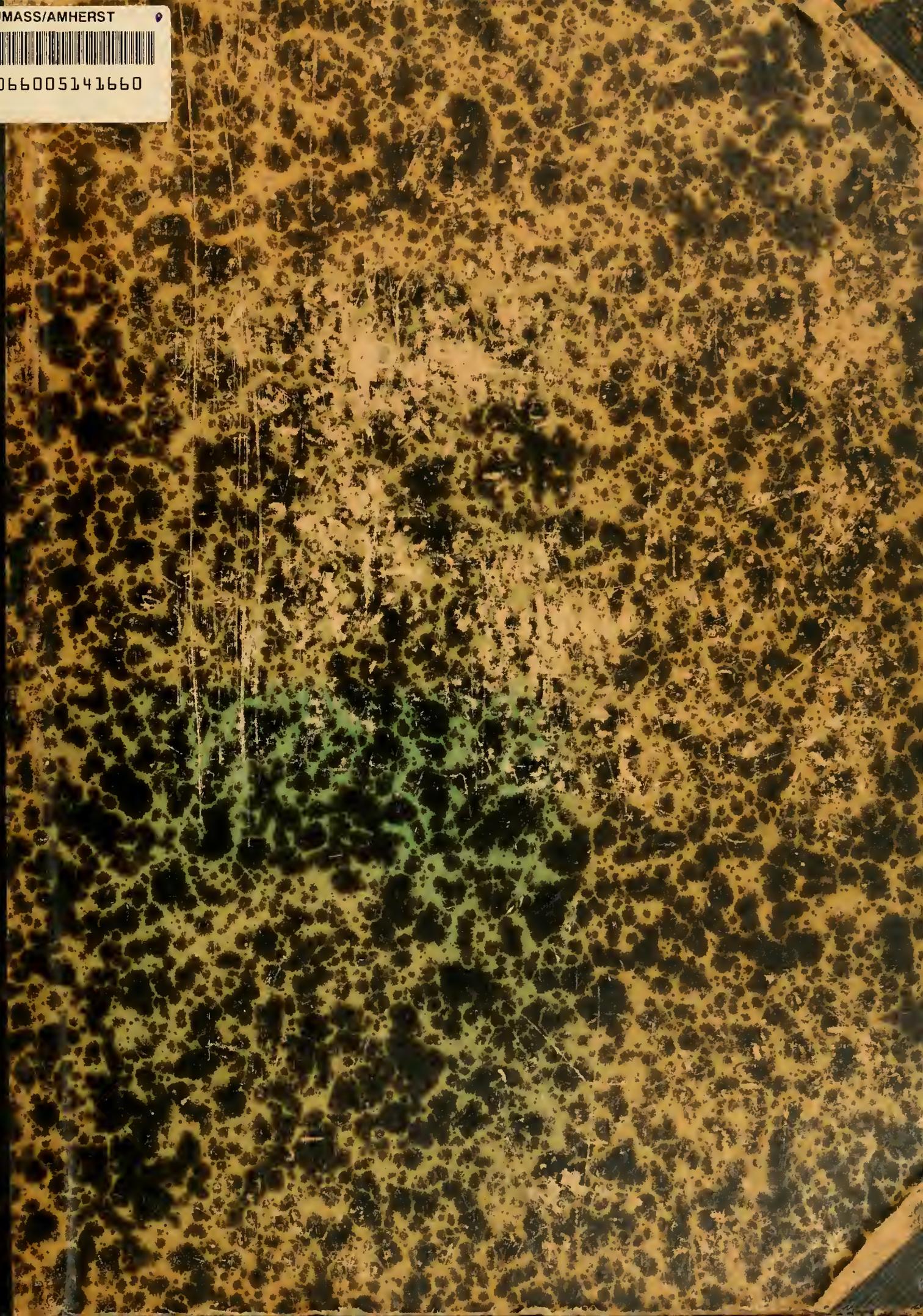


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PROCEEDINGS

OF THE

TWENTY-THIRD SESSION

OF THE

# American Pomological Society

HELD IN

WASHINGTON, D. C.,

SEPTEMBER 22-24, 1891.

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COMPILED BY THE SECRETARY.

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PUBLISHED BY THE SOCIETY.

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# CONSTITUTION AND BY-LAWS

OF THE

## AMERICAN POMOLOGICAL SOCIETY.

### CONSTITUTION.

ARTICLE 1. The name of this Association shall be the AMERICAN POMOLOGICAL SOCIETY.

2. Its object shall be the advancement of the science of Pomology.

3. It shall consist of delegates appointed by Horticultural, Agricultural, and kindred Societies in the United States and British America, and of such other persons as take an interest in the welfare of the Association, and are desirous of promoting its aims. They shall pay four dollars biennially, and twenty dollars paid at one time shall constitute a life membership.

4. The meetings shall be held biennially, at such time and place as may be designated by the Society; and special meetings may be convened at any time on the call of the President.

5. The officers shall consist of a President, a First Vice-President, one Vice-President from every State, Territory and Province; a Treasurer and a Secretary; and shall be elected by ballot or otherwise at every biennial meeting.

### BY-LAWS.

1. The President shall have a general superintendence of the affairs of the Society during its vacation; give due public notice of the time and place of meeting; preside at its deliberations; deliver an address, on some subject relating to Pomology, at every biennial meeting; and appoint all committees unless otherwise directed.

2. In case of the death, sickness, or inability of the President, his official duties shall devolve on the First Vice-President, or such one of the Vice-Presidents as the Society may elect by ballot or otherwise.

3. The Treasurer shall receive all moneys belonging to the Society, and pay over the same on the written orders of the President.

4. There shall be a Finance Committee of three members appointed by the President at each biennial meeting.

5. The Secretary shall, with the assistance of a reporter appointed by him, keep a record of the transactions of the Society for publication.

6. There shall be an Executive Committee consisting of five members, together with the President

and Vice-Presidents, *ex-officio*, five of whom shall constitute a quorum, who shall manage the affairs of the Society during its vacation.

7. Chairmen of Fruit Committees, for every State, Territory and Province, and a general Chairman over all, shall be appointed biennially. It shall be the duty of each of such Chairmen to appoint four additional members of his committee, and with their aid, and such other information as he can procure, to forward to the general Chairman one month before every biennial meeting, State Pomological Reports, to be condensed by him for publication.

8. A Standing Committee on Native Fruits, consisting of eleven members, shall be appointed by the President, immediately after his election. It shall be the duty of this Committee to report biennially on native fruits, and also to examine, and before the close of the session report on, all new seedling varieties that may be exhibited; and to make an *ad interim* report on those that were exhibited in an unripe condition at the meeting of the Society, but had subsequently attained a state of maturity; and on such other seedlings as may have been submitted to their inspection during the Society's vacation.

9. A Standing Committee on Foreign Fruits, consisting of eleven members, shall be appointed, whose duties shall be similar to those of the committee in by-law eight.

10. A Standing Committee on Tropical and Sub-tropical Fruits, consisting of eleven members, shall be appointed, whose duties shall be similar to those of the committee in by-law eight.

11. A Standing Committee on Nomenclature, consisting of seven members, shall be appointed biennially.

12. Vacancies occurring in committees shall be filled by the chairman of each, and in case of his death or inability to serve, his place shall be supplied by the President of the Society.

13. The order of business for each meeting shall be arranged by the Executive Committee.

14. The Constitution or By-Laws may be altered or amended, at any regular biennial meeting, by a vote of two-thirds of the members present.

# OFFICERS

OF THE

## AMERICAN POMOLOGICAL SOCIETY,

1891-93.

---

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CHARLES L. WATROUS, DES MOINES, IOWA.

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### TREASURER:

BENJAMIN G. SMITH, - - - CAMBRIDGE, MASS.

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Kendall, George F.....Cambridge.....Massachusetts	Sadler, Dr. O. W.....Pittsburgh.....Pennsylvania
Kent, Joseph H.....Russellville.....Pennsylvania	Samuels, J. M.....1,001 Grand Boulevard.....Chicago, Ill.
Kidder, N. T.....Milton.....Massachusetts	Sampson, F. G.....Micanopy.....Florida
King, John A.....Great Neck, L. I.....New York	Saunders, William.....Washington.....Dist. Columbia
Kirkpatrick, T. J.....Springfield.....Ohio	Sawyer, Geo. B.....Wiscasset.....Maine
Koen, R. B.....Memphis.....Tennessee	Scarborough, W.....Cincinnati.....Ohio
Kuhn, Hartman.....Philadelphia.....Pennsylvania	Scott, David A.....Newburg.....New York
Langdon, C. C.....Mobile.....Alabama	Selover, Edward C.....Auburn.....New York
Lawver, A. M.....Galena.....Illinois	Shaw, C. C.....Milford.....New Hampshire
Leighton, G. B. F.....Norfolk.....Virginia	Shotwell, J. R.....Rahway.....New Jersey
Lester, J. Erastus.....Providence.....Rhode Island	Shepard, Chas. N.....Charleston.....South Carolina
Lindley, J. V.....Pomona.....North Carolina	Smith, B.....Cuba.....Missouri
Lovett, J. T.....Little Silver.....New Jersey	Smith, Benj. G.....Cambridge.....Massachusetts
Luke, Elijah H.....Cambridgeport.....Mass.	Smith, W.....Geneva.....New York
Lyman, Henry L.....Charlottesville.....Virginia	Smith, Wm. Brown.....Syracuse.....New York
Lyons, James M.....New Bedford.....Massachusetts	Smith, Wm. Elliott.....Alton.....Illinois
Lyon, T. T.....South Haven.....Michigan	Smith, Wing R.....Syracuse.....New York
Mann, William R.....Sharon.....Massachusetts	Smith, Dr. Erwin F.....929 R. I. Ave., Washington, D. C.
Manning, Robert.....Salem.....Massachusetts	Snyth, Frederick.....Manchester.....New Hampshire
Marble, F. M.....Worcester.....Massachusetts	Southworth, C.....Stoughton.....Massachusetts
Masters, James H.....Nebraska City.....Nebraska	Spaulding Dr. C. W.....River Point.....Rhode Island
Maude, Chas. E.....Riverside.....California	Stark, Clarence M.....Louisiana.....Missouri
McCulloch, J. M.....Cincinnati.....Ohio	Starr, Robert W.....Cornwallis.....Nova Scotia
MacFerron, David.....Allegheny City, Pennsylvania	Stewart, Brice.....Clarksville.....Tennessee
McLaughlin, Henry.....Bangor.....Maine	Stewart, Henry L.....Middle Haddam.....Connecticut
Meehan, Thomas.....Germantown.....Pennsylvania	Streator, George J.....Garrettsville.....Ohio
Menke, A. E.....(For Exp. Sta.) Fayetteville, Ark.	Strong, W. C.....Brighton.....Massachusetts
Miller, F. R.....Sugar Grove.....Pennsylvania	Strother, David H.....Charlestown.....West Virginia
Mills, W. H.....Hamilton.....Ontario	Swineford, Howard.....Richmond.....Virginia
Mudd, Henry T.....Pittsfield.....Illinois	Taft, Edward P.....Providence.....Rhode Island
Munson, D. O.....Fall's Church.....Virginia	Tatnall, Edward.....Wilmington.....Delaware
Murray, R. D.....Moultrie.....Florida	Taylor, Dr. Thomas.....Washington.....Dis. Columbia
Newman, J. S.....Auburn.....Alabama	Temple, F. L.....Somerville.....Massachusetts
Noble, Samuel W.....Jenkintown.....Pennsylvania	Temple, John T.....Davenport.....Iowa
Orton, J. G.....Binghampton.....New York	Thomas, George B.....West Chester.....Pennsylvania
Osborne, Charles.....Vassalboro.....Maine	Thomas, J. J.....Union Springs.....New York
Parsons, S. B.....Flushing.....New York	Thomas, Milton.....Los Angeles.....California
Payson, Samuel R.....Boston.....Massachusetts	Townsend, B. C.....Bay Ridge, L. I.....New York
Pearson, John M.....Godfrey.....Illinois	Uber, Carlton A.....Fall's Church.....Virginia
Periam, Jonathan, 526 Englewood Ave., Englewood, Ill.	VanDeman, H. E.....Washington.....Dist. Columbia
Perley, Samuel F.....Naples.....Maine	Van Gelder, Jacob.....Saugerties.....New York

Van Lindley, J.....	Pomona.....	North Carolina	Whitehead, John B.....	Norfolk.....	Virginia
Wardwell, W. H.....	Boston.....	Massachusetts	Wickersham, Robt. A.....	Clearbrook.....	Virginia
Waterer, Hosea.....	Philadelphia.....	Pennsylvania	Wieland, John.....	Knoxville.....	Tennessee
Watrous, C. L.....	Des Moines.....	Iowa	Wilder, Edward B.....	Dorchester.....	Massachusetts
Watrous, Phillip.....	(For Hortl. Lib.)	Des Moines, Ia.	Williams, Henry T.....	Colorado Springs.....	Colorado
Watson, Wm.....	Brenham.....	Texas	Williams, E.....	Montclair.....	New Jersey
Webber, Wm. L., (For Hoyt Pub. Lib.)	Saginaw, Mich.		Wilson, W. C.....	Baltimore.....	Maryland
Wier, D. B.....	Trenton.....	Sonoma Co., Cal.	Yeomans, Wm. H.....	Columbia.....	Connecticut
Weld, Aaron D.....	Boston.....	Massachusetts	Yerrington, J. M. W.....	Boston.....	Massachusetts
Wellborn, Jesse M.....	Conyers.....	Georgia	Younglove, Joseph I.....	Bowling Green.....	Kentucky

## BIENNIAL.

Adams, Dudley W.....	Tangerine.....	Florida	McCoy, Ben.....	Oskaloosa.....	Iowa
Barry, P. W. C.....	Rochester.....	New York	McNary, J. W.....	Dayton.....	Ohio
Barry, Fred G.....	Rochester.....	New York	McArdle, H. W.....	Fargo.....	North Dakota
Babcock, A. G.....	863 Madison Ave.,	Cleveland, O.	Manning, J. W.....	Reading.....	Massachusetts
Bailey, L. H.....	Ithica.....	New York	Manville, A. H.....	Denver.....	Florida
Bailey, Mrs. L. H.....	Ithica.....	New York	Motz, Geo. I.....	Huntsville.....	Alabama
Beckwith, M. H.....	Newark.....	New Jersey	Massey, Prof. W. F.....	Raleigh.....	North Carolina
Brackett, Geo. C.....	Lawrence.....	Kansas	Mason, Mrs. Lizzie.....	Winchester.....	Massachusetts
Brackett, G. B.....	Denmark.....	Iowa	Mason, Miss Lizzie.....	Winchester.....	Massachusetts
Brunk, Thos. L.....	College Park.....	Maryland	Martin, Geo. A.....	Dept. of Agr.,	Washington, D. C.
Blackwell, I. J.....	Titusville.....	New Jersey	Munson, W. M.....	Orono.....	Maine
Bloek, A.....	Santa Clara.....	California	Phenix, F. S.....	Bloomington.....	Illinois
Boyers, Wm.....	Kansas City.....	Missouri	Porter, I. W.....	Charlottesville.....	Virginia
Cutter, J. E.....	Riverside.....	California	Pound, I. L.....	Clark Station.....	Kentucky
Cook, Geo. W. E.....	Laeon.....	Illinois	Patten, C. G.....	Charles City.....	Iowa
Carey, H. H.....	La Grange.....	Georgia	Peter, Charles.....	Ridgeway.....	North Carolina
Craig, John.....	Ottawa.....	Canada	Ruedy, Geo.....	Colfax.....	Washington
Conover, W. I.....	Norfolk.....	Virginia	Riley, Prof. C. V.....	Washington.....	Dist. Columbia
Campbell, Alex.....	Riverside.....	California	Rue, M. P.....	Norfolk.....	Virginia
Farnsworth, W. W.....	Waterville.....	Ohio	Reynolds, P. C.....	Rochester.....	New York
Goodman, L. A.....	Westport.....	Missouri	Ragan, W. H.....	Greeneastle.....	Indiana
Green, Chas. A.....	Rochester.....	New York	Saul, John.....	Washington.....	Dist. Columbia
Hale, J. H.....	South Glastonbury.....	Conn.	Smith, Geo. A.....	Waltham.....	Massachusetts
Hexamer, Mrs. F. M.....	New York.....	New York	Smith, Miss Annie W.....	Waltham.....	Massachusetts
Hendricks, Howard.....	Kingston.....	New York	Spaulding, J. B.....	Spaulding.....	Illinois
Halstead, Byron D., Rutgers Coll.,	New Brunswick, N. J.		Sturgus, M. B.....	Washington.....	Dist. Columbia
Hood, W. T.....	Richmond.....	Virginia	Stiles, W. A.....	Deckerton.....	New Jersey
Hart, E. H.....	Federal Point.....	Florida	Slaymaker, A. W.....	Camden.....	Delaware
Harrison, J. J.....	Painesville.....	Ohio	Stell, W. W.....	Paris.....	Texas
Irwin, W. N.....	South Salem.....	Ohio	Schleicher, R.....	Lewiston.....	Idaho
Johnson, W. B. K.....	Allentown.....	Pennsylvania	Stringfellow, H. M.....	Hitchcock.....	Texas
Jones, W. E.....	Lineoln.....	Illinois	Simmons, Geo. E.....	Macon City.....	Missouri
Jones, C. J. S.....	Lawton.....	Michigan	Taylor, J. F.....	Douglas.....	Michigan
Kimball, Frank A.....	National City.....	California	Taylor, W. A.....	Dept. of Agr.,	Washington, D. C.
King, Wm. M.....	Dept. of Agr.,	Washington, D. C.	Taber, L. G.....	Glen St. Mary.....	Florida
Kendall, Mrs. Reliane.....	Cambridge.....	Massachusetts	Troop, Prof. J.....	Lafayette.....	Indiana
Luke, Mrs. E. H.....	Cambridge.....	Massachusetts	Underwood, J. M.....	Lake City.....	Minnesota
Lines, C. P.....	New Haven.....	Connecticut	Willits, Hon. Edwin.....	Washington.....	Dist. Columbia
Munson, T. V.....	Denison.....	Texas	Walkins, J. B.....	Hallsboro.....	Virginia
Miller, G. H.....	Rome.....	Georgia	Wilson, A. J.....	Monticello.....	Arkansas
			Youmans, Mrs. Mary B.,	Columbia.....	Connecticut

# PREFATORY NOTE.

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Mr. A. A. Crozier having resigned his position as Secretary soon after the publication of the last report, the undersigned, upon the urgent solicitation of President Berekmans, was induced to accept of the office for the unexpired term, and entered upon the duties thereof in the month of July, 1889.

On January 19, 1891, the following letter was received by President Berekmans:

DEPARTMENT OF AGRICULTURE,  
OFFICE OF THE SECRETARY.

WASHINGTON, D. C., January 16, 1891.

*Mr. P. J. Berekmans, President American Pomological Society:*

DEAR SIR: Allow me, through you, to invite the American Pomological Society to hold its next biennial meeting, which I am informed is to take place in September, at the Agricultural Department in the city of Washington.

The Department will, I assure you, be happy to arrange for the meeting, and provide a suitable hall and such other conveniences as you may require, should you honor us with your presence.

Yours very truly,

(Signed)

J. M. RUSK, Secretary.

Invitations were also received from the Tacoma Chamber of Commerce through its Secretary Mr. C. A. Snowden, and from the California State Horticultural Society, through Mr. Emery E. Smith, its Secretary, but after submitting the matter to a vote of the Executive Committee, it was decided to accept of the invitation to meet in Washington, D. C.

Notice was sent at once to the press, and on August 1st 3,000 circulars and programs were sent to all parts of the country. All of the railroad passenger associations east of the Mississippi River granted reduced rates to all persons attending the meeting, for which the Society is under renewed obligations.

The classification and arrangement of the papers and discussions according to subjects without regard to their orderly presentation, as adopted by my predecessor, has been followed in this report. The delay in its publication is due to unavoidable circumstances beyond the control of the Secretary, which he regrets as much as any one.

The thanks of the Society are due to the Secretary of Agriculture for tendering the services of Mr. Talma Drew as stenographer, and to the contributors of the many valuable papers, which we believe will be found of more than usual interest to the Pomologist.

G. B. BRACKETT, Secretary.

NOTE.—This Society does not hold itself responsible for the opinions or theories which are expressed in the various papers or words of the speakers as they appear in this volume.

# PROCEEDINGS

OF THE

## AMERICAN POMOLOGICAL SOCIETY.

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### TWENTY-THIRD SESSION.

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#### OPENING SESSION.

