8	4
148	Quarrenden (*Devonshire*)	m s	r f c	d c r	g	Aug. Sept.	Eng.	6	6	2
149	Rambo	m	r ob	y w r	v g	Oct. Feb.	N. J.?	8	5	5
150	Ramsdell's Sweet, *English Sweet*	m l	o c	d r	v g	Oct. Feb.	N. E.?	6	9	4
151	Rawle's Janet	m l	ob c	y r c r	g	Feb. June.	Vir.	3	1	5
152	Rebecca	m	ob	w y c r	g	Sept.	Del.	7	5	2
153	Red Astrachan	m l	r c	g y c r	g	Aug.	Rus.	5	9	10
154	Red Canada, *Old Nonsuch*	m	r ob c	y r c r	v g	Dec. June.	N. E.?	8	5	10
155	Red Russet	m l	r c	y r r u	v g	Jan. Apr.	N. H.	8	7	5
156	Ribston (Pippin)	m	r c	y r r u	v g	Nov. Apr.	Eng.	7	7	4
157	Rhode Island (Greening)	l	r ob	g y r	v g	Nov. Apr.	R. I.?	9	10	9
158	Richardson	l	r c	r	g	Aug. Sept.	Mass	6	6	5
159	Roman Stem	m	r	y b r u	v g	Nov. Mar.	N. J.	7	7	4
160	Rome (Beauty)	l	r c	y r	g	Nov. Feb.	Ohio.	6	7	5
161	Rose Red, *Autumn Rose*	m	r ob c	y r	v g	Nov. Jan.	N. Y.?	6	7	4
162	Roxbury Russet	m l	r o b a	y r u r	v g	Jan. June.	Mass.	6	9	7
163	Scarlet Pearmain	m	c	c r y	v g	Aug. Oct.	Eng.	9	8	5
164	Shiawassee (Beauty)	m	ob	w r	v g	Oct. Jan.	Mich.	10	6	8
165	Sine Qua Non	m	r c	g y	v g	Aug.	N. Y.	8	5	4
166	Slingerland (Pippin)	m l	r l	y r	g	Dec. Mar.	N. Y.	6	7	6
167	Smith's Cider	m l	r o b c	y r	g	Dec. Mar.	Penn.	5	4	7
168	Smokehouse	m l	r ob	y c r	g	Sept. Feb.	Penn.	5	7	8
169	Sops of Wine	m	r	y r	g	Aug. Sept	Eur.	4	6	6
170	Spiced Sweet	m l	r f	y	g	Aug. Sept	Am.	6	5	1

SECTION I.—APPLES—Continued.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
135	....	....	....	*	....	An annual bearer. Good for either dessert or market.
136	*	*	*	*	*	Moderately vigorous, upright, productive. Fruit frequently scabby and worthless.
137	*	*	*	*	....	Hardy, moderate grower, regular bearer. Must have suitable soil and good culture.
138	*	*	*	*	*	Tree vigorous, spreading, productive. A beautiful and desirable sweet apple.
139	*	*	*	*	*	Habit of tree like R. I. Greening, but less vigorous. Generally and deservedly popular. Fruit beautiful and excellent.
140	*	*	*	*	*	Sometimes profitable to ship south. Poor flavor. Very subject to bitter rot.
141	*	*	*	*	*	Distinct from Golden Russet. An early, abundant bearer. More than one variety is probably grown under this name.
142	*	....	....	*	....	Spreading. Very productive. A very promising variety. But little known.
143	*	*	*	*	*	Moderate, upright grower. Good early bearer. An exceeding fine dessert apple. Less successful on light soils.
144	*	**	*	*	*	Usually very fair. Valuable for market as well as dessert.
145	*	....	....	....	....	Spreading grower. Must have high culture. Little known.
146	*	**	*	*	*	One of the best dessert apples. Subject to water core and other defects. Ripens in succession.
147	*	*	*	*	*	Tree strong, upright, spreading. Fruit often water cored. Culinary.
148	*	....	....	....	....	Tree spreading, productive. Flavor fine, but fruit often imperfect or scabby; beautiful.
149	*	*	*	*	....	A vigorous but tender tree. Overbears and produces small fruit. A very common farmer's apple.
150	*	*	*	*	*	Very vigorous, and productive. Best sweet apple of its season for cooking and market.
151	*	*	*	*	*	Hardy, vigorous, spreading. Better farther south. Blossoms late.
152	*	....	....	....	....	Upright, spreading, productive. A nice dessert apple. Little known here.
153	**	**	**	**	**	Strong grower; early bearer; hardy. Fruit beautiful; showy; profitable; too sour for dessert.
154	**	**	**	*	**	Very popular for market where fully proved. Tree not vigorous. Should be top-grafted in all cases. Best on strong soils.
155	*	....	....	....	....	Tree much like Baldwin. The same true of fruit except the russet, and higher flavor.
156	*	*	*	*	*	Tree a good grower, productive. High, sharp flavor. Succeeds at the north.
157	*	**	*	**	**	Tree spreading, vigorous; generally productive on strong soils; best at lake shore. One of the old favorites.
158	*	....	....	....	....	Comes in with the summer and autumn fruits. Little known.
159	*	*	*	....	*	Moderately vigorous, spreading. Very productive. Not very much known in this State.
160	*	*	*	*	*	Moderate grower, productive. Inclined to overbear on old trees.
161	*	....	*	....	....	Tree spreading, productive. Desirable when fair. Often scabby and worthless.
162	*	*	*	*	*	Very liable to attacks of the coddling moth. Tree strong, spreading, productive, tender. Not profitable on light soils.
163	*	....	....	....	....	Moderate grower. One of the finest and most beautiful dessert apples of its season.
164	*	*	*	*	....	Tree hardy, vigorous, upright, spreading, productive. Like Fameuse, but superior to it.
165	*	*	*	....	....	Slow grower. Prolific. A desirable dessert apple. Always perfect and even sized.
166	*	....	....	....	....	Tree vigorous, spreading, productive. Little known. Not especially desirable.
167	....	*	*	*	....	Very productive, vigorous, straggling. Valued for market purposes.
168	*	*	....	*	....	Vigorous, spreading, productive. Culinary, market.
169	*	*	*	*	*	Tree vigorous, upright, productive. Widely disseminated, but not valuable.
170	*	*	*	*	*	Fruit generally scabby. Going out of cultivation.

SECTION I.—APPLES—CONTINUED.

Number.	Names.	Descriptions. Size.	Form.	Color.	Quality.	Season.	Origin.	Use and Value. Scale 1 to 10. Dessert.	Cooking.	Market.
171	Stark	l	r c	g y r	g	Jan. May.	Ohio.?	6	6	8
172	Stillman Early	s	r c	y r	g	July, Aug.	N. Y.	7	4	2
173	St. Lawrence	l	ob c	y c	v g	Sept. Oct.	Can.?	8	8	9
174	Striped Bellflower	l	o c	w r	g	Oct Jan.	Ohio.?	2	5	5
175	Summer Hagloe	l	r ob	w y r	v g	Aug. Sept.	N. J.?	5	7	7
176	Summer Pippin	m l	r o c	y c r	v g	Aug. Sept.	N. Y.?	8	8	8
177	*Champlain, Nyack.* Summer Pound Royal	l	r ob c	g w	g	Aug. Sept.	Am.	6	8	7
178	Summer Queen	l	r c	y r	g	Aug. Sept.	N. Y.?	6	7	6
179	Summer Rambo, *Rambour*	l	ob	g y r	g	Sept.	Fr.	6	8	6
180	Summer Rambo [Mich.]	m	r f	w y r	v g	Sept.	Ind	9	7	4
181	Summer Rose	s	r	y r	b	Aug.	N. J.	10	7	5
182	Summer Sweet (Paradise)	l	r f	g y	v g	Aug. Sept.	Penn.	9	7	4
183	Sweet and Sour	l	ob	g y	g	Dec. Feb.	?	4	4	3
184	Swaar	l	r ob	y ob	b	Dec. Apr.	N. Y.	10	6	4
185	Sweet Bough	l	o ov	g y r	v g	Aug.	Am.	8	7	6
186	*Large Yellow Bough.* Sweet Winesap	m	ob c	r c r	v g	Nov. Mar.	Penn.	6	9	7
187	*Henrick Sweet?* Sweet Rambo	m	r ob	y r	g	Oct. Dec.	Penn ?	2	5	....
188	Sweet Vandevere	m	r ob	y r	g	Nov. Mar.	Am.	....	6	....
189	Talman Sweet	m	r	w y r	v g	Nov. Apr.	R. I.	6	8	6
190	Tetofsky	m	r ob c	y r	g	Aug.	Rus.	5	7	....
191	Tewksbury (Winter)	s	ob	y r	v g	Jan. July.	N. J	7	7	5
192	Tompkins King	l	r f c a	y r c r	v g	Dec. Mar.	N. J ?	7	6	7
193	Toole's Indian	l	r c	g y r	g	Sept. Oct.	Am.	6	8	5
194	Townsend	m	ob c	y r	g	Aug. Sept.	Penn.	6	6	7
195	Trenton (Early)?	m l	r o v	y r	g	Aug.	Am ?	6	6	8
196	Twenty Ounce	v l	r	g y r	g	Oct. Jan.	Conn.	5	7	9
197	*Cayuga Redstreak.* Vandevere	m	ob	y r	g	Nov. Mar.	Del.	6	8	9
198	Wagener	m	r ob	y c r	v g	Nov. Mar.	N. Y.	9	6	6
199	Walpole	m	r	y r	v g	Aug. Sept.	Mass.	7	5	2
200	Washington [Royal]	m l	r ob	y g r	v g	Dec. June.	Mass.	7	6	3
201	Washington [Strawberry]	l	r e f	y r	v g	Sept. Oct.	N. Y.	7	7	8
202	Water	m	r c	w y c r	v g	Oct. Dec.	Penn.	8	6	7
203	Wealthy	m	r ob	y c r	v g	Autumn.	Minn.	8	6	8
204	Western Spy	m l	r ob	y c r	g	Nov. June.	Ohio.	5	8	6
205	Westfield (Seeknofurther)	m l	r c	g r ru	b	Oct. Mar.	Conn.?	9	3	7
206	Wetherell's (White) Sweet	m	r c	y r	v g	Sept. Oct.	N. J.	7	9	4

SECTION I.—APPLES—CONTINUED.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
171	*	*	*	*	*	Tree vigorous, hardy, productive. Fruit good enough to sell. Valued as a market fruit.
172	*	....	....	*	....	Tree upright, productive. Little known. Not desirable compared with others in season.
173	**	**	*	**	**	Tree very vigorous, productive. Highly and justly valued. Sometimes cracks and scabs.
174	*	*	*	*	*	Known at Adrian as Fall or Striped Gilliflower. Large and showy but not profitable or valuable.
175	*	....	....	....	....	Vigorous, productive. An old and useful culinary variety.
176	*	*	*	*	....	Tree vigorous; forms a round head, productive. A valuable variety.
177	*	*	*	*	....	Very vigorous. Productive. A profitable market apple for its season
178	*	*	*	*	*	Liable to scab. One of the best cooking apples. Popular.
179	*	*	*	*	....	A large, vigorous tree, moderately productive. Rarely planted. Profitableness doubtful.
180	*	*	*	....	....	Tree similar to Rambo. Also the fruit with similar tendency to overbear. Superior flavor.
181	*	*	*	....	*	Tree moderately vigorous, productive. One of the finest dessert fruits of its season.
182	*	*	*	*	....	Tree spreading, drooping, moderate, regular bearer. Very desirable among sweet apples.
183	*	*	*	*	*	Much ribbed; the ribs sub-acid, the hollows sweetish. A curiosity.
184	*	*	*	*	*	Can only be recommended as an amateur fruit. Tree lacks hardness. Fruit often imperfect. Requires rich, warm, dry soil.
185	*	**	*	*	*	Tree a little tender, and lacks productiveness. The most popular early sweet apple.
186	*	....	....	*	....	Recommended as successful and profitable at Lawton and in Wayne Co.
187	*	....	....	....	....	Tree vigorous, upright, a tardy bearer. Little known. Of doubtful value here.
188	*	....	*	....	....	Tree a crooked grower, productive. Not disseminated. Too many competitors.
189	*	*	**	*	**	Best winter baking apple. The most popular and profitable sweet market apple.
190	*	*	*	*	*	Of little value, except where great hardiness is required.
191	*	*	*	....	*	Tree vigorous, upright, productive. A fine, long-keeping table fruit.
192	*	*	*	*	*	Apt to blow down. A good early winter dessert fruit. Improves at the north.
193	*	*	*	*	....	Tree vigorous, upright, moderately productive. A showy, attractive, and profitable market fruit.
194	*	....	....	....	....	Tree vigorous, upright, spreading, productive. Little known; almost "very good."
195	*	*	*	*	....	Tree moderately vigorous, productive, hardy. A fine, profitable, orchard fruit.
196	*	*	*	*	*	Fruit sometimes imperfect in Lenawee county. Very profitable for market.
197	*	*	*	*	*	Distinct from N. Y. Vandevere. This variety is widely planted. Valuable.
198	*	**	*	**	**	Very early bearer; ruining the tree unless thinned and highly cultivated. Fine dessert apple. Sells well in market.
199	*	....	....	....	....	Tree of moderate vigor. Comes in the season of the summer fruits. Hence less valued.
200	*	....	....	....	....	Tree vigorous, prolific. Fruit quite variable in size.
201	*	*	*	**	....	Tree vigorous. Bears early and abundantly. A valuable variety for general purposes.
202	*	*	....	*	....	Tree vigorous, upright. Blooms late. A fine, mild, dessert apple. Not widely known.
203	*	....	....	....	*	Originated with Peter M. Gideon. Valuable at the north. Very hardy.
204	*	....	....	....	....	Tree rather vigorous; productive. Wood soft, spongy. Of very doubtful value.
205	*	*	*	*	*	Popular old variety for home use. Somewhat lacking in productiveness, and hence unprofitable.
206	*	....	....	....	....	Introduced into Wayne county as Honey Sweet.

SECTION I.—APPLES—CONTINUED.

Number.	Names.	Descriptions. Size.	Form.	Color.	Quality.	Season.	Origin.	Use and Value. Scale 1 to 10. Dessert.	Cooking.	Market.
207	White Doctor	l	r o b	g y	g	Sept. Oct.	Penn.	6	9	7
208	White Juneating, *Early May*	m s	r f	g y r	g	July.	Eur.	4	8	4
209	White Pippin	l	r o b l	g w y	v g	Jan. Apr.	Am.?	6	7	5
210	White Spanish Reinette	v l	r o b	y g o r	v g	Oct. Jan.	Spain.	9	10	6
211	Williams (Favorite)	m	r o c	r	g	Aug. Sept.	Mass.	6	5	7
212	Willow Twig, *James River*	m	r c	y r	g	Dec. May.	Vir.	5	7	7
213	Wine, *Hay's Winter*	m l	r f	d r y	g	Oct. Mar.	Del.	7	7	6
214	Winesap	m	r o b c	d r y	v g	Nov. May.	N. J.	6	6	4
215	Winter Pippin [Mich.]	m l	r o b	g y	g	Dec. May.	N. Y.	7	7	8
216	Winter Sweet (Paradise)	m l	r o b	g b	v g	Nov. Mar.	Penn.	6	6	2
217	Winthrop (Greening)	l	o b	g y r u	g	Sept.	Me.	7	7	6
218	Yellow Bellflower	v l	o c	g y r	v g	Dec. Mar.	N. J.	8	10	7
219	Yellow Newtown (Pippin)	m	r o b l	y r	b	Dec. May.	N. Y.	10	8	3

SECTION II.—APPLES—CRABS.

ABBREVIATIONS FOR THIS SECTION.

Form.

a. angular.
c. conical.
f. flattened.
l. lopsided or oblique.
o. oblong.
ob. oblate or obtuse.
ov. oval or ovate.
r. roundish.

Number.	Names.	Descriptions. Size.	Form.	Color.	Quality.	Season.	Origin.	Use and Value. Scale 1 to 10. Dessert.	Cooking.	Market.
1	Byers (Beauty)	m	r c f	d r	g	Sept.	Mich.	5	7	7
2	Hyslop	l	r o v	d r o	g	Sept. Nov.	Am.	4	8	10
3	Large Red	l	r o v	y r	g	Sept. Oct.	Am.	4	6	6
4	Large Yellow	l	r o v	y o	g	Sept. Oct.	Am.	5	8	8
5	Montreal (Beauty)	l	r o b	y r	g	Sept Oct.	Am.	4	7	8
6	Red Siberian	s	r o b	y s	g	Sept. Oct.	Eur.	3	6	4
7	Soulard	m	o b	g y	g	Nov. Dec.	Mo.	1	4	1
8	Transcendent	l	r o b	y e r	g	Sept.	Am.	5	8	10
9	Whitney	l	r o v	y r	b	Sept.	Ill.	7	8	9

SECTION I.—APPLES—CONTINUED.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
207	*	*	....	....	....	Tree strong and prolific. A showy and profitable culinary and market fruit. Little known.
208	*	....	*	....	....	Of very poor quality. Short lived. Desirable for its extreme earliness only.
209	*	*	*	*	*	Tree vigorous, upright, productive. Fruit of the Newtown Pippin class. Popular south.
210	*	....	....	....	....	Tree and fruit much like Fall Pippin, but keeps longer. Seldom seen under its own name.
211	*	*	*	*	....	Tree a good grower; productive. Valued by some as a market variety.
212	*	*	*	*	*	Hardy, vigorous, productive. Fruits vary greatly in size. Keep and sell well.
213	....	*	....	....	....	Hardy, prolific. A fine, though little known, winter fruit.
214	*	*	*	*	*	Irregular grower; good, early bearer. Good for dessert, market or cider—Downing. Valuable in Lenawee county.
215	*	....	....	....	*	Strong, upright grower; slender shoots. Profitable. Probably an unrecognized eastern sort.
216	*	....	*	....	....	Tree hardy, upright, vigorous: a tardy bearer. Productive. Little grown.
217	*	....	....	....	....	Tree vigorous, upright, spreading. A large showy fruit. Little grown.
218	*	*	*	*	*	Needs dry, warm soils. High, rich flavor. Uneven in size. Often unproductive. Not successful at the north. Fruit much in demand.
219	*	*	*	*	....	Tree and fruit like the Green N. Some doubt their distinctness.

SECTION II.—APPLES—CRABS.

ABBREVIATIONS FOR THIS SECTION.

Color.

b. brown.
c. carmine.
cr. crimson.
d. dark.
g. green.
o. orange.
p. purplish.
r. red.
ru. russet.
s. scarlet.
v. vermilion.
y. yellow.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
1	....	**	....	*	**	Tree slender, weak grower. A very beautiful crab. Origin, Van Buren county.
2	*	*	*	**	*	An exceedingly rich looking crab. Keeps well. Sells well.
3	*	*	*	*	*	A vigorous tree, productive. Has the calyx large and prominent.
4	*	*	*	*	*	One of the most beautiful and prolific. Bears in alternate years.
5	*	*	*	*	**	Unexcelled in beauty of appearance. Said to be less beautiful at the north.
6	*	*	*	*	*	Sometimes called "small red." Quite small, beautiful. Often scabby on old trees.
7	....	....	....	*	*	Of little value except for cider and cooking. Worthless.
8	**	**	**	**	**	One of the largest, most productive, and beautiful of the older crabs.
9	....	....	....	**	....	Very large, beautiful, and excellent. Tree vigorous, upright, productive.

SECTION III.—APRICOTS.

ABBREVIATIONS FOR THIS SECTION.

Form.

c. conical.
co. compressed.
d. depressed.
o. oblong.
ov. oval.
r. roundish.

Color.

o. orange.
r. red.
y. yellow.

Number.	Names.	Descriptions.						Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Breda	m	r	o	v g	b. Aug.	Eur.	7	....	....
2	Early Golden	s	r ov	o	v g	m. July.	Am.	6	....	....
3	Hemskirk	l	r co	o r	b	e. July.	Eur.	8	....	....
4	Large Early	m	o co	o	b	m. July.	Eur.	8	....	....
5	Moorpark	l	r	o y	b	b. Aug.	Eur.	9	....	....
6	Peach	v l	r d co	y o	b	b. Aug.	Eur.	10	....	....
7	Red Masculine	s	r	y o r	v g	m. July.	Eur.	6	....	....
8	St. Ambroise	l	r co	y r	b	m. Aug.	Eur.	9	....	....
9	Turkey	m	r	y o	v g	m. Aug.	Eur.	8	....	....

SECTION III.—APRICOTS.

Apricots are recommended for dessert or amateur purposes, with little reference to actual profit, as, owing to occasional loss of the very early bloom, and liability to injury from extreme cold in unfavorable localities, together with extreme liability to the depredations of the curculio, little pecuniary return can be confidently anticipated from them. Since they are recommended only as amateur fruits, they are not quoted for cooking or market.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	
1	*	*	*	*	*	Hardy, productive, excellent. Kernel sweet.
2	†	†	†	†	†	Tree vigorous. Branches long, slender. Freestone.
3	†	†	†	†	†	Beautiful, excellent. Stone not perforated. Kernel bitter.
4	†	†	†	†	†	Vigorous. One of the best early varieties. Freestone. Kernel bitter.
5	*	*	*	*	†	One of the most popular. Stone perforated. Kernel bitter.
6	*	*	*	*	*	Considered the finest variety. Stone perforated. Kernel bitter.
7	†	†	†	†	†	Hardy, Productive. Not high flavor. Kernel bitter.
8	†	†	†	†	†	Earlier than Moorpark. Juicy, sweet, rich.
9	†	†	†	†	†	Old. Later than Moorpark. Stone impervious. Kernel sweet.

SECTION IV.—BLACKBERRIES.

ABBREVIATIONS FOR THIS SECTION.

Form.

c. conical. ov. oval.
o. oblong. r. roundish.

Number.	Names.	Descriptions.						Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Agawam	l	r o	b	v g	m	Am.	9	....	8
2	Ancient Briton	l	o ov	b	v g	l	Ark.	8	7	9
3	Barnard	l	o ov	b	v g	l	Wis.?	8	7	9
4	Brunton	s	r o	b	v g	v e	Am.	7	....	3
5	Dorchester	m	o c	b	b	m	Mass.	7	5	7
6	Early Harvest	s	r o	b	v g	v e	Ill.	8	....	3
7	Erie	l	r o	b	v g	m	Pa.	8	....	9
8	Kittatinny	l	r c	b	b	m	N. J.	10	10	9
9	New Rochelle, *Lawton*	l	ov	b	g	l	N. Y.	9	9	8
10	Snyder	m	r ov	b	v g	e	nd.	9	8	10
11	Stone	m s	r	b	v g	e	Wis.	9	9	7
12	Taylor	l	r o	b	v g	e	Am.	10	10	9
13	Wachusett	m	o ov	b	v g	e	Mass.	7	....	8
14	Wallace	l	o ov	b	v g	m	Am.	9	....	9
15	Western Triumph	m	ov	b	v g	m l	Am.	8	8	9
16	Wilson	l	o ov	b	g	e	N. J.	7	8	9
17	Wilson Junior	l	o ov	b	g	e	N. J.	8	8	9

DEWBERRIES.

These are so closely allied with the Blackberries that they are placed in connection with them rather than in alphabetical order. The columns and abbreviations correspond with those for the Blackberry.

Number.	Names.	Descriptions.						Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Bartle	s m	r o	b	g	v e	Am.	5	....	2
2	Lucretia	l	o ob	b	v g	v e	Va.	8	....	7
3	Mammoth	s m	r o	b	g	v e	Am.	4	....	2

SECTION IV.—BLACKBERRIES.

ABBREVIATIONS FOR THIS SECTION.

Color.

b. black.
w. white.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
1	....	....	....	*	....	Not fully hardy, but productive and fine.
2	....	....	....	*	....	Strong grower and prolific. Well worthy of extended trial.
3	....	....	....	*	....	Comes from west of Lake Michigan, with a reputation for hardiness.
4	....	....	....	*	....	Plant very tender—hence unproductive.
5	*	*	*	*	....	An old New England variety. Of superior flavor. Now nearly out of cultivation.
6	....	....	....	*	....	Brunton has been disseminated under this name. The genuine is claimed to be hardy.
7	....	*	*	*	....	A strong, spreading grower. Productive.
8	**	**	**	**	*	Too well known to need description. Sometimes rusts or mildews.
9	*	*	*	**	*	Plant grows late. Tender. Fruit colors before fully mature. Quality best when fully ripe.
10	*	*	*	*	**	Not large, but good. Very hardy and prolific.
11	....	....	....	*	....	Bears heavily. Size rather small. Hardy. In Lenawee county equals Snyder for market.
12	....	*	....	*	....	Claimed to be as hardy as Snyder.
13	....	....	....	*	....	Hardy. Nearly thornless.
14	....	....	....	*	....	Nearly hardy; vigorous; productive.
15	....	....	....	*	....	Hardy, vigorous and prolific. Valuable in Lenawee county.
16	*	*	*	*	**	One of the largest. Lacks richness. Needs winter protection.
17	....	....	....	*	....	Much like Wilson in both plant and fruit.

DEWBERRIES.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
1	....	....	....	*	....	An uncertain bearer. Fruit often small.
2	....	....	*	*	....	The largest, most productive and best.
3	....	....	....	*	....	Occasionally bears profusely. Often small.

SECTION V.—CHERRIES—Heart and Bigarreau.

ABBREVIATIONS FOR THIS SECTION.

Form.

a. angular. c. conical. l. long. ob. obtuse.
co. compressed. o. ovate or oval. h. heart shaped. r. roundish.

The numbers under the head of "cooking" recommend strictly for canning or drying with sugar as raisins.

Number.	Names.	Descriptions.						Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Class.	Origin.	Dessert.	Cooking.	Market.
1	American Heart	l	h	a b r	g	m June	h	Am.	6	....	7
2	Bauman's May	s	ov h a	d r	g	b June	b	Ger.	5	....	3
3	Belle D'Orleans	l	r h	w y r	v g	b June	h	Fr.?	8	....	8
4	Bigarreau, *Yellow Spanish*	v l	ob h co	y e r	b	e June	b	Eur.	10	9	7
5	Black Eagle	m	ob h	b	b	b July	h	Eng.	9	8	9
6	Black Hawk	l	ob h co	p b	v g	e June	h b	Ohio.	9	6	9
7	Black Heart	l	h	b	v g	e June	h	Eur.	9	6	9
8	Black Tartarian	v l	ob h	p b	v g	m June	h b	Rus.	9	8	9
9	Brant	l	r co ha	r b	v g	m June	h b	Ohio.	8	....	7
10	Burr	l	h	w y r	v g	e June	h	N. Y.	9	6	8
11	Champagne	m	r h	r	v g	e June	h	N. Y.	8	....	6
12	Cleveland	l	r h	r y	v g	m June	b	Ohio.	9	6	8
13	Coe's Transparent	m	r	a r	b	m June	h	Conn.	10	6	5
14	Delicate	m l	r ob	a y r	b	e June	h	Ohio.	10	....	5
15	Doctor	m	r h	y r	v g	b June	h	Ohio.	8	....	7
16	Downer's (Late)	m	r h ov	a r	v g	b July	h	Mass.	9	6	10
17	Downton	l	ob h	br y r	v g	e June	h	Eng.	9	....	6
18	Early Purple	m	r h	d r p	v g	b June	h	Eur.	9	6	6
19	Elton	l	l h	y br r	v g	m June	b	Eng	9	7	9
20	Governor Wood	l	r h	y r	v g	m June	h	Ohio.	9	6	8
21	Kirtland's Mary	l	r h	y r	v g	b July	b	Ohio.	8	....	7
22	Knight's Early	l	ob h	d p b	v g	m June	h	Eng.	8	6	6
23	Logan	m	ob h	p b	v g	e June	b	Ohio.	7	....	6
24	Manning's Mottled	l	r h co	a r	v g	e June	h	Mass.	8	....	5
25	Mezel, *Bigarreau De Mezel, Great Bigarreau.*	v l	ob h	d r b	g	b July	b	Eur.	6	6	8
26	Napoleon	v l	l h	y r	g	b July	b	Eur.	6	6	8
27	Ohio (Beauty)	l	ob h	r	v g	m June	h	Ohio.	7	....	8
28	Osceola	m l	r h	d r	v g	e June	h	Ohio.	8	....	7
29	Pontiac	l	ob h	d p r	v g	e June	h b	Ohio.	8	....	8
30	Powhattan	m	r co	d r	g	m July	h b	Ohio.	5	....	9
31	Red Jacket	l	ob h	a r	g	b July	h b	Ohio.	7	7	9
32	Rockport	l	r ob h	r a	b	m June	b	Ohio.	9	7	9
33	Sparhawk	m	r h	a r	v g	e June	b	Mass.	8	8	8
34	Tecumseh	m l	ob h	r p	g	e July	h b	Ohio.	6	....	8

SECTION V.—CHERRIES—Heart and Bigarreau.