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On Tuesday, September 22, the Society assembled in the lecture room of the National Museum, and at 10 o'clock A. M. was called to order by the President, Hon. P. J. Berckmans, of Augusta, Ga., who in a few brief remarks announced the session formally opened.

The spacious hall was fairly filled with ladies and gentlemen, among whom were many of the veteran workers of the Society.

The stage was beautifully decorated with palms and other plants and at the right of the president stood the bust of the late Hon. Marshall P. Wilder, the first president of the Society.

The committee of arrangements had provided ample space in an adjoining room for the large and fine collection of fruits exhibited.

Rev. S. M. Newman was introduced and opened the meeting with prayer, after which the Hon. Edwin Willits, Assistant Secretary of Agriculture, in behalf of Secretary Rusk, delivered the following

#### Address of Welcome:

*Mr. President and Gentlemen of the American Pomological Society:*

The pleasant duty devolves upon me to welcome you to the City of Washington. At the request of the Secretary of Agriculture, you are convened in this place at this time. There being no local society to urge upon you the claims of this city for your convention, it was befitting that this depart-

ment of the government that is affiliated with your work, that in the breadth and scope of its duties has a place for Pomology, and that watches with interest your labors and your deliberations, should extend to you the hand of fellowship, and give you a cordial welcome.

In behalf of the Department of Agriculture, therefore, I bid you a hearty welcome, and I trust you will not regret having chosen this place for your meeting. We can not offer you the same inducements that other localities can, or would be likely to present, but there are other considerations that in my judgment far outweigh them. Among the first to be noted is the fact that the occasion furnishes an opportunity for the Department, which is advancing with such rapid strides in public estimation, and which is developing in every direction and along every line that shall assist agriculture in its many forms, to come to a better and fuller understanding with your Society, which is itself almost as old as the Department that greets you to day. To you, as to us, the day of small things has passed away. You represent interests at this date that far outrun the most vivid imaginations of the most sanguine of the men who in 1848 organized your Society. Then California was practically unknown, and Florida was chiefly renowned for her everglades and her hostile Seminoles. The orange, the lemon, the fig, the persimmon, pomegranate, pine apple, and olive were essentially a

luxury imported from foreign shores. The tomato was still in many localities tempting to the eye, but distasteful to the palate, if not as positively as injurious as the "nightshade" to which it is akin. The strawberry always luscious was still in large measure sought for by the boys and girls in the meadows, who in the seeking often found something beside. The farm or home that had a tasteful wild grape commanded a readier market, and the native crab-apple was not to be despised by the small boy, or the good housewife.

But it is useless to enlarge in illustration of the conditions at the date of your organization. A complete revolution has been wrought. In this revolution you gentlemen, and those whom you succeed, and whom you represent have been an important factor. The improved methods you have brought about; the new varieties you have propagated and introduced; the new fruits you have brought from foreign lands and made popular; the assiduity with which you have studied soil and climate and adaptability; the genius you have shown in discovering and devising new strains of flavor and of increased production; the sacrifices you have made and the fortunes you have spent in the endeavor to make a hardy stock for the most acceptable qualities, all have been recorded and will be gratefully remembered by generations who enjoy the luscious pleasures you have brought to their repasts. Many of you have been household words for years. You have given joys that never satiate and sweets that never pall. Where before an improved fruit was so rare that it was a benefaction, now there is such an abundance that one can hardly discriminate and can hardly distribute his appreciation.

The Department of Agriculture is in no degree less considerate of what you have been doing and what you have accomplished. It has with pleasure, as is testified by its reports from the first, published to the world the best results of your labors, and it has recognized to the full the energy you have displayed and the intelligence you have thrown into your work. On the other hand the Department has some pride in the part it has taken in this great revolution. It has not been idle these many years. It would be unbecoming in this presence to enumerate the trophies it has won, or the good it has

accomplished. It is only mentioned for the purpose of justifying the claim it makes for fellowship with you in the deeds that have been done. Its Division of Horticulture has always been prolific in results; its Division of Pomology is working in its restricted field with an honest effort, with the means given it, to cooperate with you and to meet your wishes, while in the Divisions of Entomology and Vegetable Pathology you have found abundant assistance in fighting insect pests and vegetable parasites—four grand Divisions out of fourteen devoted largely to the interests which you represent.

It is because of our work that we are glad to meet the other and more numerous workers in this great field of fruit culture, and to become personally acquainted with you. Your coming is an inspiration to us, and may your leaving be followed by a higher appreciation of what each in his respective sphere is accomplishing, and a more hearty cooperation in the great work in which we are jointly interested.

The President then called upon Hon. C. L. Watrous, of Des Moines, Iowa, who made the following

#### Response:

*Mr. Secretary:*

We have reason to be very glad to be welcomed by the head of so great a department of so great a Government as this. There is no other government upon the face of the earth where one of its great departments may so freely devote itself to the welfare of that which makes life pleasant to the common people as this great Agricultural Department of this great Government of America. I am told by those who have been in Europe more than I have that there is no people there, in spite of their ancient Government, where the common people—I mean all of us who work with our hands—are able to have upon their tables and in the hands of their children fruits in abundance, as we have them here in America. As one of the younger members of this Society, I may the more freely speak of the great part taken by this Society in bringing about this state of affairs. The work of this Society heretofore has been very largely in introducing fruits from foreign countries and straightening the crooked places in the naming of our native fruits, and in adopting new methods of cultivation. It is only lately that this Society

has had the help of this great Department of the Government. This Department of Agriculture has taken on a new growth lately, and that, while it is good for the nation it is especially good for all of us who are concerned with the growth of fruits. As I look about the walls here in this hall, which is tendered for our use, I am led to speak just for a moment of one new work which the members of this American Pomological Society are taking up. We see here these portraits of the aboriginal inhabitants of our country. We, in the West, especially beyond the Mississippi river, are now engaged in a great work in adopting—in civilizing—the fruits which these red men ate, and making them fit for such men as form the body of the American Pomological Society. We are proud and glad to have the hearty coöperation of this great Department of this great Government. I believe that there is no other people in the world so well situated as we are to go on to develop the things which make for the higher and better life of the common people. There is no nation on the earth which can threaten us so that we are obliged to spend the best part of our blood in maintaining standing armies. We have no foe, foreign or domestic, which threat-

ens our welfare. We may pay our taxes, and we can reasonably ask the Government to spend the best part of them in developing the industries of this nation freely, without any interference from the rest of the world. The Agricultural Department, with its division of Pomology, is our great helper in our work. It is especially pleasing to have such words of welcome and assurance that we shall have all the help which that great Department is able to give. The men who sit here will soon pass away, but their work will not be ended, and with the help of the Department of Agriculture, with the work ingrained there, we know that it will go on, and with changing conditions, with new enemies to combat and old varieties running out, we know that with a nucleus here at Washington, this work may be carried on to the limits of time. It is pleasant to be here, and very gratifying to know and consider these facts. Mr. Secretary, we have to thank you for the welcome you have given us. We can appreciate it.

The president then announced the various committees for the session, a list of which will be found in the forepart of this volume, and the meeting adjourned to 2 o'clock p. m.

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## PRESIDENT'S ADDRESS.

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By HON. PROSPER J. BERCKMANS, Augusta, Georgia.

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On reassembling President Berckmans delivered his biennial address.

### The Address.

*Gentlemen and Members of the American Pomological Society:*

Most valued do I hold the privilege to commingle with you, to greet you, and to briefly address you upon a few subjects intimately interwoven with the welfare of this grand organization, and to render you an account of my stewardship.

I delight to converse with men of science, but do not pretend to give them advice; instruction must naturally tend to those who are in need of it, and I, with many others here present, come to glean from the experience of our elders.

In accepting the invitation from the Honorable, the Secretary of the Department of Agriculture, to hold our present session under its auspices in the capital of the American Union, we appreciate the great benefits which will result to our Society. This official recognition with which we have been honored, we gratefully acknowledge, as it gives the American Pomological Society as truly a national standing in name as it has always had in deeds.

One of the most illustrious men of antiquity, Hippocrates, earned the title of "Father of Medicine," because he separated the study of his profession from that of philosophy. So may we deserve the name of Pomologists for having relied more upon practical experience, rather than upon the

theoretical utopias which for many generations past have retarded the progress of our pursuit. We have found through the logic of observation, that the principles of each science, as well as the precepts of each art, should be derived from facts appertaining to their domain, and not borrowed from others mere accessories which should not control but aid in their practical application. In such a progressive science as Pomology, every day brings forth something new and valuable to be added to our stock of knowledge, and while we may radually gain in this from our own observation, yet our pursuit would be slow and often discouraging were opportunities denied us to meet with others whose more varied experience can enlighten us.

The magnitude of this assembly, graced by our most advanced men of science and national reputation, is an indication that the pursuit of Pomology is recognized as one of the great factors in promoting wealth, advancing education, and increasing health-giving products tending to human happiness and comfort. Aside from these beneficial influences, this reunion is an occasion for many of us to bring us here from our distant homes, to greet those for whom a mutual feeling of friendship is entertained, and to strengthen it by social and intellectual intercourse.

The memories of our past reunions, grand traditions of the illustrious men who founded and sustained this Society, bring to me the most cherished remembrances of friendships formed with those from whom many valued lessons were received, whose exalted words and deeds have enlightened posterity, and whose precepts, I, as their humble follower, have endeavored to carry out, that the aims of our Society may be perpetuated.

One of the ethics of this Society is to promote popular education as far as in our power, because we recognize that the true scope of all educational schemes is graded by its influence upon the welfare and refinement of men. With this view, our reunions and fruit exhibits have proven of marked and practical benefit, combining object lessons with the teachings of men of scientific attainments, and the publication of our proceedings which contain the concentrated experience of the most successful fruit growers of this continent.

Our constitution provides for biennial meetings only, this because many of our members residing

often at great distances from one another, cannot conveniently make long and expensive journeys for that purpose, hence our opportunities to meet together, are unfortunately too limited. While our present constitution does not define in words the

#### DUTIES OF OUR VICE-PRESIDENTS,

it should nevertheless be understood on their part that in accepting the honor of the position, they also accept the obligations to carry out the aims of the Society, and thus aid in achieving that which the parent organization can only map out, and relies upon them for final results. The progress of Pomology must depend upon their personal intercourse and correspondence with the fruit growers of the various counties and localities of their State, and upon the organizing of State and local Societies. These local organizations can have monthly and even weekly reunions, especially during the fruit seasons of the year. There the merits or demerits of fruits may be ascertained, annual reports made to the State Society, to which these local societies should be auxiliaries, and thus the chairmen of State fruit committees could collect more reliable reports than can be obtained where State and district societies do not exist. Our State reports are in some instances deficient in reliable and practical information. To persons unacquainted with the scope of our State reports in regard to their influence upon bringing the most desirable class of citizens to their borders, let me say that one of the main considerations a prospective settler takes in view is the adaptability for successful fruit growing of the section of that State to which he intends to change his residence. The State which gives the most comprehensive and reliable report as to its advantages in these productions will receive the most intelligent, energetic and desirable addition to its population, and that community most exclusively devoting itself to fruit-growing and horticultural pursuits is found to advance more rapidly in everything tending to elevate, refine and enrich its citizens.

#### SCIENTIFIC POMOLOGY A NECESSARY ADJUNCT TO COMMERCIAL FRUIT-GROWING.

While this Society has never deviated from its original object, which is the advancement of the science of Pomology, and cannot recognize individual interests, yet the wonderful strides made in

the production of fruits, makes it imperative to give commercial fruit-growing all due attention, inasmuch as the magnitude of that source of production is in a measure the result of the scientific work of this Society. When we compare the wonderful array of the various fruits with which our markets are now supplied with those of a generation past, well may we feel amazed at the variety and abundance, as well as the improved quality of our market products. A few years ago certain classes of fruits were offered in such limited quantities, that the names of special varieties were almost wholly ignored. Strawberries were all classed under their specific name,—for grapes the Isabella was all that could be found, and in pears the Sugar Top was deemed synonymous to the Bartlett. Every kind of Orange, good, bad or indifferent, was sold in our markets as Florida Oranges. Now look at the change; our market reports issued by every commission man who values his interests, names the varieties of the various classes of fruits, and quotations are made according to their value. Purchasers have become gradually educated to a knowledge of the best varieties, and thus inferior sorts driven out of the market. With these facts in view, commercial fruit growers should endeavor to improve our popular varieties of fruits by the most careful methods of cultivation, picking, sorting and packing, and thus not only increase their pecuniary returns, but practically aid in the progress of scientific Pomology.

#### DECLINE IN THE PRICES OF FRUIT.

The causes are various, and in many instances local, and therefore general remedial measures cannot be suggested. We may mention,

1. Overproduction in some localities.
2. Irregularities in transportation, which prevents fruits being disposed of by daily shipments, and by an accumulation of several days' ripening.
3. Larger quantities are sometimes sent to a market than it can consume.
4. Inferior quality, or faulty packing prevents ready sale, and decreases the price of a similar variety of better quality: a certain amount of what may be termed refuse fruit, will cause low prices to rule so long as this is found in a market. Many other causes may be suggested, but the above are the most prevalent. The remedies are in a measure

within our control. Let district and county Societies adopt rules that nothing but the best grades of fruit shall be shipped by their members, and if need be let a competent person be appointed as inspector, before any fruit is packed and forwarded; let the official brand of the Society indicate the name and grade of each variety, and when uniformity is thus secured, commission men will find no difficulty in securing good prices, and producers will receive the reward for their intelligent as well as systematic care in preparing their fruit for market.

#### FUNGUS DISEASES AND INSECT DEPREDAATIONS.

The rapidity of their increase is alarming in many localities, new species of fungi, and of heretofore almost unknown or comparatively harmless insects which suddenly make their appearance in countless myriads, are causing the fruit grower to call in the aid of our scientists for remedial or preventive suggestions, and to prevent the destruction of his crop admonishes him to acquire some knowledge of Entomology and kindred sciences which will enable him to intelligently observe the appearance and effects of these enemies, and thus aid in the investigation which, thanks to a wise government, is within reach of all, through the systematic organization of the National Bureau of Agriculture, whose work in its various scientific departments, is so highly appreciated by all progressive cultivators.

#### CATALOGUE AND ITS REVISION.

One of the drawbacks to the successful cultivation of fruits is the formidable array of varieties offered to the beginner, and which have a tendency to lead to injudicious selections.

Certain varieties of fruits attain perfection in only a few localities, and may there bring profitable results; others cover a larger territory, and therefore may be classed under the head of General Cultivation. The aim of the official catalogue of the Society is to present a list of fruits that have proven of value in the largest area of the states in which they are now rated. This catalogue was begun twenty years ago, and has received most careful revision at each biennial session; but it is to-day not giving as much information as is necessary, because of the difficulty of so dividing each state of our immense territory as to show the geo-

graphical and climatic regions wherein many of our popular fruits become modified to a greater or lesser extent, and their value greatly changed.

Several plans were suggested when the work was at its inception, and the climatic influences upon a given fruit when grown in states whose area includes both high, mountainous and almost semi-tropical zones, was carefully considered. This latter plan would have been adopted but for the voluminous tabulated pages necessary to carry this out, and the present form was considered as the best that was feasible. While it is insufficient in some instances, it has been retained until a better plan is suggested, and this is a matter which I desire to bring for your consideration.

#### SYNONYMY.

Your committee on synonyms have labored faithfully to reach a proper nomenclature, but their efforts are made more arduous by the introduction of well known sorts under new names—or new varieties which being held under a registered trade mark, have received additional names in order to disseminate them without liability of legal proceedings. The originator of a new and valuable fruit should receive a just remuneration for the years of care and labor required for its production, but by applying for a "Trade Mark" or "Registered Label," he does not always retain a monopoly of the fruit, from the utter impossibility to impress in indelible characters such a mark upon anything but an inert manufactured article which requires special ingredients to produce. The "Registered Label" plan, induces fraud, and adds to the confusion of our nomenclature. There are doubtless other methods to bring remuneration to the originator of a new fruit, which would be more in keeping with the question.

Again the various Japanese fruits which collectors for importing firms in California send to headquarters, are adding to a most confusing and perplexing nomenclature. Local names usually without significance, or misspelled, because of the difficulty of writing in English characters, that which to any but Japanese ears are mere murmurs, have added their quota to this vexed question. Many new Japanese fruits have proven of great value in several sections of the United States, but the difficulty in arriving at a correct nomenclature has

caused inferior sorts to be cultivated, and entailed failure, when better sorts offered under similar names would have yielded abundant returns. This subject, I trust will meet with your careful consideration during this session.

#### POLITICS IN POMOLOGY.

In reviewing the history of your Society, there have appeared instances where its influence was sought for the accomplishment of certain measures totally foreign to its ethics, and pertaining to the domain of statecraft. A wise appreciation of its legitimate field of work has always declined to entertain the consideration of any topic where individual interests were alone to be benefited. As you value the life and dignity of your grand Society, let me plead that the course inaugurated and followed by our illustrious master, whose memory we revere, be always your guide. Let questions of state or local politics be considered and settled by state or national legislative authorities; they are theirs by right, not ours.

#### FINANCES.

From the report of your venerable treasurer, you will find that, thanks to his careful and economical management, your financial resources are in a most satisfactory condition. The legacy of our venerable friend, Mr. Wilder, has by judicious investment, afforded an increased revenue, which gives the Society an annual assured income. Many of the responsibilities incumbent upon myself as the legal head of your Society and corporation, have been shared and assumed by Mr. Benjamin G. Smith.

To my friend Mr. T. T. Lyon, your first vice-president, I am indebted for valuable advice, and to the indefatigable labors of Mr. C. L. Watrous, the General Chairman of the Fruit Committee, you owe the excellent fruit catalogue of the proceedings of the session of 1889.

Your former Secretary, Mr. A. A. Crozier, being compelled to resign his official connection, owing to a change of avocation and domicile, which required his undivided time, deserves your commendation for the care bestowed in editing the proceedings of the last session, and in securing the services of your present efficient Secretary, Mr. G. B. Brackett, the Society has been most fortunate. To him and my colleagues who have so liberally shared in the

labors for the success of the American Pomological Society, I tender my grateful acknowledgements.

Friends and co-workers, pardon the length of these remarks, they are prompted by my earnest solicitude for the life and usefulness of our Society, and if my deductions have at times proven not to be infallible, my intentions have been honest in endeavoring to follow the paths which appeared the safest.

IN MEMORIAM.

And now, my friends, would that I were spared the painful duty to refer to the irreparable loss which the American Pomological Society has sustained by the decease of many of its members. Seldom has death claimed from our ranks men whose labors and loyal support to the pursuit we hold in common, will make their names more imperishable to future generations, than any marble monument that speaks not of their good works for all time to come. Other lips than mine must more eloquently eulogize the life of Patrick Barry, but none can better appreciate the usefulness of our departed friend, in his efforts to advance our country's prosperity and elevate mankind. Mr. Barry died at Rochester, N. Y., on June 23, 1890, at the age of 75 years. He became identified with horticultural pursuits at an early age, and in 1840 formed a partnership with Mr. Geo. Ellwanger, which remained unbroken until death parted him from his devoted friend and partner. His writings upon Fruit Culture stand prominent, and his "Fruit Garden" alone would have made his name illustrious in his chosen pursuit. With Mr. Wilder, he founded this Society, and as Chairman of the General Fruit Committee, he chiefly prepared the catalogue of the fruits which is now your official guide. His labors for the success and perpetuation of this Society ceased only with his life, and when the infirmities of a well-spent life compelled him to relinquish active participation in your last sessions, his solicitude for your success was ever dear to him. Mr. Barry was a man whose countenance and address commanded respect. He had a wonderful gift in expressing his ideas with clearness and firmness. Liberal in his opinions, he respected those of others; consistent in his friendships; of the strictest integrity in his dealings with men; of indomitable energy and perseverance, he faithfully

deserved the tribute of respect which was universally bestowed upon him. To those of us who listened to his practical and lucid illustrations of Pomological problems, and were among his friends, the memories of these days will always remain as laurels, ever green.

Dr. Jno. F. Strentzel, for many years your Vice-President for California, died at his home in Alhambra Valley, near Martinez, California, on October 31, 1891. He was born in Lublin, Poland, in 1813; graduated as a physician at Pesth in 1839, and emigrated to Texas soon afterwards; in 1850 reached California, where he became a pioneer fruit grower, and began experimenting with over 1,000 varieties of fruit. Bland and courteous in manner, considerate and kind in action, and sociable in disposition, full of learning, his death was sorrowfully honored by the community which surrounded his home, and his numerous friends throughout the state. We will ever remember his friendly letters which evinced a kindness of heart to his co-laborers, and together with those who knew him intimately, we will long remember and honor the man who was such a potent factor in horticultural progress.

He was the first to show a properly cured Muscat raisin, and from his efforts may be said to date the present great industry of Raisin production in California.

Chas. Gibb, of Abbotsford, Quebec, so well known to the Pomological world by his researches upon Russian fruits, died at Cairo, Egypt, March 8, 1891. His life was one of unselfish devotion for the benefit of his fellowmen; always ready to do a kind act with a free hand and heart. A most congenial friend, whose modesty was only equal to his great intellectual attainments; a man whose happiness was greatest when he could make others happy. Long will his memory be held dear by those who shared his friendship.

Phineas, M. Augur, Vice-President for Connecticut for many years, and our respected associate, departed this life on July 14, 1891. He was prominently identified with agricultural affairs, and educational matters. He represented his town in the state legislature in 1869, and originated several new varieties of fruits. His quiet demeanor, added to great practical knowledge, made him many

friends, and we will miss his presence at our reunions which he attended for the past thirty years.

On April 2, 1890, the host of friends of Dr. George Thurber were saddened by the notice of his death, which occurred at his home near Passaic, N. J., after a lingering illness. For nearly a quarter of a century he was editor of the *American Agriculturist*, in which position his vast and varied knowledge of natural science, arts and industries, his keen powers of observation, and rare judgment, made his name known throughout the American Continent, and beyond the seas wherever the English language is spoken. Few men have exerted so powerful and effective an influence on American Agriculture and Pomology as has Dr. Thurber. Most genial in disposition, generous to a fault, liberal minded, and always ready to help those whom he felt needed assistance. To many of us who held a place in his great heart, his loss will always be mourned. He served this Society for many years as a member of your Executive Committee, and when notified of his election as Vice-President for N. J., at the Ocala session, his appreciation of this token of your regard was received with emotion and gratitude; although then upon a sick bed, his great desire was to regain sufficient strength to practically recognize this honor.

The practical lessons to be derived from the lives of these useful men, are manifest in the higher educational progress of our ruralists, the enviable position attained by American Pomology, to which our European brethren concede the front rank, the untold financial benefits to our people, the comforts and pleasures of rural life when knowledge is added to labor, and which brings out the true character of man, and dignifies his pursuit.

The address was received with great applause, and a committee was appointed, to which it was referred and at a later session made the following report:

*Members of the American Pomological Society:*

Your committee appointed to consider and report upon the address of President Berckmans to this society, would say, after a careful consideration of the address, they find it so complete in itself, so full in its recommendations, and so explicit in its

statements, they perceive neither necessity nor propriety in making additional recommendations or suggestions to the matter of so able a document.

C. L. WATROUS.  
GEO. W. CAMPBELL.  
J. E. CUTTER.

Treasurer's Report.

RECEIPTS.		
1889.		
Feb. 8.	Balance from old account, which represents \$5,000 railroad bonds,	\$4,910 83
"	Cash balance from old account.....	496 80
May 1.	Interest on railroad bonds.....	100 00
Nov. 1.	" " " " .....	100 00
1890.		
May 1.	" " " " .....	100 00
Nov. 1.	" " " " .....	100 00
1891.		
May 1.	" " " " .....	100 00
	James A. Harris, Life Member.....	20 00
	W. B. Alwood " " .....	20 00
	W. J. Green " " .....	20 00
	A. E. Menke " " .....	20 00
	Henry H. Goodell " " .....	20 00
	W. S. Devol " " .....	20 00
	Wm. L. Webber " " .....	20 00
	Geo. Wm. Harris " " .....	20 00
	C. W. Minot " " .....	20 00
	E. R. Lake " " .....	20 00
	Dr. Wm. Trelcase " " .....	20 00
	H. M. Utley " " .....	20 00
	L. F. Kinney " " .....	20 00
	A. A. Crozier, to complete Life Mem.	16 00
	C. L. Watrous " " " " .....	16 00
	H. E. VanDeman " " " " .....	16 00
	W. S. Hart " " " " .....	16 00
	Chas. E. Maud " " " " .....	16 00
	Benj. P. Ware " " " " .....	16 00
	J. A. Ream, acct. life membership,	10 00
	124 biennial memberships, at \$4....	496 00
1889.		
Feb. 20.	Sold two catalogues.....	2 00
1889.		
Jan. 22.	Sold two catalogues and copy proceedings.....	4 00
		<hr/>
		\$6,775 63
DISBURSEMENTS.		
1889.		
March 15.	Boston Safe Deposit.....	10 00
" 11.	B. G. Smith's expenses to Ocala....	95 60
April 16.	John Ford & Son, printing.....	5 00
April, '88, to Jan. 3, '89.	P. J. Berckmans, printing, stamps and stationery .....	37 93
May 28.	Henry Mitchell's bill for silver and bronze medals, including engraving and cases.....	\$ 73 30
Nov. 8.	Freight two boxes "proceedings" from Mich.....	6 34
Oct. 23.	A. A. Crozier's salary.....	100 00
" "	Postage on circulars and letters... ..	16 70
	" " 430 copies proceedings .....	55 90
	Printing, expressage, typewriting, Kendall Kittredge, for printing proceedings and catalogues as per agreement.....	38 80
Oct. 18.		647 22
March 27 to Dec. 18.	B. G. Smith, postage, p. cards and stationery, labor on proceedings, expressage and telegrams.....	67 27
1890.		
Feb. 15.	A. A. Crozier, for printing circulars and wrappers, postage and expressage.....	14 70

DISBURSEMENTS.— *Continued.*

1889.			
March 13.	Boston Safe Deposit.....	10	00
1891.			
March 10.	“ “ “ .....	10	00
July 28.	J. Ford & Son, printing.....	7	00
Aug. 3.	P. J. Berckman's bill, printing, stamps, and express charges on package of proceedings .....	66	30
1889 to Sept. 1, '91	B. G. Smith, cartage, expressage, postage stamps and stationery...	55	48
1891.			
Sept. 1.	Balance from old acct., which rep- resents \$5,000 railroad bonds.....	4,910	83
“ “	Cash balance to new account.....	547	26
		<hr/>	<hr/>
		\$6,775	63
1891.			
Sept. 1.	Balance from old acct., which rep- resents \$5,000 railroad bonds.....	\$4,910	83
“ “	Cash balance from old account....	547	26

BENJAMIN G. SMITH,

Treasurer American Pomological Society.

BOSTON, Sept. 1, 1891.

I have examined the foregoing account and find it correct with proper vouchers. I have also examined the bonds of the Chicago, Burlington & Quincy Railroad, amounting to \$5,000, and find them correct.

EDWARD B. WILDER, Auditor.

BOSTON, Sept. 1, 1891.

During the session of the second day the Hon. J. M. Rusk having entered the hall, President Berckmans said: This Society is honored by the presence of the honorable Secretary of Agriculture, and I know, ladies and gentleman, it will be a pleasure to greet him, and if the Secretary will honor us by taking a seat on the rostrum we shall be delighted. The Secretary then being introduced to the Society by President Berckmans, said:

**Remarks by Secretary Rusk.***Mr. President, Ladies and Gentlemen:*

I told my assistant that I would come over here with him with the understanding that I was not to make any remarks. I only came to greet you and

to bid you be of good cheer in the work you are carrying on so successfully. The Department under my charge is doing what it can for all the interests connected with agriculture, and what we want is your coöperation in furthering these interests, of which the branch so ably represented by your Society is certainly one of the most important, and probably one of those that have been most generally neglected. Of course you are aware that our Department is doing what it can with the means at its disposal. If Congress will give us means enough we will try to expend them so as to secure their full value.

As I entered the hall I heard the closing sentences of a paper in regard to diseases of fruit, and I am glad to see that we have some representatives of the Department here who are very capable of explaining the work done by us in that direction, and of telling you what to do in order to prevent injury to your fruits. I thank you for this kind reception, and I will not longer detain your proceedings.

After the close of the session on Friday, in accordance with an invitation from Chief Van Deman, the Society in a body visited the Division of Pomology, Department of Agriculture, where every facility was offered for the inspection of the work being done in this bureau and all were highly pleased and satisfied that all is being done that is possible with the limited means allowed to advance the interest of the great industry which this Division represents. Resolutions adopted bearing upon this subject will be found elsewhere.

The members then proceeded to the Executive Mansion where they were cordially received by President Harrison, and after being shown through the building and grounds, many of them were soon homeward bound, and thus ended a long to be remembered session of the American Pomological Society.

## SCIENTIFIC POMOLOGY.

### The Chemistry of Peach Yellows.

II.

BY ERWIN F. SMITH.

Two years ago, at the Ocala meeting, a paper on this subject was read by title, and published in the proceedings of this Society. Since then, some new light has been shed on the Peach Yellows problem. This, therefore, seems a fitting occasion for supplementing what was written at that time.

Those who are familiar with the question, will remember that some of the earlier analyses, indicated a diminished quantity of  $K_2O$ , and  $P_2O_5$ , in Peach branches diseased by Yellows. It was only a step, albeit, a rather long one, from this fact, or supposed fact, to the conclusion, that a deficiency or absence of these substances in the orchard soil was a leading cause, if not the only cause, of this disease. Following these analyses, and based upon this theory, came a series of feeding experiments, by Dr. Charles A. Goessman, then chemist of the Massachusetts Agricultural College, and now Director of the State Experiment Station, assisted by Professor S. T. Maynard, of the same school. These experiments were repeated, and extended by Professor D. P. Penhallow, at the Houghton Farm Experiment Station, in New York. In both series of experiments the endeavor was to add to the soil the substances supposed to be absent or deficient, particularly  $K_2O$ , and  $P_2O_5$ , thus curing the affected trees, and preventing the further progress of the disease.

The published statements from Amherst and Houghton Farm, agreed substantially, and led the public to believe that the end had been accomplished, and that liberal doses of muriate of potash and super-phosphates, with slight addition of other substances, such as kieserite, supposed to render the muriate more effective, were all that was required to cure Peach Yellows, and to keep the orchards in a healthy condition. These statements were copied widely by the agricultural papers, and received the endorsement of various writers on horticulture, particularly A. S. Fuller, J. H. Hale, and Eli Minch.

These views were vigorously combatted by practical men equally eminent in horticultural science, and the war of words ran high. The horticultural tomahawk was brandished vigorously and woe to luckless wight who fell under its blows. Mr. Minch even went so far as to say, "I deem the man who contends that the Yellows is a contagious disease a dangerous character," while Mr. LaFleur declared with equal emphasis: "The doctrine that Yellows is not contagious is a dangerous one to teach."

Such was, substantially the state of the question when the Peach Yellows investigation was taken up by the Department of Agriculture.

Dr. Goessman began his researches in 1876, and the special treatment of diseased Peach trees in 1878. His analyses with comments were published in *The Transactions of the Massachusetts Horticultural Society* in 1882. He first treated "slightly affected trees with a phosphatic fertilizer in the usual proportion, adding at the same time from three to four pounds of chloride of potassium (muriate of potash) for every tree." Finally he settled upon a mixture of bone super-phosphate, muriate of potash, and sulphate of magnesia, laying special stress on the "specific action" of muriate of potash. Concerning these treatments he remarks, in 1889: "Our own observations have been most encouraging, and satisfactory results are reported from all directions."\*

Professor Penhallow's first paper was published in 1882, in connection with Dr. Goessman's and his experiments at Houghton Farm, subsequently described in two bulletins from that station, were begun the same year and concluded in 1883.

In his later writings he advised 625 lbs per acre of the following mixture:

Kieserite.....	25 lbs
Muriate of potash.....	150
Dissolved bone black.....	450

If marked evidence of the disease was present he recommended an additional 4 lbs of muriate for each affected tree, and said, "If not too far gone two or

\* *The Practical Farmer*, April 20, 1889.

three years will probably complete the cure, but careful treatment will be needed afterwards to prevent return."

Professor S. T. Maynard, who carried on most of the field work at Amherst, recommended in 1884,\* "400 lbs of acid bone phosphate, 150 to 200 lbs of muriate of potash, and 100 lbs of crude sulphate of magnesia," as the mixture which they had found to give the best results. This he said should be applied in the fall or very early in the spring, and worked into the soil around the trees.

Concerning the contagious nature of Yellows, Professor Penhallow wrote in 1884: "In my first report for 1882 I ignore contagion in this disease, and have still no reason for believing in it." In 1884 Professor Maynard also wrote: "While I have no positive proof that the disease is not contagious, I do seriously doubt if *anyone* has *positive* proof that it is."

Dr. Goessman now seems to hold a middle ground, believing that whatever be the cause of Yellows, we can enable Peach trees to resist it by giving them a sufficient quantity of food.

Probably the best way to present this subject succinctly, will be to divide it into two parts, first treating of laboratory work, and then of field work.

#### CHEMICAL ANALYSIS.

When my attention was first called to this theory of Peach Yellows, it struck me that the evidence was rather meager, and not as harmonious as we are accustomed to require for biological work, and the more the problem was studied the more this fact stood out. Very few analyses of the Peach had been made, and these did not fully agree. Additional analyses were made at my request, and the conclusions from three of these are here presented for the first time. Not to be tedious, I shall give a comparative statement, asking your attention only to certain striking discrepancies. Those who are specially interested will find the omitted details elsewhere.

According to the following authorities, Peach branches when diseased by Yellows vary from healthy ones, as follows, omitting minor differences:

TABLE I.—Showing the principal differences between healthy Peach branches and those affected

by Peach Yellows, as determined by five chemists (14 analyses).

AUTHORITY.	DISEASED BRANCHES CONTAIN		
	Lime (CaO).	Potash (K <sub>2</sub> O).	Phosphoric acid (P <sub>2</sub> O <sub>5</sub> ).
Kedzie (1872) . . . . .	Slightly <i>more</i>	Much <i>less</i>	Slightly <i>less</i>
Goessman (1882) . . . . .	Much <i>more</i>	Much <i>less</i>	Considerably <i>less</i>
Conn. Exp. Stat. (1884) . . . . .	About <i>same</i>	Much <i>less</i>	Slightly <i>more</i>
A. E. Knorr (1888) . . . . .	Much <i>less</i>	Much <i>more</i>	Much <i>more</i>
(Greene's orchard) . . . . .			
J. F. Eastwood (1890) . . . . .	Much <i>less</i>	Much <i>more</i>	Slightly <i>less</i>
(Greene's orchard) . . . . .			
J. F. Eastwood (1890) . . . . .	Much <i>less</i>	About <i>same</i>	Much <i>more</i>
(Harper's orchard) . . . . .			
J. F. Eastwood (1890) . . . . .	Much <i>less</i>	Much <i>more</i>	Considerably <i>more</i>
(McDaniell's orchard) . . . . .			

From this comparison it will be seen that the analyses made under direction of the Department of Agriculture (the last four) agree substantially among themselves, but contradict the earlier analyses. In case of the analyses by Professor Kedzie and Dr. Goessman no statement is made as to the exact age, location of parts, and relative proportion of the various parts of the branches taken for analysis, and this renders them practically valueless, because the amount of the various chemical constituents in a tree varies greatly according to the kind of tissue, the age, and the location of the part.

The analyses made by Mr. Knorr show that the diseased twigs contain *less* lime and *more* potash and phosphoric acid than healthy twigs, and the series made by Dr. Eastwood tend to confirm this view, although in one instance he found slightly less P<sub>2</sub>O<sub>5</sub> and in another about the same K<sub>2</sub>O.

The diseased branches collected for Mr. Knorr were the shoots of one season. They had made a comparatively meager growth and were in a less mature state than the corresponding healthy shoots.

The shoots sent to Dr. Eastwood were of one season's growth and those in particular from Mr. Greene's orchard were just as nearly comparable as it is possible to get diseased and healthy growths. The diseased shoots in each case had made a less robust growth and were slightly less mature than the healthy ones, owing to the well-known tendency of diseased branches to continue feeble growths late into the autumn and to develop unusually early in the spring.

These results, reached independently by two competent chemists, upset the old views completely and are exactly what I was led to expect from the

\* Trans. of the N. J. St. Hort. Soc.

well-established physiological law that in the ash of the shoots of land plants lime increases and potash and phosphoric acid diminish in proportion as the parts become well developed and approach maturity. To illustrate, in a given weight of growing Peach twigs, leaves included, there is more lime in June than in April, more in August than in June, and more in October than in August. The reverse of these statements holds good for potash and phosphoric acid, the young and actively growing shoots being gorged with compounds of potassium and phosphorus, which decrease in quantity as growth progresses until they reach an amount normal for the mature growths of the plant in question. The growth under the influence of Peach Yellows appears to be no exception to this rule. The amount of lime increases and the amount of potash and phosphoric acid diminishes in the ash in proportion as the growths approach maturity. They never reach the same robustness or degree of maturity as healthy shoots, and consequently might be expected to contain less lime and more  $K_2O$  and  $P_2O_5$  than healthy shoots of a corresponding age. It would appear from the analyses by the Connecticut Station and from Professor Eastwood's determinations, that diseased shoots contain absolutely less ash than normal shoots, which is also what we should expect.

In conclusion, it may be remarked (1) that there are not yet enough analyses of the peach itself to make comparative studies of the fruit of any value, and (2) that all analyses of this kind are quite open to the criticism that they can rarely be actually comparative, and therefore have only a very moderate value.

I now invite your attention to some field experiments.

## FIELD WORK.

For three years the Department of Agriculture has carried on, in the Peach Yellows region of Maryland and Delaware, a series of experiments using chemical fertilizers. Some of these experiments have followed the lines laid down by Dr. Goessman and Professor Penballow. The entire series includes over forty acres of treated trees, selected from a dozen orchards in two counties, with more than one hundred acres held for comparison. A synopsis of these experiments will be published by the Department of Agriculture, and it

is my purpose here to present only one set, but enough to show that the chemical or starvation theory of Peach Yellows breaks down when put to actual and practical test in the Peach orchards.

For this set of experiments, which I shall designate *The Goessman-Penballow Treatment*, 310 trees were selected in the middle of one of the finest Peach orchards in Delaware. This orchard contains thirty acres. It was planted in 1882, received constant care, grew thriftily, and was practically free from Yellows until 1887. The trees selected for treatment and for control, were of quite uniform growth and appearance. They stood at a uniform distance (20 x 20 ft.) upon level and very uniform soil, consisting of six to nine inches of sandy loam, resting on a porous yellow clay (samples of the soil and subsoil of this orchard were exhibited). The original timber of this farm was a heavy growth of oak, tulip tree, walnut, sassafras, holly and gum. The soil has been in cultivation many years. The wheat product of this farm now averages about thirty bushels per acre with a moderate amount of phosphate, and the corn crop, about sixty bushels. Apple trees on the same farm reach a large size and are productive.

The experimental plats were numbered *A* to *D* and arranged as shown in the following diagram, 100 trees, separating *A B* from *C D*, being used for comparison:

TABLE II.—Showing cases of Peach Yellows by years on treated and untreated plats in orchard of James W. Green, Magnolia, Delaware.

A 60 trees.		Control 100 trees.		C 60 trees.	
Year.	Cases.	Year.	Cases.	Year.	Cases.
1888	1	1888	5	1889	5
1889	2	1889	0	1890	3
1890	2	1890	15	1891	26
1891	12	1891	11		

B 60 trees.		FRUIT PRODUCT.		D 60 trees.	
Year.	Cases.	Year.	Cases.	Year.	Cases.
1887	1	1882	No fruits	1887	3
1888	3	1883		1888	7
		1884			
		1885			
1889	10	1886	Moderate crops	1889	3
1890	12	1887		1890	19
1891	7			1891	23
		1888	Big crop		
		1889	Moderate crop		
		1890	No fruit		
		1891	Moderate crop		

When these treatments began, over 90 per cent. of the trees were healthy, thrifty, and fair to look

upon. There were quite a good many cases of Yellows in the orchard in 1887 and more in 1888, and it was feared that the whole orchard would finally succumb if something were not done. This particular spot in the orchard was selected because the soil appeared to be uniform, and because the trees had made a uniform growth, and were in a great measure free from signs of disease. With the exception of one row of Christiana on the west side, and one row of Old Mixon on the east side, the trees were all of one variety — Crawford's Late. The difference in variety appears to have exerted no influence upon the results. The cases were determined each autumn, and the fertilizers were applied each spring, beginning with the year 1889. In 1889 and 1890 they were harrowed in. In 1891 they were plowed down three to five inches.

The plats were selected in an orchard where there were several hundred cases of Yellows, and in a neighborhood where the disease had been on the increase for several years. When the treatments began absolutely nothing certain could be predicted as to the course of the disease, but the presumption was strong that an excellent location had been selected for testing the virtues of muriate of potash, dissolved bone black, and kieserite.