ABBREVIATIONS FOR THIS SECTION.

Color.

a. amber.
b. black.
br. bright.
c. carmine.
cr. crimson.
d. dark.
p. purplish.
r. red.
w. whitish.
y. yellowish.

Class.

b. bigarreau.
h. heart.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
1	*	*	*	*	....	Vigorous, spreading, productive; but variable in quality.
2	*	*	*	*	....	One of the earliest and most prolific. Too small and poor in flavor.
3	*	*	*	*	*	Largest and best of the very early varieties. Tree vigorous, spreading, productive,
4	*	*	*	*	*	Downing says: "Largest, most beautiful, and delicious of cherries." Often cracks and rots, in wet seasons.
5	*	*	*	*	*	Excellent. Requires age before it will bear profusely.
6	*	*	*	*	....	Fine tree. Fruit much like Bigarreau in its general qualities.
7	*	*	*	*	*	Very old. Tree large and hardy. The abundant fruit is of fine quality.
8	**	**	**	**	**	A rapid, erect grower. Prolific. Fruit very large and showy, but not of the highest quality. Tree lacks hardiness.
9	*	*	*	*	....	One of the many fine Ohio varieties of comparatively recent origin.
10	*	*	*	*	....	A vigorous tree. Bears early and profusely.
11	*	....	....	....	....	Originated with Mr. Downing at Newburgh, New York.
12	*	*	*	*	....	A seedling of the late Dr. Kirtland, of Cleveland, Ohio. Tree thrifty, spreading, productive.
13	*	*	*	*	**	One of the finest and most beautiful of the tender fleshed cherries.
14	*	....	....	*	....	Delicate as its name imports. Excellent for home use.
15	*	*	*	*	....	Tree a free spreading grower. Good cultivation requisite to produce fine fruit. At Lawton, not worthy of cultivation.
16	**	**	*	**	....	One of the finest and most valuable late cherries. Of New England origin.
17	*	*	*	*	....	An English seedling. Supposed to have sprung from the Elton.
18	*	*	*	**	*	A moderate grower. One of the best of the very early cherries. Hardy for a Mazzard; but tender at the north.—[Parmelee.]
19	*	**	*	*	**	Originated in England in 1806. One of the best of its class and season.
20	**	**	*	**	*	Seedling of the late Dr. Kirtland. Every way desirable except for its liability to rot.
21	*	*	*	*	....	Seedling of the late Dr. Kirtland. Desirable for either dessert or market.
22	*	**	*	*	*	A week earlier than Black Tartarian. Fine quality. Tree spreading.
23	*	*	*	*	....	Seedling of the late Dr. Kirtland. Ranks high in quality. But little known.
24	*	*	*	*	....	Tree vigorous, prolific. Named fron the mottled appearance of the fruit.
25	....	*	*	....	....	Supposed to be identical with Great Bigarreau, and Large Red Prool.
26	*	*	*	*	**	Very large and showy. Very firm. Most valued for the market.
27	*	*	*	*	*	Seedling of the late Dr. Kirtland. Productive and valuable.
28	*	*	*	*	....	Seedling of the late Dr. Kirtland. Moderate grower and bearer. Flavor excellent.
29	*	*	*	*	....	Seedling of the late Dr. Kirtland. Vigorous, productive. Valuable either as a table or market fruit.
30	*	....	....	*	....	Seedling of the late Dr. Kirtland. One of the best for market purposes.
31	*	*	....	*	....	Seedling of the late Dr. Kirtland. Vigorous, spreading, productive. Very desirable for market.
32	*	*	*	*	....	Seedling of the late Dr. Kirtland. Very highly esteemed. A good bearer.
33	*	*	*	*	....	Origin Massachusetts. Vigorous; productive when trees have acquired sufficient age.
34	*	*	*	*	....	Seedling of the late Dr. Kirtland. Moderate grower; productive. Desirable for its lateness.

SECTION VI.—CHERRIES—DUKE AND MORELLO.

ABBREVIATIONS FOR THIS SECTION.

Form.

co. compressed.
h. heartshaped.
ob. oblate.
ov. oval.
r. roundish.

Color.

a. amber.
b. bright.
d. dark.
p. purplish.
r. red.
y. yellow.

Number.	Names.	Descriptions.							Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Class.	Origin.	Dessert.	Cooking.	Market.
1	Archduke	l	ob h	d r	v g	m July.	d	Eur.	7	6	7
2	Belle de Choisy	m	r ob	y a r	b	m June.	d	Fr.	10	6	3
3	Belle Magnifique	l	r h	b r	v g	m Aug.	d	Fr.	8	7	8
4	Carnation	l	r	y w r	g	m July.	.....	Fr.?	6	6	5
5	Donna Maria	m	r	d r	g	m July.	m	Eur.?	4	6	6
6	Early Richmond, *Kentish*	m	r ob	d r	v g	m June.	m	Eur.	5	9	10
7	Eugenie	l	r ob	d r	v g	m June.	d	Eur.	7	6	7
8	Jeffry	m	r ob	b r	v g	m June.	d	Eur.	6	6	6
9	Late Duke	l	ob h	d r	v g	m July.	d	Eur.	7	7	6
10	Late Kentish, *Common Red*	m	r ob	d r	g	m July.	m	Eur.	4	8	8
11	Leib	m	r	r	g	July.	m	Eur.?	....	....	....
12	Louis Phillippe	l	r	d p r	v g	e July.	m	Fr.	4	10	10
13	May Duke	l	r ob h	d r	b	m June.	d	Eur.	8	8	10
14	Montmorency (Late)	l	r ob	d r	v g	e June.	m	Eur.	5	8	10
15	Morello	l	ob h	d r	v g	m July.	m	Eur.	5	10	10
16	Plumstone	l	r h	d r	g	b Aug.	m	Eur.	4	10	3
17	Reine Hortense	v l	r ov	b r	v g	m July.	d	Fr.	6	7	6
18	Royal Duke	l	r ob	d r	g	e June.	d	Eur.	6	7	7

SECTION VI.—CHERRIES—DUKE AND MORELLO.

ABBREVIATIONS FOR THIS SECTION.

Class.
d. duke.
m. morello.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	
1	*	*	*	*	....	Tree vigorous, upright, hardy, prolific.
2	*	**	*	*	....	One of the best dessert cherries of any class, but a thin bearer. When on sandy soils, or top-grafted on Morello, proves productive.
3	*	*	*	*	*	Moderate grower, productive. Good for dessert when fully ripe.
4	*	**	*	*	....	A beautiful, large, light-red cherry, highly esteemed where known.
5	*	....	....	*	....	A small tree. Very prolific.
6	**	**	**	**	*	One of the most profitable market cherries. Not as good as several of the Dukes.
7	....	....	....	*	....	A new French cherry. An early and prolific bearer.
8	*	....	....	*	....	A tree of compact habit and slow growth. A prolific bearer.
9	*	*	*	*	....	Valuable for dessert or cooking. Ripening after Mayduke.
10	*	*	*	*	...	Emphatically the pie cherry of this country.
11	....	....	*	*	....	A newly introduced variety. Claimed to withstand the winters of the northwest. Unproductive.
12	....	*	*	*	....	A strong, healthy tree of the Morello class. Productive, valuable.
13	**	**	**	**	**	The type of its class. One of the oldest and most popular cherries.
14	....	*	....	*	....	Larger than Early Richmond and ten days later.
15	*	*	*	*	*	Highly esteemed for preserving and other culinary purposes.
16	*	*	*	*	*	One of the best culinary sorts, but a slow grower and a tardy bearer.
17	*	**	*	*	*	A healthy and beautiful tree. A popular and desirable variety.
18	*	*	*	*	*	An upright, compact grower. Later than Mayduke.

SECTION VII.—CURRANTS.

ABBREVIATIONS FOR THIS SECTION.

Form of Bunch.

l. long.
m. medium.
s. short.

Color.

b. black.
br. bright.
d. dark.
r. red.
w. white.

Number.	Names.	Descriptions.						Use and Value. Scale 1 to 10.		
		Size.	Form of Bunch.	Color.	Flavor.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Angers, *Fertile d'Angers*	l	l	r	a	m July.	Fr.	8	9	9
2	Black Naples	l	s	b	a m	m July.	Eur.	1	8	9
3	Cherry	l	s	r	v a	m July.	Eur.	4	8	10
4	Fay's (Prolific)	l	l	r	a	July.	N. Y.	5	8	9
5	Hative	l	m	d r	a	m July.	Fr.	8	8	8
6	Lee's (Prolific)	l	s	b	a m	m July.	Eur.	1	8	9
7	Red Dutch	m	m	d r	a	b m July.	Eur.	9	10	9
8	Versaillaise	l	s	d r	a	m July.	Fr.	7	8	9
9	Victoria	m	l	br r	v a	e July.	Eng.	6	7	9
10	White Dutch	m	m	w	a	b m July.	Eur.	10	7	6
11	White Grape	l	m	w	a	b m July	Eur.	9	8	8

SECTION VIII.—GOOSEBERRIES.

ABBREVIATIONS FOR THIS SECTION.

Form of Berry

ov. oval.
r. round.

Number.	Names.	Descriptions.						Use and Value. Scale 1 to 10.		
		Size.	Form of Berry.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Downing	m l	r ov	w g	v g	Aug.	N. Y.	10	10	10
2	Houghton	s	r	b	v g	Aug.	Mass.	8	10	9
3	Mountain	l	r ov	r	g	m Aug.	N. Y.	5	7	5
4	Pale Red	m	r ov	r	g	Aug.	Am.	4	7	9
5	Smith	l	ov	g	v g	Aug.	Ver.	10	10	9

SECTION VII.—CURRANTS.

ABBREVIATIONS FOR THIS SECTION.

Flavor.

a. acid.
m. musky.
v. very.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	
1	*	....	....	*	....	Comparatively little known.
2	*	*	*	*	*	Good culinary fruit. Much sought in the market by foreigners.
3	*	*	*	*	*	Its size renders it popular. One of the most acid of currants.
4	*	*	*	*	*	Long bunch. Large berry. Very productive.
5	....	....	*	*	*	The best of the less common kinds.—(Steere.)
6	....	*	....	*	....	Possibly a slight improvement upon Black Naples.
7	**	**	**	**	**	Has no superior except in size. The best for all purposes.
8	*	**	*	*	*	By some believed to be superior to the cherry currant. Others think them identical.
9	*	*	*	**	**	Valuable, rather late sort. It seems to be exempt from the attacks of the borer.
10	*	**	*	*	**	Better in quality, and in the habit of the plant, than White Grape.
11	*	**	*	*	**	Plant of spreading, straggling growth. Larger, but not as good as White Dutch.

SECTION VIII.—GOOSEBERRIES.

ABBREVIATIONS FOR THIS SECTION.

Color.

b. brown.
g. green.
r. red.
w. whitish.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	
1	*	**	*	*	*	Fine, stocky, vigorous plant; quite thorny. The highest quality of fruit.
2	*	*	*	*	*	Slender and straggling, but vigorous, prolific, and excellent.
3	*	*	*	*	*	A strong plant. Berry with a very thick skin; and uneven size. Poor quality.
4	*	*	*	*	*	An old sort of slender but upright growth.
5	*	*	*	*	*	Some doubt as to the vigor of the plant. An excellent variety.

SECTION IX.—GRAPES—NATIVE.

ABBREVIATIONS FOR THIS SECTION.

Bunch.		Form.		Berry.
b. broad,	o. open or loose.	sh. shouldered.		r. round.
c. compact.	s. short.	v. very.		o. oblong.
l. long.				ov. ovate or oval.

Number.	Names.	Descriptions.								Use and Value. Scale 1 to 10.		
		Size.		Form.								
		Bunch.	Berry.	Bunch.	Berry.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Adirondac	l	l	c sh	r	p b	v g	b Sept	N. Y.	8	....	4
2	Agawam, *Rog. 15*	l	l	c sh	r	d r	v g	m Sept h	Mass	7	....	7
3	Aminia, *Rog. 39*	.....	l	.....	r	b	v g	m Sept h	Mass	8	....	7
4	Barry	l	l	s b c	r	b	g	m Sept h	Mass	7	....	8
5	Brighton	m	l	c sh	r	r	v g	m Sept	W. N.Y.	10	....	9
6	Canada, *Arnold's 16*	m l	m l	sh	r	b	g	m Sept	h Ont.	8	....	3
7	Catawba	m	l	sh o	r	r	v g	Oct.	Md.	9	....	6
8	Champion, *Talman*	m	l	s c sh	r	b	g	b Sept	Am.	4	....	8
9	Clinton	m	s	c sh	r	b	g	Oct.	N. Y.	3	....	3
10	Concord	l	m l	c sh	r	b	v g	m Sept	Mass.	7	....	10
11	Cottage	l	l	l	r	b	g	b Sept	Mass.	6	....	7
12	Creveling	m l	m	l sh	r	b	v g	m Sept	Pa.	8	....	2
13	Delaware	s	s	c sh	r	l r	b	m Sept	N. J.?	10	....	8
14	Diana	l	l	c l	r	r l	v g	e Sept	Mass.	6	....	6
15	Elvira	m	s	s	r	g w	g	e Sept	Mo.	4	....	6
16	Empire State	l	m	sh	r ov	w	v g	m Sept	N. Y.	8	....	....
17	Essex, *Rog. 41*	l	v l	.....	r	b	g	m Sept h	Mass	....	....	....
18	Eumelan	l	m	c sh	r	p b	v g	m Sept	N. Y.	9	....	2
19	Hartford	l	l	c sh	r	b	g	b Sept	Conn.	4	....	6
20	Hayes	m	m	s b	r	y w	v g	Sept.	Mass	8	....	....
21	Herbert, *Rog. 44*	l	l	l	r	b	v g	m Sept h	Mass	6	....	....
22	Iona	l	m	o ch	r o	r	b	m Sept	N. Y.	10	....	6
23	Isabella	l	l	c sh	o	b	v g	e Sept	S.Car.	6	....	7
24	Israella	m l	l	c sh	o	p b	v g	m Sept	N. Y.	7	....	4
25	Ives	m	m	c sh	r o	b	g	e Sept	Ohio.	7	....	8
26	Janesville	s	m	s c	r	b	g	b Sept	Am.	7	....	9
27	Jessica	m s	m s	.....	r	y g	b	b Sept	Ont.	9	....	....
28	Kalamazoo	l	l	l o	r	r	v g	e Sept	Ohio.?	6	....	6
29	Lady	m	l	l c	r	y g	b	m Sept	Ohio.	10	....	5
30	Lady Washington	v l	m	sh c	r	y	g	e Sept	N. Y.	7	....	....
31	Lindley, *Rog. 9*	m	m	l c	r	r	v g	m Sept h	Mass	7	....	8
32	Martha	m	l	sh o	r	y g	g	m Sept	Mo.	4	....	6

SECTION IX.—GRAPES—NATIVE.