When the treatment began, as you will see from the diagram, there were four cases on *A*, four on *B*, three on *C*, and ten on *D*, making a total of twenty-one out of 240 on the treated plats. In the plat of 100 trees held for comparison, there were five cases. Exclusive of *D*, which had twice as many cases to start with, the per cent. of cases on the control and on the treated areas, was almost identical. *i. e.*, five per cent. and six per cent.

*A* received the following mixture at the rate of 3½ lbs per tree, or 337 lbs per acre:

Kieserite (50 per cent. MgSO <sub>4</sub> )...	7.5 lbs
Muriate of potash (50 per cent. K <sub>2</sub> O).....	45.0
Dissolved bone black (16 to 18 per cent. sol. and av. P <sub>2</sub> O <sub>5</sub> )...	135.0
Total.....	187.5

In 1889 this was evenly distributed from near the trunk of the tree outward, so as to cover about

two-thirds of the surface of the plat. The second spring three fourths of the surface was covered from the trunk outward. The third spring two-thirds of the surface was covered in the same manner.

*B* received the same mixture as *A*, but double the quantity each year, *i. e.*, 6½ lbs per tree, or about 675 lbs per acre. The first spring this was broadcasted over the whole surface. The next spring it was sowed from the trunk outward over about four-fifths of the surface. The third spring it was sowed in the same manner, but over only about two-thirds of the surface.

*C* received the following mixture:

Kieserite.....	7.5 lbs
Muriate of potash.....	90.0
Dissolved bone black.....	135.0
Total .....	232.5

In other words, the mixture was the same as for *A*, except that the muriate was doubled.

This was put on annually at the rate of 3.87 lbs per tree, or 418 lbs per acre. The first two springs about four-fifths of the surface was covered in the manner already described. The third spring the treated area around each tree was restricted a little, so that only about three-quarters of the whole surface of the plat was covered.

*D* having more cases to start with, was believed to be in greater danger, and was treated more liberally. It received annually 7¾ lbs per tree, or 837 lbs per acre of the following mixture:

Kieserite.....	15 lbs
Muriate of potash.....	180
Dissolved bone black.....	270
Total.....	465

In other words *D* received the same mixture as *B* and double as much muriate of potash; or, to state the matter still differently, *A* received a minimum of muriate, *B* and *C* received *twice* as much; and *D* received *four* times as much.

About three-quarters of the whole surface of *D* was covered the first and third spring, and about nine-tenths the second spring, in the manner already described.

The total quantity of fertilizer used on these four plats during the three years, is as follows:

TABLE III.—Showing kind and amount of fertilizer used.

SUBSTANCE.	WEIGHT IN LBS PER PLAT.			
	A.	B.	C.	D.
Kieserite.....	22.5	45.0	22.5	45.0
Muriate of potash.....	135.0	270.0	270.0	540.0
Dissolved bone black.....	405.0	810.0	405.0	810.0
Total.....	662.5	1125.0	697.5	1395.0
Rate per acre of 108 trees.....	1011.	2025.	1251.	2511.0

At time treatments began the branches lacked several feet of touching those of neighboring trees; at present they touch or nearly touch.

Now for results. In addition to Table II, which states the cases by years, it will be sufficient to give the per cent. of cases which have appeared on the control, and on the treated plats since the first appearance of the disease:

TABLE IV.—Showing per cent. of cases of Peach Yellows before and after three years' treatment (preventive) with the Goessman-Penhallow mixture:

TIME.	PER CENT. OF CASES.					
	Treated Plats.					Control area.
	A	B	C	D	Av'r	
Prior to treatment.....	6.6	6.6	5.0	16.6	8.8	5.0
Since treatment.....	26.6	48.3	56.6	75.0	51.6	56.0
Total.....	33.3	55.0	61.7	91.6	60.4	61.0

Had the trees on the treated plats remained healthy while those on the untreated one contracted the disease, the evidence in favor of the mixture would have been reasonably conclusive, because the experiments were conducted in a region eminently suitable for a test case.

It is apparent that so far from responding to treatment, plats A and B show a large increase of cases while plats C and D actually show a larger per cent. of cases at the end of three years than does the untreated one. Another point, with exception of B, the cases are more numerous the third year than any preceding year. It will also be observed that the three plats now most affected are the very ones which have received most fertilizers, and especially most of the so-called specific, muriate of potash. Whether this is merely acci-

dental, or is really due to excessive fertilization, is a question I do not wish to raise at this time.

The only point I desire to make is that a practical test on a large scale, covering a period of three years, and in one of the best possible localities for such a test, has shown that this mixture is practically worthless as a remedy for Peach Yellows, and has also shown that it has no efficacy even as a preventive.

Had these substances been used only one year, it might have been objected that, being slow to diffuse in the soil, time enough was not allowed for their action, but no such argument can be brought forward to explain the results of a period of years. Neither can it be advanced that the substances have washed away. There has been no surface washing, and it is well known that the soil holds on to potash and phosphoric acid with great tenacity. The disease has increased for three years, *pari passu* with the increase of fertility in the soil.

Not to weary you further with results so purely negative, and in one sense so unsatisfactory, I must conclude this paper, as I did my former one, with expression of the belief that the Goessman-Penhallow method of treatment was founded on an error, and that we are to look for the cause of Peach Yellows and the means of prevention in an entirely different direction. Concerning the now well established contagious nature of this disease, see *Bulletin No. 1*, recently published by the Division of Vegetable Pathology of the U. S. Department of Agriculture.

DISCUSSION.

DR. JOHNSON: I should like to ask the Professor one question or two. Has the Professor ever examined the roots of the diseased trees? Is not a healthy root of a Peach tree the color of a yellowish white, and of a tree that is diseased of a reddish yellow?

DR. SMITH: I have never found any constancy in that matter.

MR. CARY: The question I wish to ask is this: I do not think in Georgia we have the Yellows. We have a disease, but it is not the Yellows. I want to ask this question: Does the Yellows kill the tree which it attacks the first year?

DR. SMITH: It is not likely to. I have sometimes known a tree to be killed in one year, more in two, but a majority not under four, five, or six years.

MR. CARY: Will they bear perfectly for the second or third year?

DR. SMITH: Sometimes part of a tree will bear perfect fruit the second or even the third year. It depends on how seriously it is attacked at the start.

MR. CARY: We have in Georgia a disease called the "Rosette"—it assumes that form, but Mr. Berkman and Colonel Redding both say it is not the Yellows. It is fatal and kills out the trees, but I don't know what it is.

DR. SMITH: It is dangerous, seriously so; quite as much so as the Peach Yellows, but I think different from it. I have studied it carefully for two years.

MR. GARFIELD: I should like to inquire whether the gentleman has found Peach Yellows in New Jersey and Massachusetts.

DR. SMITH: I have been in New Jersey and Massachusetts, and have seen Yellows in both places, and I believe the Yellows occur from one end to the other of both States. I do not think there is a Peach-growing county in either state wholly exempt; and I have seen a great many cases which I consider to be identical with the Michigan Yellows.

MR. ENGLE: Will the Peach take Yellows when worked on the Plum?

DR. SMITH: I began several series of that kind of experiments this year, budding on Plums and Cherries, to determine whether the disease can be transmitted to these plants. It is perhaps too soon to expect results. One thing more with reference to the fertilizers, I did not mean to be understood as condemning in the least the use of these substances for other purposes. The effect on the fruit has been marked. It has been finer, larger, and altogether better. I was talking about the prevention and cure of Yellows and not of the use of these fertilizers for other purposes. There has been more growth and better fruit on the treated blocks. I ought to say a word more with reference to the Plum. I think I misunderstood Mr. Engle's question.

MR. ENGLE: My question was, whether it would prevent Yellows by budding on Plums?

DR. SMITH: I understood the question to be, whether Yellows could be induced in Plums. Three years ago a thousand well-rooted Mariana Plum cuttings were picked out and Peach buds worked upon them. These were divided into three lots and set into three very badly diseased orchards further up the Chesapeake and Delaware peninsula. It will be some years before I can speak definitely as to results.

### On the Fertilization, Crossing and Hybridization of Plants.

BY CHARLES E. BASSEY, PH. D., LINCOLN, NEB.

#### I. FERTILIZATION.

1. *In the lowest plants.*—In the lowest plants in which we observe fertilization, the process is an exceedingly simple one. These plants are all aquatics, and are of small size and very simple structure. As long as the conditions for growth are favorable, they reproduce by a simple process of division: one plant divides itself into two, each new plant divides again, and so this process goes on indefinitely. When, however, the conditions are not so favorable, reproduction takes place by a process of fertilization. This differs in different species, but in general it may be described as follows: Two plants, or parts of plants, detach themselves and swim around in the water freely, with as active a motion as little animals, and, in fact, under the microscope, the non-scientific observer would consider them to be animals. After a time two of these free-swimming plants come together and merge their substance into one another. This, in short, is the whole process of fertilization in the lowest plants. It consists simply of the union of two whole plants or parts of plants. They have fused into one and have lost their previous identity.

2. *What it means.*—Let us now make a little inquiry as to what this simple process of fertilization means. As I have shown, we have here the fusing of two plants into one mass. I have further shown that this takes place when the conditions are not favorable for the ordinary growth of the plant. It is probably a safe conclusion that we have here a simple joining of two individuals for the sake of strength and protection during the hard times which threatened the life of the individual plants. The joined plants—that is, the body produced by

the joining of two plants—is able to live and resist the adverse influences. This, I take it, is the meaning of the process. It is simply a joining of forces for the purpose of enduring the adverse conditions.

3. *What it accomplishes.*—The adverse conditions which would otherwise have destroyed the plants described above, are unable to destroy the result of their union. When the two plants have joined themselves into one, they constitute, in the first place, a much larger mass; this immediately becomes round, and covers itself, with a hard, thick protecting shell. Now, it is well known that the larger the mass the smaller, proportionately, is its exposed surface. The two plants, when united, require less covering than when separated; it is therefore a matter of economy for them to join themselves into one mass, thereby effecting a saving of both material and force. When the rounded mass which has resulted from this union comes again into good conditions, it absorbs water, bursts its shell, and resumes its growth. Soon from it there will be produced two, four, eight plants, and so on. Thus the joining of two plants into one mass has accomplished its purpose, *the saving of the life of the individual, and the perpetuation of the species.*

Now, this is essentially what takes place in all plants in which there is anything like fertilization, whether we consider plants of the simple organization of those which I have described, or those representing the highest forms of vegetation. In every case it consists of a union of two individual masses of living matter. We may then state the general law that *fertilization is the union of two masses of living matter.*

4. *The male organ of higher plants.*—In the flowering plant, as, in fact, is the case with the majority of the plants in the vegetable kingdom, there is a difference between the two cells which unite in fertilization. This difference we indicate when we say that we have the union of male and female. In the simple plant described above there is apparently no difference between the two parts which unite; in other words, there is no sexuality, properly so called. In most plants, however, the two uniting parts differ enough from each other so that we are able to speak of the one as male and the other as

female. Throughout the whole of the flowering plants there is no difficulty in distinguishing the male from the female.

If we take a flower, and open it, we find certain little structures, which have been shown to be modified leaves, and bearing the name of “stamens.” These are commonly denominated the male organs of the flower. If we examine carefully the upper end of the stamens, we find that it consists of a couple of little sacks, usually of a yellow color and filled with a yellowish powder. When the flower is still unopened these sacks are closed; but about the time the flower opens they burst, and the contents are allowed to fall out. If we gather a little of this yellow powder as it falls from the stamen, and examine it under a high power of the microscope, it will be found to consist of a great number of little round balls, very closely resembling the little plants which took part in the fertilization described above, that is, a single pollen cell of a higher plant is much like a whole plant of the simpler kind. Pollen is produced in great quantities; a single stamen will sometimes produce hundreds of pollen cells, and as there are usually a good many stamens in each flower, it is easy to see that these male cells are produced in enormous numbers.

In many cases the pollen, upon falling from the stamen, is carried away by the wind, and in this way it has a wide distribution. In other cases it is carried away by insects; of this, however, I will speak more in detail later.

5. *The female organ of higher plants.* In any ordinary flower we may find, near the center, one or more organs which differ from the stamens described above. They are usually green in color, and at the bottom are more or less swollen, while they taper toward the top. This organ is the pistil or female organ, and botanists have determined that, like the stamen, it is simply a modified leaf. If we cut open the lower, swollen portion of the pistil, we may find a number of small, white, rounded bodies, the ovules which the gardener knows as “young seeds,” and such, in fact, they are. Were we to carefully dissect one of these young seeds under a powerful microscope, we might find that each one contains a single, minute, round mass, reminding us somewhat of a single pollen cell.

This little round mass in the young seed is that which corresponds exactly to the round pollen cell from the stamen, and *these two masses must unite in order that fertilization may be effected.* We thus see that in the fertilization of the flowering plant we have the coming together of two round masses, exactly as in the case of the small plant with which I began this paper. As a consequence of this union of these two cells, male and female, there begins a growth in the interior of the young seed, which finally results in the formation of the embryo plant, which we know is to be found in every seed.

6. *Pollination.*—When the flower is matured—that is, when it is fully opened—it is necessary for the pollen to be carried by the wind, or by insects, or even by other means, from flower to flower. In a few flowers the pollen may fall directly from the stamen upon the top of the pistil, but in the great majority of cases either the wind or the agency of insects is necessary. Here we find one of the beautiful adaptations so common in nature. The flower secretes a little honey or some other enticing sweet, or it produces a pleasant odor, or it may develop a beautiful color which is attractive and showy; or, again, it may produce all these together. Now, these are for the purpose of attracting the insects and causing them to visit the flowers. When we see bees, butterflies, moths, and various other insects flitting from flower to flower, we think only of their search for honey. That is all the insects are thinking of, too, but while they are searching for honey they are, at the same time, engaged in carrying pollen from one flower to another. As the insect plunges into a flower, in its frantic search for honey, it brushes severely against the stamens and covers itself with the dusty pollen. As soon as it has satisfied itself with the sweets of that flower it flies away to the next, where a part of the pollen which covers its body is rubbed off upon the top of the pistil, and so it goes on from flower to flower. It becomes dusty with the pollen of one, and some of this pollen is then rubbed off upon the pistil of the next one. In this way pollen is carried from flower to flower in the fields, and from flower to flower in the gardens and the orchards. Very few of the plants which the horticulturist has to deal with are fertilized in any other

way than through the agency of insects. Our Apples, Cherries, Plums, and, to a large extent, our small fruits, are pollinated through insect agency. This fact must be borne in mind in all our attempts at artificial fertilization or pollination. The insects are at work early and late, and, in our attempts at artificial fertilization, if we do not take into account the activity of insects, we will meet with serious difficulties.

7. *Fertilization proper.*—The carrying of the pollen from flower to flower is, strictly speaking, not fertilization, although I have used the word as if it had that meaning. Such carrying of pollen is merely “pollination.” After the pollen has fallen upon the top of the pistil, it begins a kind of growth into a slender thread, which penetrates the pistil, and finally comes into that part which contains the young seeds. In other words, the pollen cell (the male cell) grows in such a way as to bring itself into contact with the young seeds (female organs). When the pollen cell reaches the young seed, it joins its substance with that of the female cell. This is fertilization in the flowering plant, and we see that it does not differ in any essential respect from that which takes place in the small plant first described.

8. *Recapitulation.*—When the blossom opens it has within it some honey or something attractive to insects. The stamens stand around the pistil, but not touching it. Frequently the pistil is much longer than the stamens. In many cases it is impossible for the pollen to fall from the stamens upon the end of the pistil. Now, attracted by the honey, the odor, or the color, or by all of them, insects come to the flower, and bring about its pollination. This is followed by the growth of the pollen, resulting in the real fertilization. This fertilization results in the formation of a new plant: first, as a germ in the seed, and later, when the seed germinates, in the growth of the new tree. It is easy to see from the foregoing that every new tree must partake of the characters of its two parents. If it happens that the pollen comes from a tree with, we will say, sour fruit, and is deposited upon the pistil of the flower of a sweet fruited tree, the result must be an offspring which partakes of the characters of both. There is absolutely no essential difference between the process of fertiliza-

tion and reproduction as it occurs in animals and plants. We are quite familiar with the fact that in our farm animals the offspring partakes of the characters of both its parents. We are well aware of the fact that the offspring of mixed blood will be mixed, while the offspring of pure blood will be true to the characters of the breed. Now, it is exactly so in the vegetable kingdom, but unfortunately, in ordinary horticulture we have given little attention to the matter. We scarcely realize that there is any such thing as a good pedigree in our horticultural labors.

#### II. CROSSING AND HYBRIDIZATION.

These two words have been used in discussions as to the breeding of animals, and, while they are at most identical, they are usually used with a slightly different meaning. As commonly used "crossing" is the union of two animals or plants of the same kind, but of different breeds. In other words, if the two parents belong to the same species, and differ only in those minor points which pertain to breeds or varieties we use the term crossing, while if the parents belong to different species the term "hybridization" is used. Now, let us consider these words and the acts to which they are applied. If we have two breeds which are distinct, we have two sets of plants or animals which are alike in very many things, but which differ from one another in certain rather minor characters. A good illustration of this kind is to be found in the ordinary varieties of our Apples and Grapes, where such things as size, color, taste, and a few others are the only differences. Yet these differences, slight as they are in many cases, are real differences. We cannot say, for example, that the Baldwin and Jonathan Apples are alike. The differences between these two kinds are absolute, so far as they go. So, too, we may take the Shorthorn cattle and the Jerseys. If we were to enumerate accurately all the resemblances between these two breeds, and then all the differences, we should find that, as a matter of fact, there are only a few points in which they differ. Still, here again such differences as do exist are real differences, positive differences. If, however, instead of comparing two breeds with one another, we compare two species, then we find that the differences are greater, but they are no more absolute than the

differences which existed between the two breeds. If we compare a common Apple with a Crab Apple, we see at once that the differences are greater than between the Baldwins and Jonathans. So, too, if we compare horses with cattle the differences are there much greater than between varieties or breeds of cattle on one hand, or varieties or breeds of horses on the other hand. The point to which I wish to direct your attention is this, that when we speak of different breeds or varieties we refer to things which are somewhat different, but not very much. If, however, we speak of different species, we usually refer to plants or animals which differ more from one another. Breeds or varieties differ less; species differ more. It is, after all, only a question of degree, and it has happened over and over again that some man has considered two plants to be varieties only, while another considered them to be distinct species. And so it happened in the animal kingdom. Many and many a time naturalists have disagreed as to whether two animals should be regarded as species or as varieties.

From this it is easy to see that the old distinction between crossing and hybridization is one that has nothing like as much importance as at first sight it would seem to have. If we conclude, as I think we may, that varieties differ from species only in degree, then crossing of varieties differs from hybridization of species also only in degree. Furthermore, it is well known that no two animals are ever exactly alike. No two plants are ever exactly alike, even where they belong to the same variety. There is such a thing as individuality throughout the animal and vegetable kingdoms. Just as we find that no two children of the same household are ever exactly alike, so we find that no two plants, grown from the seed taken even from the same seed-pod, are alike. There are slight variations to be noticed in the plants of any variety or breed. When the pollen is taken from the flowers of one plant and carried to those of another, there is a slight crossing of kinds. It is not as great as when the pollen is taken from a flower of one variety to that of another, nor by any means as great as when it is taken from the flowers of one species to those of another, but all these differ only in degree.

1. *Results of crossings.*—In order that I need not use both of these words, “crossing” and “hybridization,” I will hereafter use the first only, with the understanding that it is to be applied to both kinds of fertilization, that between varieties as well as that between species.

Whenever crossing takes place, the offspring will partake of the characters of both parents. This follows as a necessity from the nature of the act. We have seen that in any fertilization there is a union of two plants, or two parts of plants, and in crossing the male organ belongs to one variety or species, while the female organ belongs to another. When these two organs are joined, the result is a union of the characters of the two varieties or species. In this way the offspring must partake of the nature and characteristics of its parents. It is impossible for it to be otherwise. Now, it has been noticed in the breeding of animals, and to a certain extent in the breeding of plants, that the two parents do not always exert the same influence upon the offspring. In the case of many natural crosses which take place between the wild species of plants, noticeably in the Verbenas, the Oaks, the Willows, and others, we have been able to detect this difference with such certainty that it is not at all a difficult thing to tell whether, in the case of any particular cross, the pollen came from this or that species. It is well known that the same rule holds in the animal kingdom. The cross between the horse and the ass is known to differ very greatly, according as the one or the other species furnishes the male element. The florists have made many valuable observations upon this matter of the crossing of species and varieties, and have given us many facts by which the orchardists and cultivators of small fruits might well profit.

2. *How is crossing accomplished!*—I now come to the practical portion of my paper. In nature, crossing is accomplished largely through the agency of insects, but when we bring this matter within the domain of horticulture, we cannot afford to depend upon the wandering insects for giving us the cross which is desired. The time is coming when the grower of fruits will as carefully select the parents for his crosses as the grower of fine stock now does. Already the florist has gone into the business of the artificial

bringing about of crosses between species or varieties, for the purpose of obtaining desirable forms, and he is able to breed new varieties with as much certainty as the skillful breeder of animals. The grower of plants, however, has one advantage over the grower of animals. He need not pen up his plants, he need not grow them in different green-houses or in different fields. In the case of plants grown under glass, all he has to do to bring about a desirable cross is to carry upon a hair brush the fresh pollen from the flowers of one variety to those of the other. If, however, the operation is to be performed out of doors he must watch carefully and see that insects do not visit the flowers with which he proposes to work, and then, when both are matured, that is, when they have reached the stage in which they are perfectly open, he must carefully carry the pollen from flower to flower, as in the previous case. Now, to avoid the officious intermeddling of insects, all that he has to do is to surround the particular flowers which he has set apart for his experiments, with a netting fine enough to exclude the insects. As the pollen of our fruit trees is always yellowish, there is no difficulty in handling it upon the black point of a hair pencil. The pencil should be slightly moistened, so that the pollen will adhere to it, and then, when loaded with pollen from one flower, it can be gently pushed over the ends of the pistils of the next one. In order to be sure that the stamens of the flower to which the pollen is brought do not themselves drop pollen to the pistils, it is well to remove them at once by clipping them out by means of a delicate pair of seissors.

This operation is not a difficult one for any person to perform. It simply requires care in watching for the exact time of the maturity of the flower, and then a very little skill will enable one to place the pollen upon the ends of the pistils. The maturity of the flower may be told in the following way. The stamens are matured when they are dropping the pollen. This can be seen by any one at a glance. The pistils are matured when the top (technically called the “stigma”) has a moist appearance. This moisture is what makes the pollen adhere, so that any attempt at crossing before the maturity of the pistil would be ineffectual.

3. *Suggestions for experiments.*—There can be no question that horticulture will be greatly benefited when horticulturists begin to breed varieties scientifically. At present we simply select those fortunate variations which make their appearance in the hap hazard breeding which results from the indiscriminate carrying of pollen by insects. It is a well known fact that the seeds of apples taken from any particular tree will produce all sorts of variations. Now, the secret of this is that the flowers which produce these seeds had been crossed with pollen taken, perhaps, from a dozen different kinds of trees. Furthermore, all our Apple trees are now of mixed blood, and we know very well what that means, especially in the animal kingdom. Now, I should like to suggest that a few careful experiments should be made by members of this Society. Suppose that you select two apple trees which are not far from one another, and which for convenience, are not very large. It will be best to select trees of marked varieties. If they are trees which have characters about them which would indicate that they were likely to reproduce their kind, and their characters, it would be still better. Now, when these trees are just about ready to blossom cover each one with mosquito netting which has been carefully sewed together so as not to leave any opening to admit insects. When the stamens on the one tree are just bursting open so as to shed their pollen, take a soft camel's hair brush, wet it slightly, and carry some of the pollen from certain flowers on the first tree to certain flowers on the second tree. Then with another brush, (or, after thoroughly cleaning, the same one) carry pollen from the second tree to certain flowers on the first tree. If you remove the stamens from the fertilized flowers it will add much to the certainty of the results. Carefully mark the flowers which you have experimented upon; keep the trees covered with the mosquito netting until the flowers wither, and then remove it. Carefully note the growth of the Apples during the season. Be exceedingly careful not to allow the labels to be misplaced. Notice whether the flesh of the Apple has been changed in any way, and when the fruits are finally cut up, save the seeds for planting. When these seeds have grown, cions should be taken from the young seedlings and placed upon

old trees, so as to bring them into bearing at the earliest possible period. It will be very interesting to compare the results of such crossing. If the parent tree possessed marked characters, we should expect to find these reproduced in a modified way in the offspring.

In a similar way crosses may be effected between varieties of grapes, and it is still easier to secure early returns from the experiments. Cherries, Plums, and even the ordinary small garden fruits may be experimented upon in the same way. I have no doubt whatever that if the members of this Society were to plan a series of experiments, each man confining himself to a single experiment, that within the next ten years we should have some surprising results.

I know very well that a part of this paper will seem quite theoretical to some of the more practical members of the Society, but I wish to emphasize this fact, that it is by the application of exactly these principles which I have been expounding that the breeders of animals have been able to reach the results with which we are so well acquainted. It still seems to us in horticulture rather a theoretical thing when we talk of crossing and breeding in order to produce new and desirable species, but I must insist upon it that that which has proven of such great value in the animal kingdom, will in like manner prove of great value in the vegetable kingdom.

The horticulturist of the future, and of the near future, too, will be a breeder of plants, and he will be able, by judicious crossing, by intelligent working for a particular form, to control the results of his breeding.

MR. BRACKETT: There is one point in that paper upon which I wish to say a word, and that is in regard to the use of the mosquito netting. I do not think it is sufficient to exclude all pollen or small insects from the blossom during the process of fertilization. We use, in our State, paper sacks or fine muslin. After the sacks have remained on for a couple of weeks, we take them off and put on the mosquito netting, which gives plenty of air and light. This netting is left on until fall, when we gather the fruit and take the seeds for planting. The label shows what it is crossed with. But here is a question upon the effect of

cross-fertilization. Here are specimens grown (excluding the fruit) outside of the netting, showing the average size. You will observe that all in the netting are much larger than those grown outside and not crossed. Now, whether it was the effect of the netting or paper sacks protecting it in the first starting of the fruit or the effect of pollination, I cannot say; we select the strongest and best blossom and take off all the others, and that may have some effect in producing these Apples much larger than they otherwise would be.

### Recent Advances in Dealing with Insects Affecting Fruits.

BY C. V. RILEY.

(Partly reported stenographically, partly read from MSS.)

*Ladies and Gentlemen—Members of the American Pomological Society:*

As is so often the case, I find that my Departmental duties have prevented any carefully prepared paper on the subject for which I am booked, and at the last moment I shall have to trust to your kind indulgence.

There is so much to be said about the various insects which affect our pomological interests that almost any one alone of the prominent species would require an ordinary essay. I have found in the past, however, that the more informal the remarks, the more likely they are to draw out discussion and consideration, and thus to interest and instruct. I shall therefore adopt this plan, and under a series of headings make such remarks as I deem may be of interest or advantage to you. In asking the worthy head of the Pomological Division of the Department of Agriculture last night whether he had any subjects to suggest or any inquiries in reference to insects affecting fruits, I found that his mind was still concerned about some of the old-time pests, and that he needed light yet on such a trite subject as the Plum Curculio (*Conotrachelus nenuphar*). Assuming that others are still in the same frame of mind, it may be well to say a few words on the subject, and to save time, so far as the transformations and habits of the insect are concerned, I have brought with me an

old diagram that I used in my lectures in the West twenty-five years ago, and which will answer the purpose as well now as then.

#### NOTES ON THE PLUM CURCULIO.

To understand some of the later efforts that have been made to destroy this insect in a wholesale manner, it becomes necessary to emphasize some of the prominent traits in its life history. This has been definitely known ever since, by a series of experiments during the years 1869 and 1870. I established the fact that there was but one generation annually. The Beetles hibernate in sheltered situations, particularly under leaves and under bark, in the woods near stone fruit orchards. They issue from their hibernating quarters and are active as soon as, and even before, the buds put out in the spring. They feed, both male and female, on the tender foliage for some time before the females have a chance to oviposit in the young fruit, and during this period, when the nights are cool, they have a habit of hiding under any shelter that may be within reach, particularly under anything that may be lying on the ground within the orchard, and in the early morning, in such situations, they are somewhat torpid and sluggish. This early period of the year is, therefore, an advantageous one in dealing with the insect, as many may be killed by an early application of the arsenites or by trapping them under chips laid around the base of the tree, and this chip-trap process is most satisfactory where the base of the tree is kept clean and free from weeds and the ground raked. The jarring process, later in the season, is based on the habit of the insect to "play 'possum" and fall from the tree by a sudden jar. I need waste no time on this particular process further than to say that where other measures have not been taken, or even where they have, it is still one of the most satisfactory ways of securing an uninjured crop of fruit. The arsenical treatment, which has been so much experimented with of late years, is based on the habit of both sexes to feed, especially in the early season, and secondly on the habit of the female of gnawing with her jaws a crescent mark in order to form a deadened flap around the egg which she has previously thrust just under the skin. Whether in feeding, in making a hole for the egg, or in form-

ing this little crescent-shaped flap, the amount of the surface of the fruit taken is very slight, and a survey of the experiments with the arsenites for the Curculio will, I think, substantially bear out the position which I took in an address before the Mississippi Valley Horticultural Society, at New Orleans in 1885, where I indicated its possible value but took the ground that it would never be as effectual against this insect as against the Codling Moth. The experiments recorded in a paper read at the last meeting of the Society, and which you have done me the honor to publish, bear out this position, as do those that have been made during the intervening time. One thing to be considered in the use of the arsenites against this insect, is the effect of these mineral poisons on the different stone fruit trees. There has been a good deal of conflicting experience in reference to the Peach, particularly, and this conflicting experience is, without much doubt, to be explained by the varying qualities of the poisons themselves, by the methods of application, and to some extent by atmospheric conditions and the pathologic conditions of the trees treated. Dr. C. M. Weed's experiments while he was at the Ohio Experiment Station are, on the whole, the most satisfactory on this point. In comparative tests of spraying and jarring he found a slight advantage in favor of spraying. The experiments of Mr. Gillette conflict somewhat with those of Dr. Weed on this point, and it may be safely asserted to-day, so far as the experience of the last few years justifies the opinion, that spraying against the plum curculio is only partially successful, and the same may be said of other rhynchophorous or Snout-bearing Beetles which injuriously affect fruit, viz., the Quince Curculio, the Apple or Four-humped Curculio, and the Plum Gongers.

#### THE ARSENITES IN THE ORCHARD.

The experiments which have been made at a few of our experiment stations which have had sufficiently thorough and competent entomologists, have thrown a good deal of light on the comparative value of the different arsenical mixtures as insecticides, and as to the relative injury which they do to the foliage of different trees, and this has mostly been done since the time of your last meeting. The

testimony of several experimenters would indicate that the peach is more susceptible to the influence of London Purple than to Paris Green, and the experiments of Professor Bailey of Cornell, and Professor Cook of Michigan, would indicate that there is less danger of injury when the leaves are young than when old leaves are sprayed. The injury, as Mr. Bailey points out, is more apparent later in the season than earlier because of the cessation of growth. The cause of the injury in the London Purple is doubtless the soluble arsenic of which there is ordinarily a considerable percentage, Professor Bailey found that when Paris Green was heavily sprayed at the rate of one pound to 300 gallons of water, it did not injure the foliage, but perhaps the most valuable results obtained are those obtained by Professor Gillette, to the effect that when London Purple is used with a standard Bordeaux mixture in the proportion of one pound to fifty gallons, it is entirely harmless to the Peach and Plum. His conclusions are summed up as follows, and I shall pass each one without comment where my own experience has led to the same or similar conclusions.

1. The oldest leaves are most susceptible to injury from arsenical solutions. They often turn yellow and drop without showing the burned, spotted appearance.

[This is not true in all cases, and much will depend on the kind of tree. In my own writings on the subjects I have always urged a minimum quantity of spray and as far as possible its application to the under side of the leaves. Mr. C. W. Woodworth, in some experiments at the Arkansas Station, drew the conclusion that greater injury was done when the spraying was on the under side of the leaves, but this is probably more apparent than real, by virtue of the ease with which it is washed off the upper surface, and the advantage of under spraying in all other respects, both as to the ease of minimum and even attachment of the particles of spray and protection from heavy washing rains, are so great that I still strongly recommend this method.

In plants which are easily injured by spraying, the concurrence of experience is that Paris Green is the safer poison, and it is also, I believe, the con-

sensus of opinion that the application is less liable to injure the leaves when they are young than later in the season].

2. Dews and probably direct sunlight increase the injuries done by the arsenites to foliage.

3. Leaves kept perfectly dry can hardly be injured by the arsenites even when they are applied very abundantly.

4. Applications made in the heat of the day and in bright sunlight do not injure the foliage more than when applied in the cool of the day.

[This I think should be somewhat qualified, as the result will depend on the intensity of the heat].

5. The only effect of a heavy rain or dashing shower following an application of one of the arsenites is to lessen the injury to the foliage.

[This is less true of London Purple than it is of Paris Green, as the influence of the former after a shower is not lessened to the same degree as that of the latter].

6. Leaves suffering from a fungus disease are more susceptible to injury than are healthy leaves.

7. When freshly mixed and applied, London Purple is most, and white arsenic is least, injurious to foliage.

8. White arsenic in solution should not be used upon foliage without first adding lime, Bordeaux mixture, or some other substance to prevent its injurious effects upon the foliage.

9. White arsenic, if allowed to stand many days in water before being applied, will do far greater harm to foliage than if applied as soon as mixed.

10. Lime added to London Purple or Paris Green in water greatly lessens the injury that these poisons would otherwise do to the foliage.

11. Lime added to a mixture of white arsenic in water will greatly increase the injury. If the arsenic is all in solution, the lime will then lessen the injury, as in the case of London Purple or Paris Green.

12. London Purple can be used at least eight or ten times as strong without injury to foliage if applied in common Bordeaux mixture instead of in water.

13. The arsenites cannot by any ordinary method be successfully mixed in a kerosene emulsion.

14. The arsenites mix readily in resin compounds and do not seem to be more injurious to foliage than as ordinarily applied in water.

15. The arsenites in strong soapy mixtures do considerably more harm to foliage than when applied in water only.

16. The arsenites mix readily in carbonate of copper solution and do not seem to do more harm than when applied in water only.

17. London Purple in sulphate of copper solution does vastly more harm than when applied in water only.

#### INSECTICIDES AND FUNGICIDES.

A good many experiments have been conducted with a view of combining the substances which are known to have both insecticide and fungicide qualities. The idea has occurred to several different parties and a number of them have put it in practice, for it is very alluring. In looking over the results of these experiments I cannot say that there has been any great gain to economic Mycology. While the results have been variable it would seem that, as a whole, the combination of an insecticide does not add to the efficacy of a fungicide, but on the contrary frequently detracts from it. The reverse of this, however, does not hold true, and experiments have proved that even where the Bordeaux mixture, combined with the arsenites, does not act as effectually as a fungicide, yet it is decidedly beneficial as an insecticide in permitting us to use the arsenites much stronger with impunity. While this is true, so far as the Bordeaux mixture is concerned, it does not seem to be true with regard to some of the other fungicides, since Professor Gillette found, as we have just seen, that London Purple in sulphate of copper solution was more injurious than when applied in water only. In Professor Maynard's experiments, in which Paris Green in sulphate of copper solution and also in Bordeaux mixture was applied to the Plum trees at the rate of one pound of Paris Green to 500 gallons of the copper solution, the trees were so injured that definite results could not be determined as to the effect of the application on the *Curculio*, but the trees that were treated with Bordeaux mixture and Paris Green, at the rate of one pound of the latter to 200 gallons of the former,

matured a very large crop of Plums, while other trees not treated lost their fruit from the attack of the Curculio. He also found that Black Knot was decidedly less upon the trees treated than upon the untreated trees. In other words, the general experience is that the arsenites are made safer for Plum and Peach trees and are equally effective as insecticides, when mixed with the Bordeaux mixture, *i. e.*, mixtures of sulphate of copper, lime and Paris Green or London Purple. In the case of the Apple some of the combinations seem to have retained their insecticide property so far as the Codling Moth is concerned, but to have lost all effect on the Apple Scab. In fact it would seem that the partial injury done by the arsenites rather tends to spread and encourage the fungus. However, the subject is still in its infancy, and valuable results may yet be expected.

#### THE GAS TREATMENT.

While the orange growers of California, as a result of the experiments carried on by the Department of Agriculture between the years 1880 and 1883, obtained perfectly satisfactory remedies against their worst scale insects, as well as against the Orange Rust-mite, in the proper use of kerosene emulsion and sulphur, the orange growers of southern California have had tougher insects to deal with, and the kerosene and resin washes, though quite satisfactory if properly used, are not as satisfactory in that dry climate as in more humid Florida, while some insects, like the Red Scale, need a different treatment. The treatment of trees with hydrocyanic acid gas was, as a consequence, made a specialty, as giving great promise, and has been brought to a most satisfactory condition through the efforts of Mr. D. W. Coquillett, an agent of the Division of Entomology. Several extensive orange growers have materially aided in the work, and a number of mechanical contrivances have been perfected for covering the trees, and some of them have been patented. The most interesting practical point that has been brought out since the Society last met is, that the trees are less liable to injury when fumigated at night or in a darkened tent, than when operated on in the glare of the sun, while none of the efficacy of the gas against the insects is lost. This fact is due to the decomposition of the hydrocyanic acid gas by

the rays of the sun, forming other gases which are more injurious to the trees and less injurious to the insects. The process as now used is simple. It is, to place one part of dry or undissolved cyanide of potassium in one part of sulphuric acid and two parts of water. After the tree is properly covered with a tent, the dry cyanide is placed in a generator which is made of lead in the form of an ordinary bucket and placed near the base of the tree. The proper quantity of cold water is then added, and finally the acid, a barley sack being thrown over the top of the bucket, when the operator withdraws and a quantity of earth is thrown on the lower edge of the tent to prevent the escape of the gas. After fifteen minutes the tent may be removed, and the work is done. The amount of the ingredients used on an ordinary orange or lime tree, say fourteen feet in height by ten feet in diameter, is five and one half ounces of cyanide, eleven ounces of water, and five and one half fluid ounces of sulphuric acid. In other words, the proportions are one ounce by weight of the cyanide to one fluid ounce of the acid and two fluid ounces of water, and the cost of the materials will be less than twenty five cents for a tree of the size indicated. While eastern fruit growers have not yet employed it, I call attention to the method because it will doubtless prove equally valuable and desirable in Florida, and also in other parts of the country wherever large orchards are affected injuriously by any surface feeding insect. In these remarks it is unnecessary to go into details as to the construction of the tents, which have been fully illustrated and described in official documents.

It is true that a patent has, within the year, been granted to certain parties for this gas treatment, but I have no hesitation in recommending the members of the Society to use it if they think it will pay them to do so, without reference to the patent, because the facts, which, as Entomologist of the Department, I have been much interested in, conclusively show that the process resulted from the efforts of Mr. Coquillett, has been given to the public, and is public property. I consider that the patentees cannot maintain their claim before the courts, and as I have already discussed this question of Government work and the Patent Office in a paper read before the meeting of

the Association of Economic Entomologists, last month, nothing further upon that subject need be said here.

RESIN WASHES.

The use of these and their value against scale-insects has been fully established by extensive experiments and experience in California. They are also coming into more general use in other parts of the country. In the application of these resin washes a fine spray is not so essential as in the case of the kerosene emulsion, because the object is not simply to wet the tree but to thoroughly coat it over, which can best be accomplished by a rather coarse spray which can be thrown upon the tree with considerable force. The resin wash affects different insects somewhat differently. The San Jose Scale (*Aspidiotus perniciosus*) requires a stronger wash than does the Red Scale (*Aspidiotus aurantii*). For the latter the best formula has been found to be:

Resin.....	18 lbs
Caustic soda (70 per ct. strength),	5
Fish oil.....	2½ pts.
Water to make.....	100 gals.

For the San José scale thirty pounds resin, four pounds caustic soda and four and one-half pints fish oil are used for each one hundred gallons of the wash. The former wash may be applied at any time during the growing season; the latter should be applied only during the winter when the plant is dormant; applied during the growing season it will cause the loss of foliage and fruit.

"The necessary ingredients are placed in a kettle and a sufficient quantity of cold water added to cover them; they are then boiled until dissolved, being occasionally stirred in the meantime, and after the materials are dissolved the boiling should be continued for about an hour, and a considerable degree of heat should be employed so as to keep the preparation in a brisk state of ebullition, cold water being added in small quantities whenever there are indications of the preparation boiling over. Too much cold water, however, should not be added at one time, or the boiling process will be arrested and thereby delayed, but by a little practice the operator will learn how much water to add so as to keep the preparation boiling actively.