ABBREVIATIONS FOR THIS SECTION.

Color.

a. amber.
b. black.
d. dark.
g. greenish.
l. light.
li. lilac.
p. purple.
r. redish.
w. whitish.
y. yellowish.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
1	*	*	*	*	*	One of the finest very early grapes. Subject to mildew of the foliage. Rarely successful.
2	*	*	*	*	*	Keeps well after gathering.
3	....	....	....	*	*	Very well esteemed by those who have fruited it.
4	*	*	*	*	*	One of Rogers's very numerous hybrids.
5	....	**	....	*	....	One-fourth foreign. Highly satisfactory.
6	....	....	*	*	....	One of the recent Canadian hybrids. Little grown in this State. Bears profusely.
7	*	....	*	*	....	It is yet one of the best in localities where the season is long enough to ripen it. Good two years out of three at the south.
8	....	*	....	**	....	Very early, vigorous and productive. Valuable chiefly as an early market grape.
9	*	*	*	*	*	Is seldom good, or even passable till ripened by frost. Fruit best on high, warm, gravelly soils.
10	**	**	**	**	**	Here, as elsewhere, this is "the grape for the million," since it can take care of itself.
11	....	....	....	*	....	Seedling from Concord by E. W. Bull. Prized in Lenawee county.
12	*	*	*	*	*	Possibly from defect of the bloom, this is a bad setter and a thin bearer.
13	**	**	**	**	**	Slow grower. Fully as productive as Concord when well established. Fruit sometimes fails from dropping of the leaves.
14	*	*	*	*	*	Rather foxy, with a thick tough skin. One of the best keepers. A thin bearer on strong soils. Better on dry, warm soils.
15	....	....	....	*	....	Better in a more southern latitude.
16	....	†	....	†	....	Promises well for both dessert and market.
17	....	....	....	*	....	A fair variety for dessert and market uses. Rather liable to mildew.
18	*	*	*	*	*	A good dessert grape. May in some localities do for market. It seems to lack constitution.
19	*	*	*	*	*	Still prominent as one of the hardiest and most productive for early market; but very liable to drop its berries.
20	....	†	....	*	....	Vigorous, hardy. Of fine quality.
21	....	....	....	*	....	Another of the Massachusetts hybrids, needing more extensive trial.
22	*	**	*	*	**	Generally esteemed as the finest of our natives. The vine seems to lack constitution, and is not generally successful.
23	*	*	*	*	....	An old favorite. Still popular where it is sure to ripen. Is not generally successful.
24	*	*	*	*	*	A good early sort, with tender, breaking pulp, and fair flavor. Requires warm soils.
25	*	*	*	*	*	Valued for hardiness, vigor, and productiveness. A good wine grape.
26	....	....	....	*	*	New, hardy, and vigorous. Three weeks earlier than Concord.
27	....	†	....	†	....	Vine hardy, productive. Not satisfactory in some localities.
28	....	*	....	*	....	Succeeds at Kalamazoo. Not extensively planted.
29	....	**	....	†	....	Seedling of Concord, and as hardy and healthy; but not as vigorous and productive. Quality superior.
30	*	*	*	*	....	Valuable in locations where it will ripen.
31	....	....	*	*	*	A vigorous and productive vine. But little grown in this State.
32	*	*	*	*	*	Much sought for on account of its color. Very sweet, but too foxy.

SECTION IX.—GRAPES—CONTINUED—NATIVE.

Number.	Names.	Descriptions.								Use and Value. Scale 1 to 10.		
		Size.		Form.								
		Bunch.	Berry.	Bunch.	Berry.	Col r.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
33	Massasoit, *Rog. 3*	m	l	s sh	r	r	g	m Sept	h Mass	6	....	5
34	Merrimac, *Rog. 19*	l	l	s b c	r	b	g	m Sept	h Mass	7	....	7
35	Moore's (Early)	l	l	e sh	r	b	v g	b Sept	Mass.	7	6	7
36	Niagara	l	m	e sh	r	g y w	v g	m Sept	N. Y.	8	....	10
37	Perkins	m	m	sh c	r o	r	g	e Sept	Am.	2	....	2
38	Pocklington	l	l	l sh	r	y	v g	e Sept	N. Y.	7	....	8
39	Requa, *Rog. 28*	l	l	s o	r	r	g	m Sept	h Mass	7	....	....
40	Salem, *Rog. 53*	l	l	s b c	r	d r	g	e Sept	h Mass	7	....	8
41	Telegraph, *Christine*	l	l	c	r	b	g	m Sept	Penn.	5	....	5
42	Ulster	l	l	sh	r	r	b	m Sept	N. Y.	10	....	....
43	Vergennes	m	l	o s	r	r	v g	b Sept	Ver.	7	...	....
44	Walter	m	m	sh c	r	l r	b	m Sept	N. Y.	6	....	4
45	Wilder, *Rog. 4*	l	l	c sh	r	b	v g	m Sept	h Mass	7	....	8
46	Woodruff	s b	l	sh	r	r	v g	m Sept	Mich.	7	....	9
47	Worden	l	l	c sh	r	b	v g	m Sept	N. Y.	8	....	10

SECTION IX.—GRAPES—CONTINUED—NATIVE.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	
33	*	*	*	*	*	Moderately vigorous and productive; like most of the hybrids, liable to mildew.
34	*	**	*	*	**	Vigorous and prolific. Much like Wilder in quality and season.
35	*	*	*	*	*	Vigorous grower. Excellent; especially for the north.
36	*	*	*	*	*	A promising white, market grape. Very vigorous, healthy and productive.
37	*	*	*	*	*	Not largely planted here. Hardy, good bearer, but lacks quality. Will do for market.
38	*	*	*	*	....	Hardy, beautiful. Rather late.
39	....	....	....	*	†	Promising here, but requires farther trial.
40	*	**	*	*	**	The largest, most attractive and popular of the Rogers hybrids. Vigorous, productive. Bunches often imperfect. Mildews.
41	....	*	....	*	....	Hardy and vigorous. Ripening with Hartford Prolific, and similar in quality.
42	....	†	....	†	....	Hardy, productive. Promises superior excellence.
43	*	*	*	*	*	Hardy. Ripens with Concord. Not of high quality.
44	*	*	*	*	*	A cross of Delaware and Diana. Has not realized the anticipations of planters. A feeble plant.
45	*	*	*	*	**	One of the finest and most popular of the Rogers hybrids. Will do for market.
46	*	*	*	*	*	Hardy, vigorous. A promising market grape.
47	*	**	*	*	*	A week earlier than Concord and better in quality. Very desirable.

SECTION X.—GRAPES—FOREIGN.

Foreign grapes are recommended strictly for cultivation under glass; and as, when thus situated, they may be considered as, for all practical purposes, independent of climate; and as they are, morover, thus grown mainly, if not wholly, for dessert purposes, we have merely copied the list recommended by the American Pomological society, with the accompanying descriptions, omitting any further tabulations.

Number.	Names.	Descriptions.			
		Color.	Flavor.	Season	Vinery.
1	Barbarossa, *Prince Albert*, *Brizola*	Black.	Sweet.	Very Late.	Hot.
2	Black Champion	Black.	Sweet.	Early.	Cold.
3	Black Damascus	Black.	Sweet.	Late.	Cold.
4	Black Frontignan	Black.	Muscat.	Late.	Cold.
5	Black Hamburg	Black.	Sweet.	Medium.	Cold.
6	Black Prince	Black.	Sweet.	Medium.	Cold.
7	Black July	Black.	Sweet.	Early.	Cold.
8	Bowood Muscat	White.	Muscat.	Medium.	Hot.
9	Buckland Sweetwater	White.	Sweet.	Medium.	Cold.
10	Calabrian, *Calabrian Raisin*	White.	Sweet.	Late.	Cold.
11	Cannon Hall Muscat	White.	Muscat.	Late.	Hot.
12	Chasselas Musque or Joslin's St. Albans. *Muscat Blanc Hative?*	White.	Muscat.	Early.	Hot.
13	Duke of Magenta	Black.	Sweet.	Early.	Hot.
14	Golden Hamburg, *Stockwood Golden Hamburg*	White.	Sweet.	Late.	Hot.
15	Golden Champion	Amber.	Sweet.	Medium.	Hot.
16	Grizzly Frontignan, *Red Frontignan*, *Red Constantia*	Red & Yellow	Muscat.	Medium.	Hot.

SECTION XI.—NECTARINES.

ABBREVIATIONS FOR THIS SECTION.

Form.		Color		Flowers.		Glands.	
c. compressed.	ov. oval.	c. crimson.	r. red.	l. large.	g. globose.		
d. depressed.	r. round.	g. greenish.	y. yellow.	s. small.	r. reniform.		
o. oblong.		o. orange.	w. white.		s. serrate.		

Number.	Names.	Descriptions.									Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Flowers.	Glands.	Adhesion.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Boston	l	r o v	g r	v g	s	g	f	b Sept.	Mass.	6	....	....
2	Downton	l	r o v	g r	v g	s	r	f	c Aug.	Eur.	8	....	....
3	Early Newington	l	r o v	g r	v g	l	s	c	b Sept.	Am.	10	....	....
4	Early Violet. *Violette Hative.*	l	r o v	y g r	v g	s	r	.....	b Sept.	Eur.	10	....	....
5	Elruge	m	r o v	g r	v g	s	r	f	b Sept.	Eur.	9	....	....
6	Red Roman	l	r d	g y r	v g	l	r	c	m Sept.	Eur.	8	....	....
7	Stanwick	l	g w r	o r	g	.....	r	.....	e Sept.	Eur.	8	....	....
8	Victoria	l	r d	g y c	v g	s	r	.....	b Sept.	Eur.	9	....	....

SECTION X.—GRAPES—CONTINUED—FOREIGN.

Number.	Names.	Descriptions.			
		Color.	Flavor.	Season.	Vinery.
17	Gros Colman	Purple.	Sweet.	Late.	Cold.
18	Lady Downes	Black.	Sweet.	Very Late.	Hot.
19	Muscat of Alexandria	White.	Muscat.	Late.	Hot.
20	Muscat Hamburg	Black.	Muscat.	Medium.	Hot.
21	Mrs. Pince's Muscat	Black.	Muscat.	Late.	Hot.
22	Queen of Nice	White.	.....	.....	.....
23	Red Chasselas, *Rose Chasselas*	Red.	Sweet.	Medium.	Hot.
24	Red Lombardy	Red.	Sweet.	Medium.	Hot.
25	Rio Virgin	.....	.....	.....	.....
26	Royal Muscadine	White.	Sweet.	Early.	Cold.
27	Silver Frontignan, *Early Silver Frontignan*	White.	Muscat.	Early.	Hot.
28	White Nice	White.	Sweet.	Late.	Hot.
29	West St. Peter's	Black.	Sweet.	Very Late.	Hot.
30	Wilmot's Hamburg, *Dutch Hamburg*	Black.	Sweet.	Medium.	Hot.
31	White Sweetwater, *Dutch Sweetwater, etc.*	White.	Sweet.	Early.	Cold.
32	White Frontignan, *White Constantia Muscat Blanc*	White.	Muscat.	Medium.	Hot.
33	Zinfindal	Black.	Sweet.	Medium.	Hot.

SECTION XI.—NECTARINES.

The Nectarine is so peculiarly subject to the depredations of the curculio, that it is little grown, except by amateurs, and for dessert uses. Hence experience with it is extremely limited; and for these reasons we only express the comparative values of the varieties in the column for dessert. This fruit, in common with the almond and the peach, is liable to the killing of the fruit buds in severe winters, except in favorable localities. The starring is given with little regard for this fact.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	
1	....	....	....	*	*	Originated at Boston. Large, showy, not of high quality.
2	....	....	....	*	*	Intermediate between Elruge and Early Violet.
3	....	....	....	*	*	Like the serrate peaches, the foliage sometimes mildews. Excellent.
4	....	....	....	*	*	Hardy, productive; fruit delicious.
5	....	....	....	*	*	An old but highly esteemed variety.
6	....	....	....	*	*	Old, one of the richest and best of the clings. Productive.
7	....	....	....	*	*	A comparatively recent, and very highly praised variety.
8	....	....	....	*	*	A cross of Stanwick upon Early Violet, by the late Thomas Rivers. One of the best.

SECTION XII.—PEACHES.

ABBREVIATIONS FOR THIS SECTION.

Form.		Color.		Flowers.	Glands.
c. compressed.	ov. oval.	b. bright.	p. purple.	l. large.	g. globose.
d. depressed.	r. round.	c. crimson.	r. red	s. small.	o. obscure.
o. oblong.		d. dark.	w. white.		r. reniform.
		g. green.	y. yellow.		s. serrate.
		o. orange.			