Stirring the preparation is quite unnecessary during this stage of the work. When boiled sufficiently it will assimilate perfectly with water, and should then be diluted with the proper quantity of cold water, adding it slowly at first and stirring occasionally during the process. The undiluted preparation is pale yellowish in color, but by the addition of water it becomes a very dark brown. Before being sprayed on the trees it should be strained through a fine wire sieve, or through a piece of Swiss muslin, and this is usually accomplished when pouring the liquid into the spraying tank, by means of a strainer placed over the opening through which the preparation is introduced into the tank.

"The preparing of this compound will be greatly accelerated if the resin and caustic soda are first pulverized before being placed in the boiler, but this is quite a difficult task to perform. Both of these substances are put up in large cakes for the wholesale trade, the resin being in wooden barrels, each barrel containing a single cake weighing about 375 pounds, while the caustic soda is put up in iron drums containing a single cake each, weighing about 800 pounds. The soda is the most difficult to dissolve, but this could doubtless be obviated by first dissolving it in cold water and then using the solution as required."—(*Circular No. 1*, Division of Entomology.)

THE FLUTED SCALE (*Icerya purchasi* Mask).

No event that has happened since the last meeting of the Society is more striking than the extermination of this most destructive insect to the orange growers of Southern California. It is an old story now, but those of you who do not live in California can scarcely realize that within two and a half years this Fluted Scale, which hung over leaf and branch and trunk of all citrus and many other kinds of fruit trees and shrubs in Southern California, like a blight and plague, has been so effectually swept away that it is difficult to find any specimens except where they are being artificially and very carefully reared for the definite purpose of keeping alive a certain number of the little Australian Lady-bird, *Fedalia cardinalis*, which was imported for this purpose and which has so effectually done its work. In the language of Assistant Secretary Willits, it seems almost like an entomolo-

gical romance. You are all of you familiar with the facts that have been published in official documents and elsewhere. Mr. W. F. Channing, of Pasadena, Cal., the son of the eminent Unitarian divine, has recently been quoted as follows:

"We owe to the Agricultural Department the rescue of our Orange culture by the importation of the Australian Lady-bug, *Vedalia cardinalis*.

"The white scale were encrusting our Orange trees with a hideous leprosy. They spread with wonderful rapidity, and would have made Citrus growth on the whole North American continent impossible within a few years. It took the *Vedalia*, where introduced, only a few weeks absolutely to clean out the white scale. The deliverance was more like a miracle than anything I have ever seen. In the spring of 1889 I had abandoned my young Washington Navel Orange trees as irrecoverable. Those same trees bore from two to three boxes of Oranges apiece at the end of the season (or winter and spring of 1890). The consequence of the deliverance is that many hundreds of thousands of Orange trees (Navel almost exclusively) have been set out in Southern California this last spring."

I repeat what I stated in my annual report two years ago.

"We may hardly hope, however, that the last chapter in the story is written. On the contrary, it is more than probable, and in fact we strongly anticipate, that the *Icerya* will partially recuperate; that the *Vedalia* will, after its first victorious spread, gradually decrease for lack of food, and that the remnants of the Fluted Scale will in the interim multiply and spread again. This contest between the plant feeder and its deadliest enemy will go on with alternate fluctuations in the supremacy of either, varying from year to year according to locality or conditions; but there is no reason to doubt that the *Vedalia* will continue substantially victorious, and that the power for serious harm, such as the *Icerya* has done in the past, has been forever destroyed. We have learned, also, that it will always be easy to secure new colonizations of the *Vedalia*, where such may prove necessary, or even new importations, should these become desirable."

In other words the victory over this Scale is complete and will practically remain so, and the

history of the introduction of this pest, its spread for upward of twenty years, and the discouragement which resulted; the numerous experiments which were made to overcome the insect, and its final reduction to unimportant numbers by means of an apparently insignificant little beetle imported for the purpose from Australia, will always remain one of the most interesting stories in the records of practical entomology.

The history of *Icerya purchasi*, which I have thus briefly alluded to, has made everything pertaining to insects of the same genus interesting, and during the past year no less than four different species have come to my knowledge or have been sent from different parts of the world for consideration and identification, in most cases the parties sending them being fearful that it was the genuine Fluted Scale (*Icerya purchasi*). They have all been considered in *Insect Life*, the periodical bulletin of the Division of Entomology. One of them occurs chiefly on the rose and may be known as the Rose *Icerya* (*Icerya rosea*). It occurs in Key West, Fla., but seems to be extremely limited in its range, though found on the Sugar Apple, Lime and Lemon. The second is from Alexandria, Egypt, and is known as *Icerya aegyptiacum*. It was first noticed on the Banyan tree and has spread very rapidly and infested many other plants. Another species (*Icerya montserratensis*), occurs on the island of Montserrat, in the West Indies, infesting a species of *Chrysophyllum* known to the inhabitants as Galba or Galaba tree. It is said to occur also on the Fig and Cypress trees. The fourth, which has been named *Icerya palmeri* or Palmer's *Icerya*, occurs on the Grape vine in the province of Sonora, New Mexico. It was found by Dr. Edward Palmer in 1887, but only upon one variety of the vine, namely, the Muscat of Alexandria. The interest attaching to this species lies in the fact that there is great danger of their being accidentally brought over from the regions where they now occur to other parts of the world or to this country, so that the practical lesson to be learned is that our Florida fruit growers should take all possible care to quarantine against plants from the West Indies until they are examined, and the people of Texas and California should similarly guard against the introduction of the infested plants from Mexico.

The result of the introduction of *Vedalia* and its successful operation in California, have induced me to try to repeat the experiment in other countries, especially in connection with these new species of *Icerya*. The efforts made are summed up in an item in the last number of *Insect Life*, Vol. III. The efforts to send the little Lady-bird to South Africa so far, on account of the great length of the journey, whether direct from Australia or New Zealand or from this country, have hitherto proved unsuccessful, but the experiments will be repeated by adopting different methods, especially by endeavoring to keep the insects torpid by shipping them in refrigerators. I have also endeavored to send some from California back to New Zealand, for, strange as it may seem, the *Icerya* has almost completely disappeared from New Zealand so that the *Vedalia* can now scarcely be found, as no effort has been made to artificially preserve the species. The efforts so far, however, have been unsuccessful, chiefly through the fault of the New Zealand Customs officials, the box having been opened and carelessly retied. The shipments from California to the Sandwich Islands were, however, successful, and the results there were just as rapid and satisfactory as they were in California. The last attempts made were to send *Vedalia* to Egypt, where the Egyptian species already referred to threatens to become an eleventh plague. The possibility of sending it successfully to Egypt is assured, though the first attempt failed.

#### NEW INSECT PESTS.

It is a common remark of members of this Society, as well as of other horticultural societies, the meetings of which I have attended, that their insect enemies are on the increase. In one sense this is undoubtedly true, *i. e.*, the number of insects affecting our fruits as well as our other crops constantly grow as our knowledge of them becomes more and more complete; but I question whether more injury is done to-day to our fruits than was done fifty years or a hundred years ago. In fact it is patent that with the advances made of late years in our methods of warfare against these fruit pests less injury relatively is done, but as the area of fruit culture increases so does the aggregate of injury and also the number of species that we have to contend with.

It may convey to you some idea of the vastness of the subject of economic entomology for a country as great as ours, to give a bare reference to the reports of insect injury either quite novel or of species that have hitherto been absolutely unknown that have come to the Department since your last meeting.

Among them is a large and undescribed scale insect of the genus *Lecanium* found infesting grape vines at Hudson, Ohio, and in Pennsylvania, reported by J. R. Adams.

A small mite of an undescribed species of *Phytoloptus* has been reported on Plum, making a gall on the leaf, from Akron, Ohio, and from Pomposuc, Vermont.

A new plant-louse belonging to the genus *Myzus* was reported on Cherry from Southern Indiana.

A leaf-folder (probably *Cacoecia argyrosphila*) was reported on Apple and Gooseberry from Fort Collins and Denver, Colorado.

A hairy caterpillar belonging to the genus *Halesidota* was reported on Apple from Highland, North Carolina.

Another hairy caterpillar belonging to the family *Arctiidae* but previously unobserved, was injurious to Mulberry, Pear and Apple in Winchester, Massachusetts.

A new species of plant-louse was badly infesting Orange leaves at Los Angeles, California.

An *Allorhina*, a large chafer belonging to the same family as the Rose-bug, was quite injurious to fruits in Tombstone, Arizona.

An undescribed *Aphis* is reported on the Pear from Lafayette, Indiana.

A species of *Aleurodes* has been found on strawberry leaves in the District of Columbia, as also a new species of plant-louse.

*Sparthococcus diffusus* has been very injurious to Grape leaves in Waldo, Florida.

A large scale-insect belonging to the genus *Lecanium* has been reported on Strawberry leaves from Urbana, Ohio.

A new leaf-roller belonging to the genus *Semasia* was found on Apple trees near St. Louis, Missouri.

A new miner belonging to the genus *Lithocolletis* has been found in the epidermis of Peach twigs in Napa county, California.

One of the fire blight beetles, *Xyleborus dispar*, long known in Europe and in the Eastern States to be injurious to certain fruit trees, was reported as quite injurious to various fruit trees in Nova Scotia.

A new span worm has been reported on Apple trees from Lafayette, Indiana.

A flea-beetle (*Haltica ignita*) has proved very injurious to the strawberry and peach in Orlando, Florida, Lake City, Florida, Waco, Texas, and in Indiana.

I have already referred to *Icerya rosea* on Roses and other plants at Key West, Florida.

A small mite, probably *Phytolius pruni*, was injurious to Damson Plum trees at Berlin Cross Roads, Ohio.

A little case-bearing Lepidopterous larva belonging to the genus *Coleophora* was injurious to the buds of Peaches at Akron, Ohio.

A new species of the genus *Lecanium* was found affecting the twigs of Plum trees at San José, California, and another species of the same genus was found on Peach at Ithaca, N. Y.

*Chrysobaris coballinus* was found injuring the leaves of young peach trees at San José, California.

An unknown Lepidopterous larva, one of the genus *Hyphantria*, was injurious to Apple and some other trees at Omaha, Nebraska, and Brownwood, Texas.

A bark-borer hitherto unknown to have such habits, viz., *Platypus compositus*, has been found boring in the trunks of Orange trees in Lake county, Florida.

A new flat-headed borer has proved quite destructive to the Sharpless Strawberry at Coeur d'Alène, Idaho. This is a rather remarkable fact, not only because the species of the family *Buprestidae*, to which this flat-headed borer belongs, have hitherto been found boring under the bark of hardwood trees, but because the species belongs to an undescribed species of *Chrysobothris*, the same genus to which the Flat-headed Apple-tree borer belongs and one which has recently been monographed. In company with it there was an undescribed Lepidopterous crown-borer.

A saw-fly larva (*Janus flaviventris*, Fitch) has been found in the stem of Currant at Adrian, Michigan.

A case-bearer belonging to the genus *Coleophora*, also undescribed, was reported on Orange trees from Los Angeles, California.

An undescribed mite of the genus *Tetranychus*, the same genus to which the red spider belongs, has been found on Lemon trees at Los Angeles, California, as also an undescribed thrips on Orange trees in the same locality.

A leaf hopper (*Typhlocyba rosea*) has been very numerous on the leaves of Apple trees at Burlington, Vermont.

A canker-worm belonging to the genus *Anisopleris* was reported on Plum from Elliott, California.

A snout-weevil (*Cercopus chrysorhæus*) belonging to the same family as Fuller's rose beetle, was found upon Grape vine at Paris, Texas, supposed to be the Grape Curculio.

A currant stem-borer (*Oberea ocellata*) has been found breeding in the twigs of Peach in Harris county, Texas.

A new span worm has been found feeding on the bark and young twigs of Plum trees and doing considerable damage at Mitchell, Indiana.

A new case-bearer of the genus *Coleophora* was found on the buds of Blackberry in parts of Indiana.

A beetle larva belonging to the family *Tenebrionidae*, and somewhat resembling a wire-worm, was very injurious to the roots of Peach and Plum trees in Southern California.

An undescribed bug belonging to the genus *Trapezonotus* has been very injurious to fruit trees in Lead county, Idaho, by sapping them.

A beetle (*Ptychodes trivittatus*) is reported as girdling the twigs of Fig trees at New Orleans, Louisiana.

Another snout weevil (*Thricolepis inornata*) of the same family as Fuller's Rose-beetle, was found injuring the foliage of young Prune trees in Salem, Oregon.

A plant-lice, undeterminable, was badly infesting Orange leaves at Santa Barbara, California.

A larva belonging to the same genus (*Heliolithis*) as the Boll Worm, was doing great damage to the leaves of Apple and Quince trees at Coeur d'Alène, Idaho.

An undetermined species of *Lygus*, one of the true bugs, was injuring young Pears at South Byron, New York.

*Fidia longipes* and *F. murina*, two leaf-feeding beetles, were injurious to the leaves of Grape-vine at Vineland, Arkansas.

A leaf-beetle (*Haltica villosa*) was very injurious to Grape foliage at Socorro, New Mexico.

A scale-insect (*Chionaspis biclavis*) was found on Orange twigs in California, which had recently been introduced from Tahiti.

*Stictocephala inermis* proved very injurious to young Peach trees in Tehama County, California.

I have thus enumerated the additions to the list of injurious insects that have incidentally come to the Department of Agriculture in this short period, and were I to enumerate those recorded by other workers and other institutions, the list would simply weary you.

#### THE APPLE MAGGOT.

One of the most thorough and satisfactory investigations made at any of the experiment stations is that by Professor F. L. Harvey of the Maine Station, on the life-habits of the Apple Maggot, *Trypeta pomonella*. This is one of those interesting insects which, though native, and occurring on the wild haws and wild crabs throughout the Mississippi Valley, does not affect the cultivated fruit there, and first began to prove injurious to cultivated Apples in the Eastern States. The strain of it which infests cultivated fruits has been spreading westward from the East, having been reported as far west as Michigan.\*

Professor Harvey shows, in his excellent treatise on this insect, that the larvæ become full grown in from four to six weeks; that they leave the Apple through the characteristic openings in the skin and that on grassy ground they probably hibernates in the grass about the roots of the tree; that the larvæ in stored fruit leave it and assume the pupa state in the bins or barrels. The soft, pale yellow and fusiform eggs are inserted from time to time in the Apples, by means of the sharp ovipositor which the female possesses. They are inserted through the skin and are deposited before the fruit is ripe, in

Maine, in early July. There is no doubt that oviposition takes place earlier farther south. From an examination of the ovaries each female seems capable of laying between 300 and 400 eggs. No remedy seems available beyond prompt and careful destruction of all fallen fruit and the burning of refuse from bins and barrels.

#### INSECTS WHICH AMERICAN POMOLOGISTS WOULD DO WELL TO BE ON THEIR GUARD AGAINST.

As has been well shown, the number of species that are annually added to the long list of fruit pests which we have to contend with, is great enough, whether of species hitherto unobserved or of species which have acquired new habits or have transferred their field of action from some wild plant to a cultivated one; but the number is constantly augmented by additions from abroad and these, for reasons which have frequently been set forth by myself and others, are more to be dreaded than the native species. I would here call attention to two which I think it behooves you, as pomologists, to help to keep out, and of the introduction of which there is great danger.

*The Peach Cerialis*: One is the larva of a two-winged fly having the same general habits as the Apple Maggot, which I have just referred to and known as *Cerialis capitata*. It is a sub-tropical insect, and there is good reason to believe that it will not thrive in the Northern States; but the Peach crops of Georgia and the allied fruits in Florida are in danger from its possible introduction. It occurs in several parts of the world already, but has of late years become extremely destructive in Bermuda, especially to the Peach crop, and it is from this source that the greatest danger threatens.

*The Japanese Peach Fruit-worm*. — In the August (1888) number of *Insect Life* was published some correspondence between the Rev. W. J. Holland, who was then serving as naturalist to the United States *Eclipse* expedition, and the United States minister to Japan and the Commissioner of Agriculture, relative to the ravages of a worm which damages the Peach crop of Japan. Those who read this correspondence will recollect that it was suggested through Commissioner Colman that the matter be referred to Professor C. Sasaki, of the Agricultural and Dendrological College of Tokio,

\* Dr. J. F. Simonds, of Fayetteville, Arkansas, informed me after the reading of this paper that it has been observed in Arkansas.

and that Professor Sasaki be directed to make a full report concerning this insect, which he kindly did. I present an abstract of his report as given in a later issue of *Insect Life*:

"The moth, according to Professor Sasaki (and judging from his figures he is correct) is a species of *Carpocapsa* very closely allied to our Codling Moth, and hence it is called by Professor Sasaki 'a new Codling Moth injurious to the Peach.' The Peach crop is very large in Japan, and during some seasons more than ninety per cent. of the fruit is injured by this insect. Not infrequently more than one larva are found in a single peach. No means have been heretofore suggested for the protection of the crop. Professor Sasaki's studies were begun in April, 1888, and concluded in May, 1889. The Moth appears twice in the year, viz. in June and in August, although certain individuals of the first brood are delayed until July and others of the second brood until September. They hide in the daytime and at twilight fly about the trees. The eggs are deposited singly on the apex of the fruit or along the suture passing from the apex to the base. Usually one or two, but sometimes more, eggs are deposited in a single fruit. The eggs are spherical in form, measuring one half millimeter in diameter. They are yellow in color. They hatch in a few days, and the larva molts four times. Upon first hatching it crawls actively about in search of a suitable spot to enter the fruit; it then gnaws its way in, turns its head towards the opening and closes it with silk, sometimes pushing its excrement outside. It then burrows to the stone and makes a large excavation around it. Occasionally a larva will leave one Peach and enter another.

The fruit is continuously infested from June until September, those containing larvæ ripening early and dropping off. Infested fruit may be recognized in the following ways:

(1) It becomes soft and may be crushed by a slight pressure on account of the central excavation.

(2) It has usually a small cluster of yellowish-brown excrements on its surface.

(3) It bears irregular patches of a greyish-yellow or reddish-blue color.

The larva attains its full growth in from three to four weeks after hatching; it then leaves the fruit

and falls to the ground, if the fruit has not already fallen.

The larva enters the ground to the depth of one to two inches, where it makes an oval cocoon of light gray silk. The cocoon is very strong and elastic. The larva of the first brood remains within this cocoon about a week and then changes to pupa, while the larva of the second brood remains within the cocoon in the larval state through the winter and changes to pupa in the month of May.

Professor Sasaki makes but one suggestion as to remedies, and that is to gather the fallen fruit every day and to dispose of it in such a way as to destroy the larva. I have already written him that he will unquestionably find a good remedy in the application of arsenical poisons.

Dangers of this kind are constantly threatening your fruit interests, but I see no way in which they can be averted except by the aid of the Customs officials, among whom, at our chief ports of entry, there should be one especially instructed to inspect fruits and plants from any part of the world from which we know danger threatens. It is a subject well worthy of consideration on the part of this Society, and with well-conceived plans there is no reason why Governmental aid should not be had.

#### CONCLUSION.

It was at the Philadelphia meeting of this Society some eight years ago that I had the honor of introducing and showing the working of the Cyclone Nozzle, and also of illustrating and showing the mode of making and application of the kerosene emulsion and its value. Since that time the resin washes and the hydrocyanic acid gas treatment have been discovered and rendered practicable and economically available for the destruction of the various insects that affect fruits and fruit trees. These four discoveries, which I am proud to say have all resulted from Government investigation, together with the discovery of the Bordeaux mixture as a fungicide, have virtually revolutionized our methods of dealing with insect diseases; so that the advance in the last few years is unprecedented in the history of Pomology. The first four discoveries resulted from previously conceived and well planned courses of experiments having for

object the very result finally obtained. They may be considered as illustrations of the results obtained by the scientific and experimental method. The Bordeaux mixture was a chance discovery, due to our having given to France some of our worst vine pests, including the Downy Mildew (*Peronospora viticola*.) It was a habit with some Bordeaux grape-growers, with a view of preventing the stealing of their grapes, to spatter sulphate of copper and lime along the rows bordering on the highways, as a warning that the fruit could not be eaten with impunity, and upon the introduction of *Peronospora* it was noticed that these very rows of vines along the roadways, were exempt from its attacks when the rest of the vineyard suffered severely.