Number.	Names.	Descriptions.									Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Flowers.	Glands.	Adhesion.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Alberge	m	r	y p r	g	s	g	f	e Aug	Fr.	6	....	8
2	Alexander	m	r	g w r	v g	l	g	e f	e July	Ill.	9	....	9
3	Amsden	m	r	g w r	v g	l	g	e f	e July	Mo.	9	....	9
4	Atlanta	m	r c	w p r	b	s	r	f c	e Sept	N. Y.	10	10	7
5	Barnard	m l	r	y d r	g	s	r o	f	b Sept	Am.	7	7	9
6	Beatrice	s	r c	w r	v g	l	r	f	m Aug	Eng.	8	....	7
7	Bergen (Yellow)	l	r d	o d r	b	s	r	f	b Sept	Am.	9	....	5
8	Briggs (May)	m l	r	g w r	v g	.....	s	f	e July	Cal.	9	....	4
9	Cole's (Early)	m	r	w d r	v g	s	g	f	e Aug	Am.	7	...	5
10	Columbia	l	r d	r	v g	s	r	f	m Sept	Am.	6	....	4
11	Coolidge	l	r	w c	v g	s	g	f	m Aug	Mass.	9	....	7
12	Crawford's Early	l	o	y r	v g	s	g	f	e Aug	N. J.	9	10	10
13	Crawford's Late	v l	r	y d r	v g	s	g	f	e Sept	N. J.	7	10	10
14	Delavan	l	r o	w r	g	s	r	f	b Oct	Am.	6	7	7
15	Downing	s	r d	g w r	v g	l	s	f c	e July	Penn.	8	6	6
16	Druid Hill	l	r	g w r	b	s	g	f	e Sept	Md.	10	....	7
17	Dumont	l	r	d y r	g	s	r	f	m Sept	Mich.	8	7	10
18	Early Admirable	m	r	y w r	v g	l	g	f	e Aug	Fr.	8	....	3
19	Early Newington free	l	r c	y w r	b	s	g	f	e Aug	Am.	10	....	7
20	Early York	m	r o	g w r	v g	l	s	f	e Aug	N. J.	8	....	....
21	Foster	l	r d	d o r	v g	s	g	f	e Aug	Mass.	8	8	9
22	George the Fourth	m	r	y w d r	b	s	g o	f	e Aug	N. Y.	10	....	5
23	Golden Drop	m l	r ov	b y	v g	.....	.....	f	e Sept	Mich.?	7	9	10
24	Grosse Mignonne	l	r d	g y p r	b	l	g	f	e Aug	Eur.	10	9	6
25	Haines (Early)	m	r d	w r	g	s	g	f	e Aug	N. J.	6	....	7
26	Hale (Early)	m	r	g w r	v g	l	g	f c	m Aug	Ohio.	10	....	9
27	Heath cling	l	o ov	y w r b	v g	s	r	c	b Oct	Md.	9	9	7
28	Hill's Chili	m	ov c	y d r	g	l	r	f	e Sept	N. Y.	6	8	9
29	Imperial (White)	m l	r c d	y w r	v g	s	g	f	b Sept	N. Y.	7	10	7
30	Jacques	l	r c	d y r	v g	s	r	f	m Sept	Mass.	7	9	9
31	Keyport (White)	l	r	w c	g	s	r	f	b Oct	Am.	6	7	8
32	Lady Palmerston	m l	r	y d r	g	s	r	f	e Sept	Eng.	6	9	9
33	Large Early York	m l	r	w r	v g	s	g	f	b Sept	Am.	8	8	8

SECTION XII.—PEACHES.

Since the peach is generally used in its fresh state, or for canning, which is only a mode of preserving it in a nearly fresh condition, we have generally omitted to give values in the column headed "cooking." Throughout Central Michigan, except in favorable localities, occasional severe winters prove fatal to the fruit buds of the peach, and sometimes even to the trees. These facts cannot be properly expressed in the starring, and hence are disregarded.

Number.	Locality.					Remarks.
	East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	
1	*	*	*	*	*	This is one of the earliest of yellow-fleshed peaches, and only desirable for that reason.
2	*	*	*	*	*	A partial cling, much like its supposed parent, Hale, and two or three weeks earlier. Profitable for market.
3	*	*	*	*	*	Almost exactly like Alexander in tree, fruit, and season of ripening.
4	*	*	*	*	*	Of the finest quality. Not a market fruit.
5	*	**	**	**	**	When thoroughly thinned, the size is large, often overbears, becoming small.
6	*	*	*	*	*	As far as tried, it is too small for the market, although some esteem it profitable. Rich, beautiful.
7	*	*	*	*	....	Lacks productiveness.
8	*	*	*	*	*	An exceedingly beautiful peach, but, like all serrate varieties, liable to mildew of the foliage.
9	*	*	*	*	*	This has been elbowed aside, the markets craving yellow peaches.
10	....	....	....	*	....	Lacks productiveness, and is not attractive in appearance.
11	*	*	*	*	*	One of the best pale-fleshed, early market peaches.
12	**	**	*	**	*	Very popular with both market men and fruit growers. Much used for canning. Others often sell under this name. Bloom tender.
13	*	**	*	*	*	Lacks productiveness on light soils, and on young trees. Many place it first for profit.
14	....	....	....	*	....	Is liked by some planters, but is not generally known or valued.
15	*	*	....	*	....	Mildews, hence less desirable. Scarcely earlier than Amsden.
16	*	*	*	*	....	An excellent late pale-fleshed peach that should be better known.
17	....	....	....	*	....	Tree and buds hardy. Shipping qualities best.
18	*	....	....	*	....	Mainly valuable for the private garden.
19	*	*	*	*	*	Sometimes clings slightly. A fine amateur peach. Fruit large and beautiful. Very profitable at Lawton.
20	*	*	*	*	*	Its liability to mildew is its most serious drawback.
21	....	*	....	*	*	A good market peach, but almost identical in season with Early Crawford.
22	*	*	*	*	*	One of the best for home use. Too tender and delicate for market.
23	....	....	....	*	....	Probably an unrecognized old variety.
24	*	*	*	*	....	The true variety is one of the most delicious of peaches.
25	*	*	*	*	*	Hardy and productive. Well adapted to the market.
26	*	**	*	**	**	A fine peach and a vigorous tree. Sometimes rots before maturity. By many highly esteemed for market. A semi-cling.
27	*	*	*	*	....	One of the finest clings, but needs a long season in this latitude. Very profitable when it ripens fully.
28	*	*	*	**	*	Hardy; a good bearer and a profitable late variety on young trees. Lacks quality. Losing reputation.
29	*	*	*	*	*	Valued for drying, canning and preserving.
30	*	**	*	**	*	Profitable, but not of high quality.
31	*	*	*	*	....	Does not mature perfectly in unfavorable seasons. Surer on light soils.
32	....	....	....	*	....	Originated by the late Thomas Rivers. Promising.
33	*	**	*	*	*	Has not become generally popular in Michigan.

SECTION XII.—PEACHES—CONTINUED.

Number.	Names.	Descriptions.									Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Flowers.	Glands.	Adhesion.	Season.	Origin.	Dessert.	Cooking.	Market.
34	Large White cling	l	r	w b r	v g	s	g	c	m Sept.	N. Y.	8	9	9
35	Late Admirable	v l	r ov	y g r	b	s	g	f	m Sept.	Fr.	10	....	8
36	Late Red Rareripe	l	r ov	y r	b	s	g	f	m Sept.	Am.	10	....	6
37	Louise	m	r c	g w p r	v g	s	r	f	b Aug.	Eng.	8	....	8
38	Lemon cling	l	o	y r	v g	s	r	e	e Sept.	Am.	6	7	8
39	Lewis	l	r	w r	g	.....	.....	f	e Aug.	Mich.	7	....	8
40	Macon [local]	.....	.....	.....	.....	.....	.....	f	.....	Mich.	8	....	....
41	Moore	l	r ov	w r	v g	s	g	f	b m Sept.	Mass.	8	6	8
42	Morris White	m	o v	g w p	v g	s	r	f	e Sept.	Am.	7	10	8
43	Mountain Rose	l	r c	w r	v g	s	g	f	b Sept.	N. J.	7	....	10
44	Nonpareil	l	r ov	y r	v g	s	g	f	m Sept.	Am.	8	....	8
45	Oblong	l	r o	y r	g	s	r	f	e Sept.	Am.?	5	8	8
46	Oldmixon cling	l	r ov	y w r	b	s	g	c	m Sept.	Am.	8	9	7
47	Oldmixon free	l	r ov	y w r	v g	s	g	f	m Sept.	Am.	8	8	10
48	President	l	r ov	g r	v g	s	g	f	m Sept.	N. Y.	9	....	....
49	Pullen	l	ov	y r	v g	s	g	f	m Sept.	N. J.	6	8	8
50	Reeves' Late	v l	r ov	y r p	v g	s	g	f	Sept. Oct.	N. J.	....	10	10
51	Red Cheek	l	r ov	y b r	g	s	g	f	m Sept.	Am.	7	....	8
52	Richmond	m l	r c	y d r	v g	s	r	f	b Sept.	N. Y.	8	9	9
53	Rivers	l	r	y pink	b	l	r	f	m Aug.	Eng.	9	9	8
54	Ruding's Late	l	r c	w r	g	s	r	f	m Sept.	Am.	8	....	....
55	Salway	l	r d	y c r	v g	s	r	f	b Oct.	Eng.	8	9	9
56	Silver Medal	m	r o	w	v g	s	g	f	Sept. Oct.	Am.	8	10	10
57	Smock free	l	ov c	o y d r	g	s	r	f	Oct.	N. J.	6	9	10
58	Snow	m	r	w	g	s	r	f	m Sept.	Am.	5	10	5
59	Snow's Orange	m l	r	b y d r	v g	s	r	f	b Sept.	Mich.	6	7	9
60	Steadley	l	r ov	w r	v g	s	r	f	b Oct.	Am.	9	10	....
61	Stump (the World)	v l	r o	w b r	v g	s	g	f	e Sept.	N. J.	8	8	9
62	Susquehanna	v l	r	y r	v g	s	r	f	m Sept.	Penn.	7	9	7
63	Temple's Late	m	o ov	y r	g	.....	g	f	m e Sept.	Am.	....	....	....
64	Tippecanoe	v l	r c	y r	v g	s	r	c	e Sept.	Penn.	9	9	9
65	Troth's (Early)	m	r	w b r	g	s	g	f	e Aug.	N. J.	5	....	8
66	Van Zandt	m	ov	w r	b	s	r	f	e Aug.	N. Y.	10	....	5
67	Variegated	l	r	w c p	b	s	g	f	e Sept.	N. J.	10	9	6
68	Wager	m	o ov	y	v g	l	g	f	b Sept.	N. Y.	8	10	10
69	Wheeler's Early	s	r	w r	g	.....	g	fr	b Sept.	Am.	7	....	6
70	Yellow Rareripe	l	r o	o y r	v g	s	g	f	b Sept.	Am.	8	8	8

SECTION XII.—PEACHES—CONTINUED.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
34	*	*	*	*	....	A large and showy cling of good quality.
35	*	....	....	....	....	One of the finest for home use as a dessert peach.
36	*	....	*	....	....	Highly valued as a dessert peach. Comes before the preceding.
37	....	....	....	*	*	Ripens in advance of Hale or Beatrice. Very high quality. At Lawton said to sell well.
38	*	*	*	*	....	The largest and best of the yellow fleshed clings. Does not sell well.
39	....	....	....	*	....	An Allegan Co. seedling. A market peach.
40	....	....	*	....	....	Valued in northeastern Lenawee.
41	....	....	....	*	....	A beautiful and promising peach. May be valuable for market if productive.
42	*	*	*	*	*	Valued for preserving and canning on account of its color.
43	*	*	*	*	**	A valuable market variety. Highly prized where fully proved.
44	....	....	....	*	....	A variety originating from Old Red Cheek, and promising to be superior.
45	....	....	....	*	....	Promising market peach. Received from Pennsylvania under this name. Origin and history unknown.
46	*	*	*	*	*	Where a cling is desired, this is one of the finest of its season.
47	*	*	*	**	**	A very old variety, which still hold a high position as a market peach.
48	*	....	....	†	....	One of the finest amateur varieties.
49	....	....	....	*	....	Originated many years since by the late Isaac Pullen. Somewhat grown at Douglas, Allegan county.
50	....	....	....	*	....	Much like Early Crawford, and more desirable where it will ripen with certainty.
51	*	*	*	*	....	An old sort. The parent of Crawford's Early and Late.
52	*	*	*	*	*	A new and valuable variety. A few days later than Early Crawford, and less acid.
53	....	....	....	*	*	An excellent very early sort; lacks color. Fruit large and beautiful. At Lawton very profitable.
54	....	*	*	*	....	Promising amateur peach. Adaptation to market yet undetermined.
55	*	*	*	*	....	Will only ripen at the south with certainty; fails in unfavorable seasons.
56	....	....	....	*	....	The finest of canning peaches, without either red or brown at the pit. Occasionally a faint red cheek.
57	*	*	*	**	....	One of the latest profitable market peaches in Southern Michigan. Valuable.
58	*	*	*	*	....	Young growth yellowish green. Fruit clear yellowish white; flesh clear white.
59	*	*	*	**	**	Similar to Barnard; brighter in color and slightly later. Must be thinned to insure good size.
60	....	....	....	*	....	Excellent for either dessert or canning.
61	*	*	*	*	*	A large and beautiful market peach of fair quality. Very profitable.
62	*	*	*	*	....	A large, beautiful and fine, rather late peach. Lacks productiveness.
63	....	....	....	*	....	Good; but very little grown.
64	*	*	*	*	....	One of the finest late yellow clings; for Southern Michigan.
65	*	*	*	*	*	An early and productive white fleshed peach of only medium quality.
66	*	*	*	*	....	Skin very smooth and beautiful. A fine amateur peach.
67	....	....	....	*	....	A beautiful and superior peach, originating with the late Isaac Pullen, of New Jersey.
68	*	....	....	*	*	Said to be the most profitable variety in Mason county.
69	....	*	....	*	*	A market variety, now nearly out of cultivation.
70	*	*	*	*	*	The genuine is a fine early peach. The one grown here is probably spurious.

SECTION XIII.—PEARS.

ABBREVIATIONS FOR THIS SECTION.

Form.

a. acute. e. elongated. ob. obtuse. ov. oval or ovate. r. roundish.
d. depressed. o. oblong. obo. obovate. p. pyriform. t. turbinate.