The use of these five discoveries is now almost universal, and if we add to them the spraying with the arsenites which dates back somewhat longer, but the general use of which is encompassed within the period mentioned, we can get a fairly good idea of the great advances made in that period in combating the insect enemies of fruits and fruit trees. Is that splendid progress to stop? I trow not, and who shall say what the next ten years will bring forth in still further giving man control over these insidious foes? The truth is that fruit-growing has come to be a business involving a good deal of special knowledge based upon scientific data, and the intelligent fruit grower will come to look upon the insect hordes that attack his trees and fruits, if he does not already do so, as a not unmixed evil, but rather as a blessing in disguise, making it unprofitable for his negligent or ignorant neighbor, and securing for himself all the greater reward for his industry and intelligence.

#### DISCUSSION.

MR. ENGLE: I would like to ask whether the spraying as for Codling Moth would affect the Apple Curculio?

MR. RILEY: No; as I remarked, I do not think the effect of the spraying is as good in destroying any of the curculios—any of the snout-beetles—as in the case of Codling Moth. In the very nature of the case it cannot be.

MR. CUTTER: This question of importing bugs arose first, I think, in the meeting of the State Agricultural Society of California at Riverside, and

sprang from remarks made by Professor Riley at the time. It was suggested that a commission should be sent to the South Seas, from which we knew that the injurious insects had been derived, in order to find the predaceous insects which would exterminate them. The result was the importation of the *Vedalia*, which has so effectually killed out *Icerya*. Before coming from California the other day, I think on the train of cars, buying a paper, I found this statement that Professor Albert Kœbele, who has been sent to the South Seas again on a like errand, found there an insect which attacks and destroys the *Lecanium oleæ* or Black Scale. Here, again, the Government is affording to us a relief from one other of the triad of pests that trouble us so exceedingly there, and trouble the country in general. In the county where I belong the inspection is very rigid, and the discovery of an affected tree in that county means that the tree must be gashed and receive the treatment at an expense of one or two dollars, and it is an expensive matter to put it through an orchard. But the discovery of one insect is esteemed to be such a warning that the owner cannot afford to let it pass, and if he would he is still under the stress of the corporation which requires that the remedy be applied.

MR. WILLIAMS, of New Jersey: I have had during the last ten years some considerable experience with one of the insects alluded to by the Professor. I consider it one of the most dangerous of the small insects. We old people cannot see it. But there is another insect that recently appeared in New Jersey and which attacks our Pears, and is equally destructive, I think, and to be feared. It operates while the Pear is very young, and has troubled them for two years. This season in Essex and Union counties it has been very troublesome, and it has appeared also, I find, on the Hudson River. I think we had better look out for it.

MR. RILEY: It is the Pear Midge, so-called, which has been uncommonly abundant the present year, and was first fully treated of in my annual report some four years ago, where I called it the *Diptosis pyricora*. It is similar to the insect that affects Pears in the same way in Europe, but nevertheless is different and a new species, but there is every reason to believe it was imported

from Europe, as it occurs there also. We know very little yet as to how to manage it. It is one of those insects that is very difficult to deal with. It is a small midge, smaller than a mosquito.

Before I take my seat I will permit myself to say one word more to this effect, that the time would not permit me to touch upon many interesting matters that I should like to have included in my paper. I could not say anything about *Phylloxera* and its spread, but I would like to say in response to what was said by one of the speakers that the introduction of *Vedalia* was the result of a set purpose, and few persons have realized what an extensive correspondence and how much time I devoted during three years to the matter of proving first of all that the *Icerya* was of Australian origin, and that it was not an injurious insect there, being kept in check by natural enemies. Upon these facts, which involved a trip to Europe, we studied the natural enemies of this particular insect and worked out the results which have been given to you. This subject has had to be dealt with on most strict scientific methods.

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### Recent Progress in the Treatment of the Diseases of Pomaceous Fruits.

BY B. T. GALLOWAY.

The treatment of plant diseases is a subject of such recent origin that comparatively few are aware of the progress made in this line of work during the past few years. At the Boston meeting of this Society, held only four years ago, it is doubtful if anyone could have satisfactorily answered the question of how can Apple Scab, Pear Scab, Cherry Leaf-blight or any of the numerous other diseases of pomaceous fruits, be cheaply and effectually prevented.

It is not so much the object of this paper to tell you in detail how these diseases are combated, as this information will be found in the published reports of the United States Department of Agriculture and elsewhere. We shall deal with the subject in a somewhat general way, hoping by this means to awaken a wider interest in the matter and thereby in the end bring about a better understanding of plant diseases and their treatment.

However, before taking up a discussion of the subject proper, it might be well to call attention to the losses occasioned in this country by the widespread and destructive maladies of pomaceous fruits, as with this data before us the importance of the results accomplished in the matter of preventing the injuries will, we believe, be better understood. Take for example the Apple crop. From reliable data we know that at the very lowest estimate the damage to this one fruit in 1890 by Scab alone exceeded six million dollars. The Apple crop of many parts of the great fruit-growing State of New York was wholly destroyed by it, the fungus attacking and killing the flowers even before the fruit had begun to form. The damage done to Pears in both nursery and orchard by Leaf-blight, Scab and Cracking is probably as great as that of the Apple. Add to this the damage to Cherries, Plums, Peaches and other similar fruits by such diseases as Blight, Mildew, Leaf-blight, Rot and Yellows, and the sum is simply appalling, aggregating no less than fifty millions of dollars annually. How to prevent this damage is a problem which has long confronted the fruit grower, yet as we have already stated, and will repeat again for emphasis, no definite attempt was made to throw light upon the question until four or five years ago. At this time there were probably not more than half a dozen experiment stations in the country, and they were devoting most of their attention to questions of a chemical nature. It is true, here and there a botanist connected with one of the stations, agricultural colleges, or other institutions of learning was studying the subject in a small way, more, however, from a scientific than a practical standpoint. Matters were in about this condition when, in 1886, the National Government, through its Department of Agriculture, took the subject in hand by establishing a branch for the investigation of plant diseases. This Division, for so it is designated, has been constantly at work since its organization endeavoring to throw light on the prevention of plant maladies.

Briefly stated, the usual method of work is first to make a careful study of the diseases in the field and laboratory, then follow this with practical field experiments, first on a small scale and later more extensively, if the results justify it. In accordance

with a plan of this kind the work on Pear Leaf-blight was commenced nearly three years ago and is still being carried on. First, it was necessary to study the life history of the fungus causing the disease, as it was only with a full and complete knowledge on this point that an intelligent effort in the way of treatment could be undertaken. As a result of the laboratory and field work along this line it was found that to successfully prevent the disease it would be necessary to protect the young unfolding leaves from infection by the spores or reproductive bodies of the fungus which had passed the previous winter in the fallen foliage. As a mere statement this problem may not seem like a difficult one. The fact is, however, that a great many difficulties have been encountered, and while some have been overcome, others still remain to be mastered.

The time of the first application, *i. e.*, when the leaves are about half grown, being settled, the next questions to solve were (1) the kind of preparation to use in order to cheaply and effectually protect and not injure the foliage; (2) the number of applications necessary to insure the best results; and (3) the cheapest and most practicable means of making the applications. As already stated these problems have as yet not all been solved, but as a result of our work, we are able to satisfactorily cope with one of the most destructive diseases of the fruit grower at comparatively little expense. Without going into details it may be said that in treating nursery stock the best results have been obtained from six or seven applications of the Bordeaux mixture applied with a Knapsack pump and improved Vermorel spraying nozzle. The Bordeaux mixture is so well known that a description of its preparation is unnecessary. It may be well to say, however, that the standard preparation contains six pounds of copper and four pounds of lime to twenty-two gallons of water. While, as already stated, the best results from the use of this mixture have been obtained when Knapsack pumps were used the fact remains that for work on a large scale it does not always pay to use such machines. Where one has 30,000 or even 50,000 stocks two Knapsack pumps can be relied on to do this work. For more than this, however, it is best to use horse-power machines. We have recently devised two

machines of this kind. The first is a cart machine holding twenty-five gallons. It is made to pump automatically, is drawn by one horse and requires two men and a boy to operate it. Four rows are sprayed at a time making it possible to cover ground quite rapidly. In fact it is not difficult to spray 100,000 or 150,000 Pear seedlings a day with it. With a Knapsack pump 20,000 to 25,000 seedlings of this kind is a good day's work.

The second form of horse-power machine is simply a barrel mounted on wheels or runners and provided with a force pump which is worked by hand. With a horse, two men and a boy, four rows can also be sprayed at one time with this apparatus. The work can not, however, be done as rapidly as with the automatic pump, although, owing to better control of the machine, it can be done more thoroughly. The cost of the automatic machine will range from \$40 to \$50 while the last described apparatus complete can be fitted up at home for \$15. This includes wheels or runners, pump, suction and discharge hose, four nozzles and gearing for attaching the horse.

A special feature of the machine we have devised is the pump, which is a modification of the pump we use on our Knapsack sprayer. Most of the force pumps capable of supplying four nozzles are expensive, ranging in price from \$8 to \$20. The one under consideration can be made for \$2.50 and it is as durable and effective as any of the more expensive kinds. By attaching this pump to the automatic machine already mentioned, the price of the same may be materially decreased. In fact, we are now perfecting an automatic apparatus that will spray four rows at a time and which we think can be made for \$25.

The idea is to devise a machine so simple that the various parts may be obtained from almost any reliable implement dealer and put together at home. All the machines mentioned can be used for various purposes, such as spraying Potato and Tomato vines, Grapes, nursery stock and orchard trees.

Laying aside the question of machinery, let us turn again to the treatment of nursery stock and briefly summarize our present knowledge of this subject. In this connection we may say (1) that Pear, Plum, Cherry and Quince Leaf blight are best controlled by Bordeaux mixture applied first when

the leaves are one-third grown, and thereafter at intervals of twelve or fifteen days until six or seven sprayings in all have been made: (2) that the ammoniacal solution of copper carbonate applied the same as the Bordeaux mixture gives the best results in combating Powdery Mildew of the Apple. In the orchard, however, the ammoniacal solution has for various reasons been more satisfactory for Pear Leaf-blight and Scab than the Bordeaux mixture. It is also found that three or four early sprayings give as good results as six or seven made at intervals during the growing season. It is proper to say that this statement may not hold good in the nursery, where as yet no experiments, so far as we know, have been made to test the matter.

Directing our attention now to the progress made in combating Apple Scab we will say that the first extended experiments in treating this malady were made in 1889 by Professor Goff of Wisconsin, and Professor Taft of Michigan, under the direction of the Division of Vegetable Pathology. As a result of this work it was demonstrated conclusively that Scab could be prevented cheaply and easily by at least two of the copper preparations, namely ammoniacal solution and modified *can celeste*. The cost of the treatment averaged about twenty-five cents per tree while the increase of perfect fruit on the treated trees over the untreated ranged from twenty-five to seventy-five per cent. In 1890 we continued the experiment, making an attempt to obtain information on a number of other points, chief of which may be mentioned the value of early as compared with late treatments, the number of treatments necessary to obtain the best results and the comparative efficacy of three fungicides, two containing copper and one devoid of this chemical. An attempt was also made to cheapen the treatment without decreasing their efficacy. It was found that early treatments, particularly those made just as the flowers were opening, gave better results than late ones. Three early sprayings, one when the flowers were just opening, one when the fruit was the size of peas, and one, two or three weeks later, gave as good results as five or six or even seven sprayings made at intervals during the summer. The fungicide giving the best results was one originating with us last year and sent out under the name of "Mixture No. 5." This fungicide consists of a mixture of equal parts of ammoniated copper sulphate and ammonium car-

bonate. It was used at the rate of from eight to twelve ounces to twenty-five gallons of water. The special advantages of the mixture are; (1) cheapness; (2) ease of preparation and application; and, (3) that it can be put up in dry form in small or large packages, making it easy and convenient to handle by the practical man in the field and the store keeper who may wish to place it on the market. The chief objection to the fungicide is that it sometimes burns the foliage. While this drawback may in time be overcome, it is necessary that we know of it in order that due care may be observed in using the solution. Work on the treatment of this disease is being carried on this year by us in the chief Apple-growing sections of the country. As yet it is too early to speak definitely of results, but enough is known to warrant us in saying that many new points will be brought out. We may conclude these remarks on Apple Scab by saying that with even moderate care this disease can be largely prevented in the most badly affected regions at an expense ranging from ten to twenty cents per tree.

I have now briefly reviewed some of the chief points coming under the subject of this paper. Time forbids that I should enter upon the details of various other diseases of pomaceous fruits and the progress made in treating them. In conclusion I will briefly call attention to a disease which has received more attention than all the others and which so far has baffled the skill of one of our most experienced workers. I refer to Peach Yellows, the cause of which as yet remains a mystery. Four years of almost continuous work have been devoted to this malady and in that time many interesting and valuable facts have been brought out. Some of these will be given you later by Dr. Smith to whom this entire subject has been entrusted. Briefly summarized the present condition of our knowledge on this subject is as follows:

1. The cause of the disease is unknown.
2. The disease is transmissible.
3. It cannot be cured.
4. It can only be dealt with by wise legislation and a judicious use of the ax and firebrand.

#### DISCUSSION.

DR. CARY: I would like to ask the Professor what is really the pathology of Pear Blight. I have never seen a fungus grow that killed our vegeta-

tion so quickly as this does in our part of the country.

MR. GALLOWAY: It is now definitely known, in fact has been proved, that Pear Blight is due to a micro organism, which usually enters at a growing tip or through the flower. The matter has been under consideration by the Department for nearly three years, and while a great many important questions have been settled, a satisfactory method of dealing with the disease is unknown. To prove that the disease is really due to micro-organisms is a comparatively easy matter. The germs, or microbes with which most of us are familiar, may be easily obtained from the blackened limbs and grown in artificial culture media, and from that inoculated into healthy pear trees and thereby produce the disease. How the organism goes through the winter is unknown, but it is easily proved that the disease is due to this cause. The disease also attacks the apple, and the same germ can be transferred from the pear to the apple and the disease produced upon the latter. The Leaf-blight is an entirely different disease. That we can combat successfully by the application of copper preparations. The Pear Blight has never been successfully treated.

#### Pear Blight and Climate Influences.

G. F. B. LEIGHTON, NORFOLK, VA.

In response to an invitation from our President to furnish a paper on Pear Blight for this occasion, I will state that in its preparation I have confined myself to my own observations, excepting scientific aid from L. B. Anderson, M. D., of Norfolk.

It is not surprising, in this age of new theories that Pear Blight, which has been shrouded in mystery for the past century, should be seized upon by theoretical minds for a solution, hence the promulgation of the idea that Pear Blight is caused by bacteria.

In May, 1877, I noticed Twig Blight among my Pear trees, and then being in the habit of noting the temperature at sunrise and at the highest point during the day, referring back I found that over thirty degrees difference of temperature had occurred nine days before, which caused me to ascribe the effect to sudden changes of temperature

at the time of most vigorous sap flow. Since that time my observations have been specially directed to this matter with the following results.

I have noticed that during the month of May, when there was over thirty degrees difference in the temperature within the twenty-four hours, that nine days thereafter Twig Blight would set in. I also noticed that when it was followed by a more uniform temperature that the Twig Blight would stop, and at that point shoots would put out, but if these differences of temperature should be frequent thereafter the Blight would extend down the limb and form a nucleus for the destruction of the tree.

I did not read the paper on Pear Blight published in the United States Agricultural report for 1886 until 1887, when my friend, the late Patrick Barry, to whom I had communicated the result of my observations, suggested that I open correspondence with Professor J. C. Arthur, then of the New York Agricultural Experimental Station at Geneva.

I wrote Professor Arthur on the 12th of May, 1887, stating the difference of temperature noted between that morning and that afternoon and also that of the day before as being thirty or more degrees, and stated that Twig Blight would appear on the 21st. On the 21st, I wrote him that Twig Blight had appeared promptly on time and in a few days would send him some twigs to see if bacteria was present short of fermentation. On the 23d, I forwarded him twigs, but he was unable to find bacteria without immersion in water.

In 1888, May 18, I noted the thermometer 50 at sunrise and 85 at 4 P. M. Twig Blight set in on the 27th.

In 1889, May 8, I wrote Professor Van Deman, Chief of Pomology, Agricultural Department, giving the difference of temperature between morning and the warmest part of the day as being 30 degrees and that Twig Blight would set in on the 17th. On the 20th, I wrote him that Twig Blight did set in on the 17th, and enclosed a clipping from *The Public Ledger*, wherein I had requested Pear growers of that section to observe whether they found Twig Blight appearing on the 17th. The 18th being Saturday I met several persons who had seen my request and they all stated that Twig Blight had appeared as I predicted.

On the 11th of last May I found the difference of temperature to be such as to request through *The Public Ledger* that Pear growers should examine their Pear trees on the 20th, and see if Twig Blight had set in. The report is that Twig Blight had not only set in on some varieties of Pears, but had appeared quite extensively on Apple trees.

I have noticed that where Pear trees have been out some fifteen years, that if green crops are cultivated among them, the sap flow is increased, having a tendency to increase Pear Blight, particularly on the Bartlett variety.

In the pursuit of my efforts in this direction, in 1887 I received the efficient aid of Dr. Anderson, whose reputation as a bacteriologist is recognized on the other side of the water. He took a deep interest in the subject and carefully examined the twigs as I would take them to him, under his microscope of fourteen hundred diameters, he could find no bacteria short of fermentation.

I will quote the following from Dr. Anderson's letter of reply to some correspondent from New Jersey published in a paper assailing his position, which reply was directed to me.

"It was expressly stated and is now reaffirmed, that a sudden fall of temperature has this effect on the circulation, the sap is coagulated, superficial vessels are congested, the circulation is arrested, nutrition ceases, and the twigs and leaves beyond the point of congestion die.

"I distinctly stated that I had carefully examined the tissues, vessels, etc., and found the vessels congested, and coagulated and discolored sap, and that all beyond the point of congestion was devitalized—dead.

"The so-called germ theory of disease, whether in vegetable or animal tissues, rests upon declarations which bear the scrutiny of neither logic, science nor observation, and need for their overthrow only the facts which have been promulgated by their most earnest advocates."

When two such eminent bacteriologists as Professor Arthur and Dr. Anderson are unable to detect bacteria in newly blighted twigs, and as Dr. Anderson tells exactly what his microscope revealed, I claim that I am presenting you facts against theory, from which you are to draw your own conclusions.

I consider the bacteria plank in the Blight platform as unsupported, and must drop out as a thing of the past.

If my observations will lead to the directing of experimental stations where Pears are cultivated, in noting the effect of the sudden changes of temperature upon the trees I shall be more than gratified in passing over so important a subject as my legacy to the coming generation of pomologists.

#### DISCUSSION.

MR. WATTE: I do not think that the statements made by the gentleman in regard to the cause of Blight ought to be allowed to pass unchallenged. There are perhaps a good many members of this Society who have heard of the work of Professor Burrill in 1880, in which the bacteria associated with Pear Blight were discovered, and the disease pretty clearly proven to be due to their work. These bacteria are minute parasitic beings, nearer to plants than anything else, and are parasitic in the tender growing cells of the Pear tree, which structures they kill and destroy. That disease is called "Pear Blight," but it works also in the Apple, Quince, etc. Dr. Arthur, of Geneva, N. Y., who was mentioned in the paper read, carried on a series of experiments in which he made this demonstration practically conclusive. This is not a theory, but a fact, and I may perhaps be pardoned for thinking that the theories are on the other side of this problem. Let me state to you in a few words what the evidence is that bacteria cause Pear Blight. I have been working for over two years on this disease, and at the time I commenced I accepted the fact as proven that bacteria did cause the Blight, and have been working on their life history, means of distribution, the way they spend the winter, etc., but it has never occurred to me to dispute the main fact that the disease was caused by the germs. This is the series of facts in which we have proven that bacteria cause Pear Blight. In the first place, they are always found associated with the disease when fresh specimens are examined. In the second place, we are able to take these bacteria from the blighting twigs and cultivate them on nutrient media. We grow them in these culture media and propagate them over winter. We are able to grow them in the same

way that you would seeds in a field. We then take them—grown in culture tubes— inoculate them into the growing tissues of the Pear and produce the disease. We then examine the diseased portions and find the bacteria there again doing their work. In the course of my experiments I have not had occasion to prove that bacteria cause the disease, but in working on the disease in order to study it I have been compelled in many cases to produce it myself. The present spring I received some Pear twigs from Thomasville, Georgia. From these I isolated the Pear Blight germs by cultures and carried on the experiments with them. I did not wait for Pear Blight to appear here, but had it under my own control and got some very interesting results in the distribution of Blight and as to its workings on the flowers. I found that it grew in the nectar of the flowers, and was distributed by insects visiting the flowers for honey. These results led to my being sent by Assistant Secretary Willits to Western New York to continue the experiments there on a larger scale. In a single test tube I carried all my stock of germs, and I had an artificial epidemic of Pear Blight in an orchard in Western New York which came originally from Georgia germs. After all this work it seems to me absurd to deny that Pear Blight is caused by these bacteria.