Number.	Names.	Descriptions. Size.	Form.	Color.	Quality.	Season.	Origin.	Use and Value. Scale 1 to 10. Dessert.	Cooking.	Market.
1	Ananas D'Ete	l	p ob	y b ru	v g	Sept. Oct.	Hol.	10	5	6
2	Angouleme, *Duchess*	v l	o obo	g y ru	v g	Oct.	Fr.	7	9	10
3	Anjou	l	ob p	g ru c b	v g	Nov.	Fr.	9	9	10
4	Bartlett	l	o ob p	y ru r	v g	Sept.	Eng.	8	10	10
5	Belle Lucrative	m	obo ob p	y g ru	b	Sept.	Fr.	10	8	8
6	*Fondante de Automne.* Bloodgood	m	t obo	y ru	v g	Aug.	N. Y.	9	6	4
7	Bosc	l	p	d y ru r	b	Oct.	Bel.	9	8	9
8	Boussock	l	obo p	d y ru	v g	Sept. Oct.	Bel.	7	7	9
9	Brandywine	m	e ob p	y g ru r	v g	b Sept.	Penn.	7	7	5
10	Brignais, *Des Nonnes*	m	r ob	g y	v g	Sept.	.....	6	6	4
11	Buffum	m	ob obo	d y r	v g	Sept.	R. I.	6	7	6
12	Clairgeau	l	p	y oc ru	g	Oct. Nov.	Fr.	6	7	9
13	Clapp's (Favorite)	l	obo ob p	l c y	v g	Sept.	Mass.	8	8	9
14	Columbia	l	o obo	g y o	g	Nov. Jan.	N. Y.	7	8	6
15	Comice, *Doyenne du Comice*	l	r ob p	y c ru	b	Oct. Nov.	Fr.	9	7	7
16	Dana's Hovey	s	obo ob p	g y ru	b	Nov. Jan.	Mass.	9	5	5
17	Dearborn	s	r p	l y	v g	Aug.	Mass.	7	5	3
18	Diel	l	obo ob p	y o ru b	v g	Sept. Dec.	Bel.	6	8	7
19	Dix	l	l p	d y ru	v g	Oct. Nov.	Mass.	8	6	5
20	Easter (Beurre)	l	r obo ob	y g ru b	v g	Jan. March.	Eur.	6	8	3
21	Emile (d'Heyst)	l	o obo p	y o ru	b	Nov. Dec.	Bel.	10	8	8
22	Epine Dumas	m	obo ob p	g y ru b	v g	Nov. Dec.	.....	7	6	5
23	Flemish Beauty	l	obo ob p	y ru r b	v g	Sept.	Bel.	7	7	8
24	Giffard	m	p	g y r	v g	e Aug.	Fr.	10	6	6
25	Glout Morceau	l	obo ob p	g y b	g	Dec.	Fr.	7	7	5
26	Goubalt	s	obo	g y	g	Sept.	Fr.	4	6	3
27	Gray Doyenne	m	o obo	l ru	b	Oct.	Eur.	9	8	8
28	Gris D'Hiver Nouveau	m	r ob p	y ru	v g	Nov. Jan.	Eur.	6	8	6
29	Hardy	l	obo ob p	g ru b	v g	Sept. Oct.	.....	7	7	8
30	Howell	l	r p	l y ru	v g	Oct.	Conn.	8	7	8
31	Josephine (of Malines)	m	r ob p	g y ru	v g	Jan. Feb.	Bel.	6	7	8
32	Kieffer	l	r ob p	y r	g	Nov.	Am.	1	7	7
33	Kirtland	m	ob obo p	y l ru r	v g	b Sept.	Ohio.	8	5	4

SECTION XIII.—PEARS.

ABBREVIATIONS FOR THIS SECTION.

Color.

b. brown. c. crimson. d. dark. g. green. l. light. o. orange. r. red ru. russet. y. yellow.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
1	*	*	*	*	*	A fine amateur variety.
2	*	*	*	*	*	When neglected proves unproductive. Profitable under good treatment, and on dwarf stocks. At north loses quality.
3	**	**	**	**	*	One of the best late autumn pears, whether for market or home use.
4	**	**	**	**	**	The leading market sort. Too musky to suit some tastes.
5	*	*	*	*	*	An excellent and profitable old variety.
6	*	*	*	*	*	No garden should be without this. Fruit best when house-ripened.
7	*	*	*	*	*	Fruit fair and even in size. Will bear to be planted for market.
8	*	*	*	*	*	Popular as a market pear. Also a good amateur fruit.
9	*	*	*	*	*	But little disseminated. A good early amateur pear.
10	*	----	----	----	----	Not much disseminated. Valued in Lenawee county.
11	*	*	*	*	*	Popular on account of the health, vigor, and productiveness of the tree. Market.
12	*	*	*	**	*	Soon becomes dry and insipid, after ripening. A showy market pear.
13	*	**	*	*	*	A strong grower. Fine large fruit. Inclined to rot at the core. A good market pear if gathered early.
14	*	*	----	----	----	Liable to drop or be blown from the tree prematurely.
15	*	----	----	*	----	New; gives promise of value.
16	*	*	----	*	----	One of the few winter pears of high quality.
17	*	*	*	*	*	Well known and esteemed, but too small to become very popular.
18	*	*	*	*	*	Fruit apt to be astringent on young trees. Should be house ripened.
19	*	*	*	*	----	Too tardy bearer; hence is rarely planted.
20	*	*	*	*	*	In a warm exposure and favorable season, this will be found satisfactory. Better south.
21	*	----	----	*	----	Little disseminated. A fruit of high quality.
22	*	----	----	*	----	Tree vigorous; fruit lacks attractiveness and quality.
23	**	**	**	*	**	Vigorous tree. Large, showy fruit, which decays soon at the center. Drops, and sometimes scabs or spots.
24	*	*	*	*	*	Fruit requires to be gathered before maturity—decays rapidly.
25	*	*	*	*	*	On old trees, when well ripened, this is an excellent pear.
26	----	*	----	----	----	Not much disseminated. Not of high quality.
27	*	*	*	*	*	Excellent. Should be more widely planted.
28	*	----	----	----	----	A promising winter pear.
29	*	*	----	*	----	Not as well known as it should be.
30	*	*	*	*	*	Quite freely planted and generally esteemed.
31	*	*	*	*	*	Not as freely planted as it should be.
32	*	*	*	*	----	In this climate, only valued for market and canning; and that only at the south.
33	*	*	*	*	----	Very fine, but comes in the height of the fall fruit season. Only amateur.

SECTION XIII.—PEARS—CONTINUED.

Number.	Names.	Descriptions.						Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
34	Langelier	m	obo ob p	y c ru	v g	Nov. Jan.	Eng.	6	8	7
35	Lawrence	m	obo ob p	y ru	v g	Dec.	N. Y.	6	8	8
36	Le Conte	l	ob p	y	g	Aut.	Am.	1	4	4
37	Louise Bonne (of Jersey)	l	o p	g b r	v g	Sept. Oct.	Fr.	7	9	8
38	Madeleine	m	obo p	y g b	v g	July.	Fr.	8	8	7
39	Manning's Elizabeth	s	obo ob p	l y r	v g	Aug. Sept.	Bel.	9	7	6
40	Mount Vernon	m l	r ob p	ru y b r	v g	Nov. Dec.	Mass.	8	8	6
41	Napoleon	l	ob p	y g	g	Sept.	Bel.	5	6	6
42	Onondaga	l	obo ob p	y ru	v g	Oct. Nov.	Conn.	7	8	9
43	Osband's (Summer)	s	r ov obo p	y r ru	v g	Aug.	N. Y.	7	7	8
44	Oswego	m	ob obo	y g ru	v g	Oct. Nov.	N. Y.	8	8	4
45	Paradise (of Autumn)	l	o obo a p	y ru	v g	Sept. Oct.	Bel.	8	6	4
46	Pound	l	p	y g b	g	Dec. Mar.	Eur.?	1	8	7
47	Reeder	s m	r ob p	y ru	b	Nov.	N. Y.	9	8	5
48	Rostiezer	s	obo o p	y g r b	b	Aug.	Eur.	9	5	6
49	Seckel	s	obo	y b r ru	b	Oct.	Penn.	10	....	7
50	Sheldon	m	r ob obo	g y ru c	v g	Oct.	N. Y.	8	8	9
51	Souvenir du Congres	l	p r	y g	v g	Sept.	Fr.	8	8	9
52	Sterling	m	r ov p	y ru c	v g	Sept.	N. Y.	7	5	9
53	Stevens (Genesee)	l	r	y	v g	Sept.	N. Y.	9	6	6
54	St. Ghislain	m	p	y	g	Sept. Oct.	Bel.	7	6	4
55	Summer Doyenne *Doyenne d'Ete.*	s	r obo p	y r	v g	July.	Bel.	9	5	9
56	Superfine	m	r p	y c ru	v g	Oct.	Fr.	7	8	8
57	Tyson	m s	a p	y ru c	b	Aug. Sept.	Penn.	9	6	8
58	Urbaniste	m l	obo p	y ru	v g	Oct. Nov.	Fl.	9	7	6
59	Vicar	l	l p	y b	g	Nov. Jan.	Fr.	2	8	6
60	Washington	m	o obo	y r	v g	Sept.	Del.	9	6	6
61	White Doyenne	m l	obo	y r	b	Oct.	Fr.	10	7	7
62	Windsor	l	p	y g	g	Aug.	Eur.	1	5	6
63	Winter Nelis	m	r obo	y g ru	b	Dec. Jan.	Fl.	9	7	7

SECTION XIII.—PEARS—CONTINUED.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
34	*	....	....	*	....	Like winter pears generally, this has not been largely planted.
35	*	*	*	*	*	Tree healthy and vigorous. Should be grown on dry, warm soils.
36	....	....	†	....	....	Tree vigorous. Fruit large. Quality poor at the north. Better south.
37	*	*	*	**	**	A good market pear. Should always be grown as a dwarf.
38	*	*	*	*	....	The earliest pear of good quality. Sometimes slightly astringent.
39	*	*	*	*	....	One of the most desirable amateur pears of its season.
40	....	*	....	*	*	A promising late autumn and early winter pear. Bears young.
41	*	*	*	*	....	An early and abundant bearer. Lacks quality.
42	*	**	*	**	*	A good, constant bearer of large, showy fruit of fair quality in most seasons.
43	*	*	*	*	*	Tree vigorous, productive. Fruit sufficiently good for the market.
44	*	*	*	*	....	High vinous flavor; rich. Becomes productive with high culture.
45	*	....	....	....	....	Fruit somewhat like Beurre Bosc, but more variable.
46	*	*	*	*	....	Chiefly valued for the kitchen. Trees, strong, healthy.
47	*	*	....	*	....	A New York seedling from Winter Nelis.
48	*	*	*	*	*	Tree vigorous and productive. Fruit excellent, but unattractive in appearance.
49	*	*	*	*	**	The standard of high quality among pears. Tree forms a beautiful pyramid. Profitable when buyers come to know it.
50	*	**	*	*	**	A hardy, productive tree; and a good fruit for general purposes; not attractive in appearance.
51	....	*	....	*	....	Very large and beautiful. Variable in size. Not of high quality.
52	*	*	*	*	†	Both tree and fruit well adapted for the market.
53	*	*	*	*	*	An excellent and fine looking pear, but soon decays at the core.
54	*	....	....	....	....	An old variety; now to a great extent superseded.
55	*	*	*	**	*	The best and most satisfactory very early pear. Valued for early market.
56	*	*	*	*	....	A fine pear. Sometimes a little too acid. Productive.
57	*	*	*	*	....	A beautiful tree. Fruit grown to some extent for the market. A tardy bearer.
58	*	*	*	*	....	Too tardy a bearer. Is being abandoned; probably for this reason.
59	*	*	*	*	*	Tree very vigorous and productive; its greatest recommendation for this climate. It often fails to ripen well.
60	*	**	*	*	....	This pear should be planted in every garden.
61	*	*	*	*	*	This old favorite is generally successful in this State; but occasionally scabs and cracks.
62	*	*	*	*	*	The vigor and beauty of the tree, and the size of the fruit, are its sole recommendations.
63	*	*	*	*	....	The fruit if well grown and ripened, is scarcely inferior to the Seckel. The tree must not be allowed to overbear.

SECTION XIV.—PLUMS.

In the grading and starring of plums no reference is had to the prevalence of the curculio in the district: nor yet to the tendency of the tree to the premature rotting of the fruit or loss of foliage.

ABBREVIATIONS FOR THIS SECTION.

Form.

d. depressed. ob. oblate. l. long. obo. obovate.
n. necked. ov. oval. o. oblong. r. roundish.

Number.	Names.	Descriptions.							Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Adhesion.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Bavay's (Green Gage)	l	r d	g y	b	f	Oct.	Bel.	9	9	9
2	Bleeker's Gage	m	r ov	y	v g	f c	e Aug.	N. Y.	8	7	8
\ —3	Bradshaw	l	ov obo n	r p	g	c f	e Aug.	Am.	7	10	10
4	Canada Egg [local name]	l	.....	.....	g	c	m Aug.	Ont.?	7	7	8
\ — 5	Coe's Golden Drop	l	ov	y	v g	c	e Sept.	Eng.	8	8	9
6	Columbia	l	r	br p	g	f	b Sept.	N. Y.	6	....	5
7	Copper	m s	ov n	c b	g	c	e Sept.	Eur.	4	8	9
8	Damson	s	ov	b p	g	f c	Sept.	Am.	3	10	7
9	Duane's Purple	v l	o ov	r p	g	f c	m Aug.	N. Y.	7	4	6
10	General Hand	v l	r ov	g	g	f	Sept.	Penn.?	6	7	7
—11	German Prune	l	l ov	b p	g	f	Sept.	Eur.	6	9	9
— 12	Green Gage	s	r	g y r	b	f	e Aug.	Eur.	10	8	3
13	Huling's Superb	v l	r ov	g y	g	c	e Aug.	Penn.	8	7	5
14	Imperial Blue [local]	m	r	b p	v g	c	b Sept.	Mich.	8	9	9
— 15	Imperial Gage	l	ov	g y	b	f	b Sept.	N. Y.	9	9	8
16	Italian Prune, *Fellemberg*	m	ov	b	g	f	b Oct.	Eur.	6	8	8
\ —17	Jefferson	l	ov	y p r	b	f	b Sept.	N. Y.	10	9	9
18	Kirke's	m	r o	p	g	f	b Sept.	Eur.	....	....	....
19	Lawrence's Favorite	l	r ob	y g	b	f	m Aug.	N. Y.	10	....	....
\ — 20	Lombard	m	r ov d	r p	g	c	b Sept.	N. Y.	6	10	10
21	McLaughlin	l	r ob d	y r	b	c	e Aug.	Me.	10	6	7
22	Miner	m	l r	p r	g	c	b Oct.	Penn.	6	6	4?
23	Monroe	m l	ov	g y r	g	.....	b Sept.	N. Y.	6	7	9
24	Orleans	m	r	r p	g	f	e Aug.	Eur.	....	....	....
—25	Peach Plum	v l	r d	b r	g	f	b Aug.	Eur.	6	10	10
— 26	Pond, *Fonthill*	v l	ov n	y r	g	c	m Sept.	Eng.	6	7	9
—27	Prince Englebert	l	ob ov	p br	v g	f	b Sept.	Bel.	8	8	10
— 28	Prince's Yellow (Gage)	m l	ov	y	v g	f	b Aug.	N. Y.	8	8	9
29	Quackenboss	l	o r	p	g	f c	Sept.	N. Y.	6	7	9
30	Red Magnum Bonum	l	ov	r	g	f	b Sept.	Eur.	5	7	7
31	Smith's Orleans	l	ov	r p	v g	c	e Aug.	N. Y.	8	8	8
—32	Washington	v l	r ov	g y c	v g	f	e Aug.	N. Y.	8	10	7
33	Wild Goose	m	r ov	p	g	c	e July	Tenn.?	6	5	....
34	Yellow Egg	v l	ov	y	g	c	e Aug.	....	6	8	7

SECTION XIV.—PLUMS.

ABBREVIATIONS FOR THIS SECTION.

Color.

b. blue. br. brownish. p. purple. r. red.
c. copper. y. yellow. g. green.

Number.	Locality. East.	Center.	South.	Southern Lake Shore	Northern Lake Shore.	Remarks.
1	*	*	*	*	*	Nearly or quite as fine as Green Gage. Tree a better grower.
2	*	*	*	*	*	Hardy. A good regular bearer. Shoots downy.
3	*	**	*	**	**	Grows and bears well. A superior market variety.
4	....	*	....	*	**	Probably an unrecognized old variety. Very hardy and productive in Mason county.
5	**	**	**	**	**	Beautiful. Excellent. Perhaps may not ripen with certainty at the extreme north.
6	*	....	....	....	....	Subject to rot. Tree vigorous and productive.
7	....	....	....	*	....	Valued for market and cooking.
8	*	*	*	*	*	A slow grower. Productive. Valued for preserves.
9	*	*	*	*	*	Too soft and uneven in size for market.
10	..	....	....	*	*	Does not succeed well in Mason county.
11	*	*	*	*	**	Valued for drying and preserving.
12	*	*	*	*	*	The standard of quality among plums. Tree a slow grower.
13	*	*	....	*	*	Tree very vigorous, upright, moderate bearer.
14	....	....	*	....	....	Originated in Lenawee county by the late Israel Pennington, who prized it highly.
15	*	*	*	*	*	Productive, excellent; shoots dark, downy, vigorous.
16	....	....	....	*	....	Tree vigorous, spreading, branches smooth.
17	*	*	*	*	**	A slow grower, good bearer, very profitable at the north.
18	....	....	....	*	....	Branches smooth. The stone is broad and flat.
19	*	*	*	*	*	A seedling from Green Gage. Very productive.
20	**	*	**	*	**	Tree vigorous, hardy, and productive. The leading market variety. Tree not satisfactory at St. Joseph.
21	*	*	*	*	*	Nearly or quite equal to Green Gage. Hardy, vigorous, productive.
22	*	*	*	*	*	Comparatively unproductive if standing alone. Very hardy. Of the Americana species.
23	....	....	....	*	*	Tree very vigorous and productive. Slightly tender.
24	....	....	....	*	*	Vigorous. Branches gray and very downy.
25	....	..	....	*	*	Tree upright, vigorous. A moderate bearer.
26	....	....	....	*	**	Productive, vigorous. Branches smooth, grayish. Dorr's Favorite of Oceana county is identical with this.
27	*	....	..	*	**	Tree a great bearer. Valuable for market.
28	*	*	*	*	*	An old favorite. Hardy, productive.
29	*	*	*	*	*	A rapid, upright grower; productive.
30	*	*	*	*	**	The genuine has slender, smooth shoots.
31	*	*	*	*	**	One of the most vigorous; shoots glossy, reddish purple; very productive.
32	*	*	*	*	*	One of the largest and most beautiful, but inclined to rot on the tree. Free from rot at the north.
33	*	*	*	*	*	An uncertain bearer at the north; probably from imperfect pollenization.
34	*	*	*	*	**	A fine market variety, but rots in some seasons at the south, and as far north as Mason county.

SECTION XV.—QUINCES.

ABBREVIATIONS FOR THIS SECTIO

Form.

ob. obtuse. p. pyriform. r. roun .

Number.	Names.	Descriptions.						Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Angers	v l	ob p	y	v g	Oct. Nov.	Eur.	....	9	7
2	Apple, *Orange*	l	r p	y	v g	Oct. Nov.	Eur.	....	10	10
3	Champion	v l	ob p	y	v g	Nov.	Am.	....	8	8
4	Meech	l	r ob p	y	v g	Oct. Nov.	N. J.	....	10	10
5	Portugal	v l	ob p	y	b	Oct.	Eur.	....	10	5
6	Rea	l	r ob p	y	g	Oct.	N. Y.	....	10	10

SECTION XVI.—RASPBERRIES.—RUBUS OCCIDENTALIS AND SUPPOSED HYBRIDS; ROOTING FROM THE TIPS OF THE BRANCHES.

ABBREVIATIONS FOR THIS SECTION.

Form.

c. conical. ob. obtuse. r. roundish.

Number.	Names.	Descriptions.						Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
1	American Black, *Doolittle*	s	r	b	g	m July.	N. Y.	5	7	7
2	American White	s	r	y w	g	m July.	Am.	5	6	4
3	Caroline	l	r	o y	v g	m July.	N. Y.	9	9	6
4	Florence	m	y	o y	g	m July.	Am.	7	8	6
5	Golden Thornless	m	r	y	g	July.	Am.	6	6	4
6	Gregg	v l	r	b	v g	m July.	Ind.	6	9	10
7	Hilborn	v l	r	b	v g	m July.	Ont.	9	9	10
8	Hopkins	m l	r	b	g	m July.	Kan.	6	6	8
9	McCormick, *Mammoth Cluster*	m l	ob c	b	v g	July. Aug.	Am.	6	9	9
10	Miami	m	r	b p	g	July.	Am.	7	10	7
11	New Rochelle	l	r c	p	v g	m July.	N. Y.	8	8	6

SECTION XV.—QUINCES.

ABBREVIATIONS FOR THIS SECTION.

Color.

y. yellow.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
1	*	*	....	*	....	A longer keeper than the Apple, but not equal in quality. Very unproductive at Traverse (Parmelee).
2	**	**	**	**	*	Well known and universally approved.
3	....	....	....	*	....	An early and prolific bearer. Very downy. Very late.
4	....	†	....	†	....	Said to be very productive, and of superior quality.
5	*	....	....	....	....	Tree a strong grower, but unproductive. Quality superior.
6	*	....	....	*	....	Larger than the Apple, and equally good. Tree thrifty.

SECTION XVI.—RASPBERRIES.—RUBUS OCCIDENTALIS AND SUPPOSED HYBRIDS; ROOTING FROM THE TIPS OF THE BRANCHES.

ABBREVIATIONS FOR THIS SECTION.

Color.

b. black. p. purple. r. red. y. yellow.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
1	*	*	*	*	*	Desirable when great hardiness is required. A little later than Souhegan.
2	*	*	*	*	*	Fancied for its color, which, however, changes to a dirty brown when overripe.
3	...	*	....	*	...	Supposed hybrid between Idæus and Occidentalis. A family berry.
4	....	....	..	*	....	One of the best of Yellow Caps.
5	*	*	*	*	....	Canes have but few spines. Very productive.
6	*	*	*	*	....	Larger than McCormick. Is now the leading Black Cap.
7	....	....	....	†	....	Nearly as large as Gregg; better in flavor, and clear black in color.
8	....	....	....	*	....	A very popular sort.
9	*	*	*	**	*	Plant very vigorous with stout thorns. Very productive. Profitable.
10	*	*	*	*	*	The most juicy and luscious of the Black Caps. Prized by some in Berrien county for market.
11	....	....	....	*	....	Excellent; but too dull in color.

SECTION XVI.—RASPBERRIES—CONTINUED—RUBUS OCCIDENTALIS AND SUPPOSED HYBRIDS; ROOTING FROM THE TIPS OF THE BRANCHES.

Number.	Names.	Descriptions.						Use and Value. Scale 1 to 10.		
		Size	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.
12	Ontario	m	r	b	v g	July.	N. Y.	6	6	8
13	Ohio	l	r	b	g	m e July.	Ohio.	8	9	9
14	Shaffer	l	r	p r	v g	m e July.	N. Y.	8	9	8
15	Souhegan	m	r	b	g	b m July.	N. H.	8	9	9
16	Tyler	m	r	b	g	b m July.	N. Y.	8	9	9

SECTION XVII.—RASPBERRIES—RUBUS IDÆUS AND STRIGOSUS, INCREASING BY SUCKERS OR SPROUTS.

ABBREVIATIONS FOR THIS SECTION.

Form. c. conical. ob. obtuse. r. roundish.

Color. b. bright. c. crimson. o. orange.

Number.	Names.	Descriptions.						Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking	Market.
1	Braudywine, *Susquco*	m	r ob c	b r	v g	July.	Am.	8	9	9
2	Clarke	l	c	b c	v g	e July.	Conn.	8	8	7
3	Cuthbert, *Queen of the Market.*	l	r c	b c	b	July.	N. Y.	8	8	10
4	Franconia	l	ob c	p r	v g	July.	Eur.	8	8	7
5	Golden Queen	l	r c	o	b	July.	N. J.	8	8	10
6	Hansell	s	r	r	g	b July.	N. J.	7	7	7
7	Herstine	l	r ob c	b s	v g	July.	Penn.	10	10	8
8	Marlboro	l	r	r	g	July.	N. Y.	7	7	9
9	Orange (Brinckle)	l	c	o	b	July.	Penn.	10	10	4
10	Philadelphia	m	r	p r	g	July.	Penn.	6	8	8
11	Reder	l	r	b r	v g	m July.	Mich.	9	9	9
12	Reliance	m	r	b r	g	e July.	N. Y.	9	9	8
13	Superb	v l	r ob	p r	v g	b July.	N. J.	9	9	7
14	Turner	m	r	b r	v g	July.	Am.	9	8	9

SECTION XVI.—RASPBERRIES—Continued—Rubus Occidentalis and supposed Hybrids; Rooting from the Tips of the Branches.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
12	....	....	....	*	....	Fruit with a thick bluish bloom. Not very acid. Very firm.
13	*	*	*	*	*	A very profitable market variety; good for drying.
14	*	**	*	*	*	Enormous grower. Fruits ripen in succession. Superior for canning.
15	*	*	*	*	*	A good, early, market blackcap.
16	*	*	*	*	*	Very much like Souhegan.

SECTION XVII.—RASPBERRIES—Rubus Idæus and Strigosus, Increasing by Suckers or Sprouts.

ABBREVIATIONS FOR THIS SECTION.

Color.

p. purplish. r. red. s. scarlet.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
1	*	*	*	*	*	Its beauty, size, color and firmness are strongly in its favor.
2	*	*	*	*	*	Best early red, but does not set well. Not fully hardy away from lake protection. Unproductive on southern lake shore.
3	*	*	*	**	*	Very firm, productive and hardy. Has come to be the leading market variety of its class.
4	*	*	*	*	*	Like nearly all foreign sorts, away from lake influence must have winter protection.
5	*	*	*	*	*	Like Cuthbert, except in the color of the fruit.
6	*	*	*	*	*	Hardy. Lacks vigor and productiveness.
7	*	*	*	**	*	May not be fully hardy in the interior of the State. Lacks firmness. Valuable where it will stand; especially for home use.
8	*	*	*	*	*	Very vigorous and productive. Is being extensively planted.
9	*	*	*	*	*	Must have winter protection. Unequaled for amateur purposes; but very tender.
10	**	**	*	**	*	Entirely hardy; dull color; lacks quality and size. Suckers but little. A bad shipper. Nearly abandoned.
11	....	*	*	*	....	Highly esteemed where fully tested. Canes not always healthy.
12	....	....	....	*	....	Berries good, even size. Profitable, but its color is too dark.
13	*	*	*	*	*	A good family berry. Crumbles easily.
14	*	*	*	**	*	Strong grower; hardy; productive. Suckers profusely. Lacks firmness. Leading market variety in Berrien county.

SECTION XVIII.—STRAWBERRIES.

ABBREVIATIONS FOR THIS SECTION.

Form.

c. conical.
co. coxcombed.
l. long.
n. necked.
o. oblong.
ob. obtuse.
ov. oval or ovate.
r. roundish.

Color.

b. bright.
c. crimson.
d. dark.
p. pale.
r. red.
s. scarlet.

Number.	Names.	Descriptions.								Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Sex.	Texture.	Season.	Origin.	Dessert.	Cooking.	Market.
1	Alpha	m	ov c	r	g	b	m	9 June.	Ont.	8	9	9
2	Arnold's Pride	v l	c co	c	v g	b	f	24 "	Ont.	8	9	10
3	Atlantic	l	l c	b s	v g	b	m	20 "	N. J.	8	....	8
4	Belmont	v l	l r c	b c	b	b	f	20 "	Mass.	10	....	7
5	Bidwell	v l	l c n	b s	v g	b	f	12 "	Mich.	9	8	9
6	Black Defiance	v l	r ob c	d c	b	b	f	10 "	N. J.	9	....	8
7	Boyden, *Seth Boyden*	l	ob c	b c	v g	b	f	13 "	N. J.	9	....	8
8	Bright Ida	v l	c r	b r	v g	b	m	19 "	Ont.	8	8	10
9	Bubach, No. 5	v l	ob r c	b c	v g	p	m	20 "	Ill.	8	....	10
10	Captain Jack	m	r c	b c	v g	b	f	10 "	Mo.	8	....	8
11	Champion	l	r c	d c	v g	p	f	10 "	N. Y.	7	....	9
12	Charles Downing	l	r c	d s	v g	b	m	10 "	Ken.	8	8	10
13	Cheney	l	r c co	b c	v g	p	m	10 "	N. Y.	9	....	8
14	Cornelia	v l	ob r c	d s	v g	p	f	7 July..	Ohio.	8	8	10
15	Cowing	v l	r ob c	b c	v g	b	m	12 " ..	Ind.	10	8	9
16	Crescent	l	c	d s	g	b obs	s	12 June.	Conn.	6	4	10
17	Crimson Cluster	l	o c	b c	v g	p	m	12 "	N. J.	8	....	....
18	Cumberland	v l	r ob c	b c	v g	b	m	12 "	Penn.	9	8	9
19	(Daniel) Boone	l	r ov	p r	g	p	f	16 "	Ky.	6	7	8
20	Downer's (Prolific)	m	r c	b s	v g	b	f	10 "	Ky.	7	....	8
21	Duncan	l	c	d r	v g	b	f	5 "	N. Y.	9	....	5
22	Early Canada	m s	r c	d c	v g	b	m	16 "	Ont.	9	7	8
23	Eureka	v l	o c	b c	v g	p	m	17 "	Ohio.	8	....	8
24	Gandy	v l	ob c	b c	v g	b	m	19 "	N. J.	9	....	9
25	Gipsy	m	r c	r	v g	p	f	20 "	.....	9	....	9
26	Glendale	v l	l c	b s	g	b	f	16 "	Ohio.	7	8	7
27	Goldsmith	v l	l c	b s	v g	b	f	17 "	Ohio.	9	8	8
28	Haverland	l	o c	b c	v g	p	f	11 "	Ohio.	9	....	9
29	Henderson	l	l c	c	b	b	m	15 "	N. J.	10	1	1
30	Jersey Queen	m	ob c	c	g	p	m	15 "	N. J.	7	....	8
31	Jessie	v l	ob c	b c	v g	b	f	17 "	Wis.	9	....	10
32	Indiana	m	r c	c	g	b	m	18 "	Ind.	7	....	8

SECTION XVIII.—STRAWBERRIES.

ABBREVIATIONS FOR THIS SECTION.

Sex of blossom.
b. bi-sexual or perfect.
p. pistillate.

Texture.
f. firm.
m. medium.
s. soft.

Season.
The date (in June) of the ripening of the first perfect specimens is given in each case as the most convenient mode of indicating the relative season.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
1	*	*	*	*	*	Hybrid of the late Chas. Arnold. One of the most productive early sorts.
2	*	*	*	*	*	Hybrid of the late Chas. Arnold. A superior market berry.
3	....	....	....	*	....	Productive. A market variety.
4	†	†	†	*	†	Superior dessert fruit. May prove profitable for market.
5	*	*	*	*	*	Does not always ripen well at the tip. Valuable.
6	*	*	*	*	*	Very perfect in form. Moderate bearer. Holds its size well. Excellent.
7	*	*	*	*	*	To produce with certainty should be grown in hills, and on moist soils.
8	*	*	*	*	*	Hybrid of the late Chas. Arnold. A market variety.
9	*	*	*	*	*	One of the best new varieties for market.
10	*	**	*	*	*	Exceedingly productive. Even sized, but not quite large enough or good enough.
11	*	*	*	*	*	Might properly take a leading position as a market sort. Windsor Chief is identical.
12	**	**	*	*	**	Succeeds generally as a fruit for near marketing. Plant vigorous.
13	*	*	*	*	*	Needs a little more firmness for remote markets. Plant a weak grower.
14	....	....	....	*	....	A very promising late market variety; just introduced.
15	*	*	*	*	*	One of the very finest large berries. Succeeds on very light soils. On heavy soils often misshapen.
16	*	**	*	**	*	Vigorous plant. Very prolific, but lacks quality and firmness. Foliage healthy.
17	....	....	....	†	....	Must have high culture; otherwise fails.
18	*	*	*	*	*	Excellent as a berry for home use, or for near marketing.
19	*	*	*	*	*	Very productive. A market berry. Not generally valued.
20	*	*	*	*	*	Valuable for near market. Plant vigorous. Nearly abandoned.
21	*	*	*	*	*	A highly desirable amateur berry. Plant vigorous. The first to ripen. Will do for early market.
22	....	....	....	*	....	Productive and early. Not generally valued.
23	....	....	....	†	....	Bears profusely. Promising as a market berry.
24	....	....	*	*	....	Desirable late market berry. Good dessert fruit.
25	....	....	....	*	....	Not a vigorous plant; but bears heavily.
26	*	*	*	*	*	A late sort. Valued for market.
27	*	*	*	*	*	Fruit uniformly large. Not profitable.
28	....	....	....	†	....	Plant vigorous. Promises to be valuable.
29	....	*	....	*	....	Of high quality. Plant lacks vigor.
30	*	*	*	*	*	Variable. Generally productive.
31	*	*	*	*	*	Is very highly praised, so far as tested.
32	*	*	*	*	*	Has valuable characteristics for market.

SECTION XVIII.—STRAWBERRIES—CONTINUED.

Number.	Names.	Descriptions.								Use and Value. Scale 1 to 10.		
		Size.	Form.	Color.	Quality.	Sex.	Texture.	Season.	Origin.	Dessert.	Cooking.	Market.
33	Jewell	l	r o b c	b c	g	p	f	26 June	Conn.	7	9	10
34	Jucunda	v l	o b c	b s	g	b	f	14 "	Am.?	6	....	9
35	Kentucky	l	l r c	b s	v g	b	f	16 "	Ky.	8	....	8
36	Longfellow	v l	o b c	c	g	b	m	16 "	Ky.	9	8	8
37	Maggie	m	o v r	s	g	b	s	30 "	Ont.	8	7	8
38	Manchester	l	c r	c	g	p	f	26 "	N. J.	8	9	9
39	May King	m	o b c	b c	v g	b	m	10 "	Am.	8	....	8
40	Miner	l	r c	c	g	b	s	14 "	N. J.	8	8	8
41	Mount Vernon	l	c r	b s	g	b	m	24 "	.....	7	8	9
42	New Domlnion	l	o b c	b r	g	b	m	14 "	Ont.	8	8	8
43	Nicanor	m	r o b c	b s	b	b	m	6 "	N. Y.	9	....	5
44	Ohio	l	l c	c	g	p	m	19 "	Ohio.	8	....	8
45	Ontario	v l	o b c	b c	v g	b	m	14 "	N. Y.	8	....	9
46	Parry	v l	r o b c	s	b	b	f	26 "	N. J.	10	....	....
47	Pearl	m	o c	c	b	b	m	16 "	N. J.	9	....	....
48	Phelps, *Old Ironclad*	m	o b c	b c	v g	b	m	15 "	.....	7	....	8
49	Piper	m	r	b c	g	b	f	24 "	Ill.	8	8	9
50	Russell's Advanco	l	r o v	b s	v g	b	f	10 "	N. Y.	7	....	6
51	Seneca Queen	l	r c	b c	b	b	m	11 "	N. Y.	8	....	8
52	Sharpless	v l	o c c o	b r	v g	b	m	14 "	Penn.	8	....	9
53	Shirts	v l	l c	b c	v g	b	f	14 "	Mich.	9	9	7
54	Sucker State	m	.....	.....	.....	.....	.....	.....	Ill.	....	....	....
55	Summit	l	r o b c	d s	v g	p	f	27 "	Ohio.	6	....	9
56	Triomphe (de Grand)	l	r o b c	b r	b	b	f	12 "	Bel.	10	....	9
57	Vick (Jas.)	m	r c	c	v g	b	f	17 "	Mo.	6	....	7
58	Warfield	m	c	d r	v g	p	f	12 "	Ill.	9	....	10
59	Warren	m	r c	d c	v g	b	t	19 "	Ky.	9	8	7
60	Wilson	l	r c	d c	g	b	f	11 "	N. Y.	6	9	9
61	Woodruff (No. 1)	m	l c	d c	v g	b	f	13 "	Mich.	7	....	8

SECTION XVIII.—STRAWBERRIES—CONTINUED.

Number.	Locality. East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.	Remarks.
33	....	....	....	†	....	Decidedly the most productive of the introductions of 1885. Makes very few runners.
34	*	*	*	*	*	Vigorous. Profitable when grown in hills and on strong soils. At the north this succeeds on sandy soils.
35	*	**	*	**	*	Vigorous. A good late market berry. Nearly superseded.
36	*	*	*	*	*	Its large size and productiveness would seem to fit it for market.
37	*	*	*	*	*	Hybrid of the late Chas. Arnold. Very productive. Deficient in color.
38	....	*	...	*	....	Has become a leading market berry.
39	*	*	*	*	*	Very popular as an early berry.
40	*	*	*	*	*	Vigorous and productive. Excellent for near market.
41	*	**	*	*	*	Very highly praised as a market variety. Quite late.
42	....	*	....	*	....	Bright colored, large, productive.
43	*	*	*	*	*	One of the best early amateur varieties. Rather small.
44	....	....	....	†	....	Promising for late market.
45	....	....	....	*	....	Much like Sharpless, but preferable to that variety.
46	....	....	....	*	....	Very beautiful, fine flavor. Large. Productive.
47	....	....	....	†	....	A promising fruit, of high quality.
48	*	*	*	*	*	Generally prized as a market variety.
49	*	*	*	*	*	Has valuable qualities as a market fruit.
50	*	*	*	*	*	Very productive. Retains its size till last pickings.
51	*	*	*	*	*	Continues large to the last. A fine market berry. Very desirable.
52	*	*	*	*	*	Is attracting much attention. Lacks firmness for distant marketing. Does best in hills.
53	*	*	*	*	*	Very rich in color and fine in quality. Desirable for home use.
54	....	*	*	*	....	Valued in Illinois as a market variety.
55	....	*	*	*	....	Fine large even sized fruit. Not a strong grower.
56	*	*	*	*	*	Flavor rich, excellent. Must be grown in hills to warrant success for market.
57	*	*	*	*	*	In plant and fruit much like Captain Jack.
58	....	....	....	†	....	A vigorous plant. Said to be very productive.
59	*	*	*	*	*	A superior variety for home use.
60	**	**	**	**	**	Colors early. Only good when fully ripe. Later pickings fail in size. The leading market berry with the mass of growers.
61	*	*	*	*	*	Ripens fully at the tips. Valuable.

REJECTED LIST.

With the purpose to avoid the liability to the reintroduction of varieties of fruit which have been already tried and abandoned, we append lists of such as have heretofore appeared in the catalogue, but which, for one cause or another, have been superseded, and have therefore been dropped from the lists.

At the first revision, in 1879, the following were omitted:

Apples.	Pears.	Plums.
Autumn Pearmain. Bush. Lancaster Greening.	Dunmore. Jalousie de Fontenay. Vendee.	Admiral.

The following were dropped at the second revision, in 1881:

Apples.	Blackberries.	Peaches.
Woolcot (Steere), the same being continued under the corrected name—Morris' Red.	White Seedling.	Windoes.
	Plums.	Strawberries.
	Dorr's Favorite; this proving to be a synonym for Pond, *Fonthill*.	Windsor Chief, which is identical with Champion.

In the third revision, in 1883, the following were omitted:

Apples.	Peaches.	Strawberries (continued)
Better than Good. Hall.	Cooper's Mammoth.	Grace. Hudson No. 10. Ida. Iowa Prolific. Kissany. Large Early Scarlet. Lennig's White. Longworth's Prolific. Luckhurst. Major McMahon. Napoleon III. President Lincoln. President Wilder. Romeyn. Scarlet Globe. Seedling Eliza. Star of the West. Starr. Sterling. Walden. Wilding Seedling.
Black Caps.	Strawberries.	
Lum's Everbearing.	Afrique. America. Burr Oak. Caroline. Centennial Favorite. Cinderella. Crimson Cone. Damask Beauty. Dr. Warder. Early Hudson. Emperor. Essex Beauty. Fillmore. Fowler's Seedling. French. Frontenac. General Sherman.	
Red Raspberries.		
Early Andrews. Saunders. Winant.		
Cherries.		
Rivers' Amber.		

REJECTED LIST—CONTINUED.

The following were omitted in the fourth revision, in 1885:

Cherries.	Red Raspberries.	Strawberries (continued.)
Duchesse de Palluau. Rumsey's Late Morello.	Naomi—A probable synonym of Fastolf.	Marvin. Matilda. Metcalf. Michigan. Minnesota. Russell. Seneca Chief. Springdale.
Grapes.	**Strawberries.**	
Taylor's Bullitt.	Boston Pine. Burgess. Excelsior. Forest Rose. Golden Defiance. Hooker. Kirkwood.	
Cap Raspberries.		
Ganargua.		

In the present revision, for 1888, being the fifth, the following are omitted:

Apples.	Cherries.	Grapes.
Craig's August. Early Long Stem. Fort Miami. Gabriel, *Ladies' Blush.* Green's Choice. Hansum's Red. Lacker. Melt in the Mouth. Newark Pippin. Northern Sweet. Progress. Pumpkin Russet. River. Somerset (N. Y.) Summer Belflower (N. Y.). Summer Greening. Sweet Baldwin. Table (greening). Twin. Wealthy's Favorite.	Buttner's Yellow. China Bigarreau. Early Amber. Large White Bigarreau. *Bigarreau Gros Coeuret.* Merveille de Septembre. Red Heart. Tradescant. Transparent Guigne. White French. White Tartarian. Wilkinson.	Allen. Alvey. Anna. Belvidere. Black Hawk. Cornucopia, *Arnold's 2.* Croton. Mottled. Neff, *Keuka.* Norton's Virginia. Othello, *Arnold's 1.* Peter Wylie. Rebecca. Rogers' 20. Senasqua. To Kalon. Union Village. York Madeira.
Crabs.	**Cap or Tip Rooting Raspberries.**	**Strawberries.**
Brier's Sweet.	Canada. Davison's Thornless. Ellisdale. Norwood. Purple Cane. Seneca. Wetherbee.	Agriculturist. Burr's New Pine. Duchess. Great American. Green Prolific. Hervey Davis. Hovey. Monarch of the West. New Jersey Scarlet. Photo, *Martha.* Pioneer. Victoria, *Golden Queen.*
Peaches.	**Raspberries Increasing by Suckers.**	
Muscogee. Thurber.	Arnold's Red. Bristol. Delaware. Fastolf, *Naomi.* Highland Hardy. Hornet. Kirtland. Montclair. Red Antwerp. Thwack.	

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