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#### Heredity and Environment in Originating New Fruits.

THOMAS MEEHAN, GERMANTOWN, PA.

*Mr. President, and Fellow Members of the American Pomological Society:*

Sometime since I received this letter from our worthy Secretary: "Will you kindly consent to give us a paper on Heredity and Environment in Originating New Fruits?" I suppose that to mean that there have been fruits that have originated by reason of the environment, that is to say that on account of some peculiar conditions or circumstances, climatic or otherwise, some of the species have sprung into existence, or some of the varieties have, by reason of those peculiar circumstances and conditions, come into existence, and that is what is called environment.

Now I was a little surprised to receive that invi-

tation, because although scientific men generally have come to the conclusion that not merely varieties but species have sprung into existence by reason of the environment, and that idea has become so generally diffused through the community that it might be supposed, with the little interest I sometimes show in scientific matters, that I also have an idea of that kind, nevertheless, the more I have thought of the matter, the more I am convinced that environment, so called, has never had any such influence in originating any variety, much less any species; and I am therefore under the impression that my friend, in notifying me to address you on this occasion, must have done so—as my record is clear on that score—to raise a first-class row and shake the red flag at the bull, and lie by and see where the sport comes in.

It seems certainly contrary to general rule, that a party appointed to open a subject should have to speak on the negative. That is all I can do this afternoon; I can show you some reasons why I believe no species or varieties of any consequence have ever originated in that way. I have given some considerable thought to this, and have looked over the evidence about it not only in the vegetable but in the animal kingdom also, but I cannot see where there is any circumstance or condition for any permanent influence of this kind. Certainly when we look around us in the animal kingdom, we can see no evidence of it whatever. Take these pictures of Indians before us [referring to the Catlin collection hung on the walls of the hall], they will suggest some facts which I think bear very strongly on the subject before us. We have here, men of the Indian race spread over the whole continent, from the Arctic regions to the Gulf of Mexico; men who for centuries have been living under the most varied conditions of environment, and yet they are Indians to-day; yet, as I said, their conditions have been extremely different. In the far northwest they live in the winter time half buried in the ground, spending a few months in summer fishing, and living all the winter on dried fish and perhaps deer fat. On the prairies of Nebraska we find Pawnees living, as I have seen, almost wholly on animal food obtained in the chase; living as is shown in that picture, number 401 of the collection, in wigwams formed by a few stakes

and skins stretched around them for shelter, moving from place to place leading a nomadic and unsettled life, entirely different to those I referred to before in the Northwestern parts of the continent. As we get further along on the South Pacific coast, we find Digger Indians living on herbs and roots, and in entirely different habits and characters from those further northwest; and then again, down further south are the Zunis, whom we find in the past living as an agricultural people, having their canals for irrigation, having houses for protection, and protecting themselves by ladders. Thus, we can see the most varied conditions and environments, and yet everybody knows they are still Indians to-day after thousands of years of those very varied conditions of environment, some living on plains, some on rocky mountains, some in arid deserts, and some where rains and dews and other good things abound. Of course they will sometimes get some little advantage by some discoveries, and there we see the ability that other classes of men have to take advantage of circumstances. As soon as Indians got fire arms, they spread through the whole of the Indian community. When some few years ago they could get horses they seized on them, and wherever they have been able to get the implements of civilization, they have to some extent progressed by means of their use, but they have never so progressed that they are not Indians to-day. I think that is true also of other animals. The horse with the Indian is just the same after two hundred years of Indian environment, as he is with the environment furnished him by the more civilized white man. Again, the horse itself has been the servant of man through all history, and has been taken into all sorts of climates and subjected to all sorts of conditions. Environment of most varied character has furnished the horses as well as other domestic animals. But we see no difference which we can trace to environment. The different breeds of horses have been the direct work of man by uniting varied conditions, and what is called environment as ordinarily understood, has nothing to do with the various breeds of horses and cattle, but differ as they may they are not different in character from the horses of two or four thousand years ago. And so far as the human race is concerned, I believe—setting

aside the Indian and taking for instance, if you choose, the natives of Africa—I believe if they are taken fresh from that soil to-day and brought to this continent and remain in Maryland for two thousand years, they would still have essentially the characteristics of the Negro race. And so with the white man taken to Africa; you would still find the distinctions characterizing the race. So I see no reason for believing that environment has had any vital effect in influencing change. It is the same when we look at the plants. I have had an opportunity to examine the different timber trees of our country extending all the way along the mountains from Canada to Mexico, and we find the Linden tree from Mexico precisely the same as we find the Linden tree on the Potomac River and in Canada—no different. It makes no difference whether those trees grow on plains or mountains, whether under conditions of climate furnished by Mexico or by Canada. Notwithstanding this, there is not the slightest difference whatever between the Linden we find in Mexico, and that which we find in Labrador. So with the Sweet Gum, we find precisely the same tree in Mexico and precisely the same in our own swamps here. I see nowhere any evidence whatever that climatic conditions or anything whatever involved in them, or in the idea of environment has had anything to do in producing new varieties or species. On the contrary, when we find any new forms coming into existence they simply spring into existence of a sudden without any law with which we are acquainted, without any knowledge as to what has produced those laws. We may have as every nurseryman knows, seedlings of various trees for centuries, and yet all at once a weeping variety is found—as the weeping beech, ash, etc., and whenever they come they spring into existence; environment cannot be understood as having anything to do with bringing them into existence, and the florist continually knows that some of his best varieties are no more than sudden freaks of nature. Some variety springs into existence not merely from the seeds—perhaps sometimes from bud variation. Some variety which has been in cultivation perhaps for twenty or thirty years or more, with its own peculiar color or general characteristics, will push out a branch entirely different from the rest of the plant, and

the cultivator can therefrom introduce the new variety. Environment could not possibly have had anything to do with the conditions of the same plant. What is true of flowers now in cultivation by florists, is also true of fruits. The Nectarine was originally a branch from the Peach tree, and we have a class of fruits which spring off of a sudden—apparently of a sudden—certainly without any knowledge of the law that produces them. We have evidence of these things every day. One of our friends pointed out to me this morning a Peach which she had on exhibition, the “Stump the World” Peach, a Peach which ripened its fruit four weeks ago, and yet that particular branch pushing out of a sudden produced another variety which ripened four weeks before the other. There is another illustration where environment has had nothing to do with the case. I, therefore, have been unable to see anywhere around me any evidence in any kingdom that environment has had anything to do with the introduction of new varieties. To be fair to the subject, one point has struck me occasionally as evidencing some little disposition to operate by reason of environment, and that is in the question of hardiness. I think it is generally admitted by all who have studied geology, that at one time what is now the Rocky Mountains was a plain of about the same level with the line which now forms the Western coast of California and Nevada, and the mountains were thrown up by some great eruption of nature, thousands of years after the rest of the Pacific Coast was formed. Whatever trees and vegetation were on the land then were thrown up with it, and the conditions surrounding those trees and plants were greatly changed. Being thrown up from seven or eight to fourteen or fifteen thousand feet high, vegetation must have found itself in an entirely different climate and in entirely different conditions, as it might be said, with an environment of a totally different character than that which surrounded it before the mountains were thrown up. Paleontology shows us that was just the case. Many varieties of oak and the red-wood tree which were all growing in the Rocky Mountains at the time this eruption took place could not stand the change of climate, and all we know of them now is by finding their remains in a

false condition. But a few managed to get there. What we once called the Colorado Blue Spruce managed to get there. The Douglas Spruce also managed to get there, and two or three other kinds of pines managed to get there notwithstanding the great change in environment. They managed to live and get there, but they have not changed materially in all their characteristics by reason of having been thrown up so high. *Pinus ponderosa* is the same in the Rocky Mountains to day as it is on the Pacific Coast. The other one I mentioned—the Douglas Spruce—is the same; with all its changes it has retained the same characteristics. But there is an illustration where plants which have evidently been thrown into greatly changed environment have remained the same except in the one point of hardiness. When we bring the Douglas Spruce here it is easily killed by comparatively mild winters, but these species from the Rocky Mountains will endure. Again, I have had other illustrations to show that hardiness is an acquired character to some extent. We frequently in nurseries sow seeds in large quantities of certain trees, for instance of the common Sweet Gum tree. If we get the seed from Georgia, as sometimes we do, or from the Carolinas, a light winter destroys them, but the seed from Maryland, Delaware or Pennsylvania will never die. Undoubtedly they have acquired hardiness by ages of cultivation in hardier localities. I am satisfied, therefore, that so far as achieving hardiness is concerned, plants may possibly profit by environment so far as that goes, but outside of that, so far as any essential characteristic is concerned, I have never seen any. I know it is sometimes said that if we take a Bartlett Pear, for instance, raised in Pennsylvania, and plant them in Savannah or Charleston or some other place along the seaboard, they do change their character. I have heard some people say they could not tell a Bartlett raised under those conditions, from their acquaintance with the Bartlett of Pennsylvania or further North, but I have never failed to detect what they were, and I think the idea that there is any essential change in these respects is an idea greatly exaggerated. Taken all together, I feel that no variety has been raised worthy of being called a variety simply by the circumstance of environment. When we come to heredity, that is

entirely another matter. If we could prove that varieties were induced by environment, the other part of my question would be easy, for undoubtedly heredity has much more power and strength than is generally supposed, as at one time it was thought to be the evidence of a true species if it would reproduce itself from fruit. If it would not do so, it was simply a variety, and that was the test given. But I think we all know now from very wide experience that there is just the same tendency to heredity in a variety however induced, whether from the seed or bud variation—the character of sport which I have already referred to—no matter how casual may seem the circumstances that may have induced the variation, that variation is just as great as if induced in what we call species. Many years ago I raised a large quantity of seeds from the Weeping Beech, which we know to be a variation from the original Beech, and every one of the seedlings was weeping just as the parent was; and so with the Weeping Ash; I have had experience with that, and I think everyone must have had a similar experience. The purple leafed plants are just the same. The Purple Beech is so true to seed that it is often the practice of nurserymen to raise it in that way. When we come to vegetables we know how it is. A new variety of pea or of bean, or of anything else that we raise in our garden crops, when we plant them by themselves and raise seed from them, they are just as true and just as constant as the original species from which they sprung, so that so far as heredity is concerned, there is no doubt in my mind that when we once get possession of a variety, the laws of heredity will prevail to preserve it for us as it would from the original species from which the variety was raised. Not to detain the meeting further, I will say briefly that so far as the matter committed to me is concerned, I have never seen any reason why environment should be considered as being the parent of any variety that we have or are likely to have; while, on the other hand, so far as heredity is concerned, I believe it to be a more powerful agent in preserving to us variations nature has given us than we have before been accustomed to believe.

## DISCUSSION.

MR. STRONG: Since the red flag has been shaken in the face of the bull, I have no disposition myself

to come in contact with the animal, and yet I feel inclined to say that I think he has stated the case a little too strongly. I think he has carried the point in the main, but has he not also in stating some of the facts shown that there has been some little modification? He has spoken of the increased hardness of some plants in different localities. I would like to mention one in particular—the *Magnolia Glauca*, which grows freely in Massachusetts, and is entirely hardy as the seedlings from it are; but the seedlings taken from Florida are entirely tender and worthless with us. I am the more inclined to say a word in reference to a point the speaker made, and as to which I think he was in the main correct. I wish to state the facts in regard to a recent rose—one introduced within the past year; I mean the Waban rose. The facts were told to me by Mr. Montgomery, who was the originator of the rose. It is a sport from the Catharine Mermet rose. Mr. Montgomery told me that the plant which had been planted in their conservatory, after two or three years had become an old stunted plant and they were about to throw it away, until he noticed one day that it had produced a large deeper colored rose than the normal type, and it had been in such a state of neglect that he ascribed the change in color to the condition—environment. He preserved the shoots of that rose, noticing it as so marked. He propagated the rose, and it has retained its characteristics. I judge that Mr. Meehan referred to that particular rose in his remarks, and I think the facts as stated by Mr. Montgomery ought to be known, and perhaps Mr. Meehan will have a word to say on that point.

PROFESSOR RILEY: There are other papers this afternoon, and therefore I do not wish to occupy much of your time, but I should be sorry to leave Mr. Meehan's interesting communication without a few words. Mr. Meehan's arguments and presentation of facts have this characteristic of merit, that they are always provocative of discussion and reply. Now the subject of evolution—the subject of variation in form, whether plant or animal, and the influences that bring about that variation in the present as they brought it about in the past—that subject is one that has always deeply interested me; in fact I have written upon it and have discussed

the influences which affect specific variation in an address which I had the honor to deliver before the American Association for the Advancement of Science at Cleveland. Now the two factors that Mr. Meehan refers to are almost universally recognized by evolutionists as conservative factors. If Mr. Meehan means to argue that change of environment—change of condition of life does not produce variation, then I say that his position is antagonized by the experience of the majority of most persons whether they be breeders of animals, students of animal or plant life, or students of evolution. For environment is one of the potent factors of the change of form, appearance, character, attitude, appetite—change in fact in a dozen or a hundred different directions. Now this change may not always be perceptible on the individual, though often it is marked there. But it becomes more and more patent in time—in races. The changes Mr. Meehan has referred to are what we know as fortuitous variations, and are all of them referable to that limbo that we call fortuitous, and it was one of Darwin's faults that he failed to recognize fortuitous variation to the extent to which it takes place in nature. But when it comes to changes that are permanent in nature and not artificial—perpetuated by man by artificial means—then I think the store of evidence is overwhelming that environment has played and is playing a most important part in producing variation. Now we must recognize this fortuitous variation. There is variation going on around us all the time under the same conditions, and man simply takes charge of that portion for his own benefit, and perpetuates what nature otherwise would not do. She perpetuates only what is essential to her, and it is the type that is perpetuated by her, whereas the changes, alterations and variations Mr. Meehan refers to are what are known as simply varieties. Many of them would not be perpetuated in a state of nature. I would also say that the law of atavism is as well recognized a law as that of heredity. While heredity is conservative, atavism will produce changes, and the series cited by Mr. Meehan as to the uniformity of his seedlings, will not be borne out by many of you as nurserymen in the very great variation of seedlings generally shown. Seedlings are well known to vary, and

these variations are attributed first of all to atavism—to reversion to some earlier parent or to cross fertilization, etc. But this is a very great subject and I do not wish to take the time of the Society. I only wish to put in my plea for the influence of the conditions of life, when they are changed, upon variation, and to rather dissent from the general tenor of our friend's remarks. While I realized that some of the facts he has stated are perfectly justified and correct, the application of them in my judgment is not.

PROFESSOR BAILEY: I do not wish to have these remarks go unchallenged in regard to the purely horticultural side of this question. While Mr. Meehan was giving us his interesting talk, two things occurred to me as perhaps open to objection, one of which has been mentioned by Mr. Riley. I suppose the speaker had in view the matter of change of conditions of life upon the organism. Professor Riley has referred to that. The other weak point, or one other, was this: That in speaking of these variations, he said that when they did occur, they still occurred within the limits of the species. The Indians which occur all about the country are Indians still, he said, and that is true enough, but they are of different tribes. But now from the truly horticultural side I wish to oppose Mr. Meehan's doctrine, because there are innumerable facts against it. I am positive that change of environment or change of conditions of life does modify every type of plant which man has cultivated. I do not believe there is a single plant cultivated from a period of a quarter of a century and from several degrees of latitude, but has changed considerably. To cite instances would be to cite the whole catalogue of plants. Darwin has shown that winter wheat can be changed to spring wheat, and *vice versa* conditions and environments—as to whether it is planted in spring or fall. The English cucumbers, characterized by their great length and by their ability to produce long fruit entirely without the aid of pollen—fruits entirely seedless and which have larger flowers than ordinary cucumbers, have all been developed in this century by environment, and we have the records so complete that we know that within this century those cucumbers have been produced from the common field cucumbers. Peas have been changed in their characters in one

season by the character of the soil upon which they grow, which is one of the conditions of life and of environment, and I have myself in my own patches detected two varieties of peas from one row, one end of which was in heavy soil and one in clayey soil. Others have had the same experience, and every fruit which we grow in some way or other is changed by climate. In the North it becomes smaller and hardier. Go to yonder hall and see the fruits from Minnesota and Wisconsin, and see if their luster is not brighter than that of fruit from latitudes further south. I never saw this so plainly marked as at the meeting of this Society in Grand Rapids on some specimens of Minnesota fruit. It is well known that flowers and fruit take on intenser colors as we go Northward. Environment certainly does change. Cabbages are not the same in the South as they are in the North. So these things change all over the country in an intricate net work, and I do not believe there is one plant under heaven which man has cultivated long which has not been modified greatly by environment.

MR. HALSTED: I wish to say just a word in this connection as to diseases of plants—or fungus diseases of plants. If you were in my laboratory, I could show you fungus diseases of plants grown under different conditions in test tubes; spores from the same plant that when placed under a microscope the mycologist might declare were of different species, and that only takes five days. The difference is environment.

MR. FERNOW: I only want to point on the difficulty we have in discussing such a subject before we have a conception of our ideas regarding the nomenclature. Now we are accustomed to speak of variations and species entirely from a morphological point of view, and I believe there is where the difficulty lies in explaining differences resulting from environment. Mr. Meehan has given one point himself in speaking of the hardness being changed by environment. We believe that more than that is true of the change in biological features. I know for a fact that in the Caucasian race, and I believe also in our Indian brothers, exists absolute differences not of form but of characteristics, and these characteristics are bred by their surroundings. I am well acquainted with European nations, and

well acquainted with the American. Now we know there is considerable difference in the characteristics of the two nations which have been brought about by—I do not know anything else but by surroundings—the differences of climate and the necessary difference of occupation. So I believe that one of the difficulties in talking on this question, is that we misconceive what we should call species and what variation; that we have no biological conception of these terms, and it would be necessary to define just what is meant by species and variation.

MR. MEEHAN: Did I not tell you that your Secretary was getting me into a great racket? Perhaps I may be gored after all, but I must say that so far as the arguments have gone nothing has been advanced to shake the position I assume. Mr. Riley has simply reiterated what I said before. I said the tendency of scientific men was to consider that environment was a great factor. He has simply emphasized that. I do not think that meets any point I have made. Now in regard to what Mr. Bailey has stated with reference to a great many of the statements Darwin has made, I would say that I was familiar with those statements when I made the point I have already made, and although those points seem to have great weight with Mr. Bailey, they have had no weight with me; many evidences go to show that Darwin and his followers have mistaken altogether what they themselves meant by environment. I think what they mean by environment is the operation of some natural law outside the agency of man, and so far as that is concerned I have seen no great evidence to show that any great change has ever occurred in that way.

MR. FERNOW interposed, that in discussing this important biological question it was only too frequently overlooked that in speaking of species and varieties we refer to these as established by morphological distinctions. Such distinctions may satisfy the systematician, but the biologist will have to find biological distinction, and as our knowledge of these increases, our conceptions of species and varieties will change. We will then have species and varieties based upon biological characters, rather than morphological distinctions. Thus while zoologically speaking there is no specific distinction

between the European and American, yet there were such marked differences in character evidently produced in differences in environment as should distinguish them specifically. The same would be found among the Indian tribes which Mr. Meehan cited as specifically the same.

#### Immediate Effect of Cross-Fertilization as Affecting Quality and Commercial Value of Citrus Fruits.

REV. LYMAN PHELPS, SANFORD, FLORIDA.

"Without some reflection it will all appear rubbish; perhaps it will appear so after reflection." CHARLES DARWIN.

To one who has spent almost a score of years in planting Citrus seeds, budding and watching the growth from year to year of varieties gathered from every belt where the citron, the lime, the lemon, and orange grow, and ocular, olfactory, and gustatory nerves at work daily for twenty-three months consecutively, keeping a record, some strange things have been seen, some understood, in part at least, many still hidden to my untutored mind; for I only "know in part," just enough to be most unsatisfactory to myself and totally disappointing to my friends. Yet I have been put before this systematized, learned and venerable Society to speak on the most interesting family of fruits, the Citrus, a *berry*, to quote from Asa Gray. I say I have assigned to me a subject which to even announce is deemed heresy by a very learned body of men. But if it be heresy, brethren, no one will be more glad to be led back to the fold of those who hold the true faith than your humble servant, nor is there any body of men who will perform that office in gentler ways than the members of the American Pomological Society. Yet I am not deterred when a man writes me, "Do you not know this is contrary to well-known botanical laws?" To say a thing is impossible, or can not be, is to arouse the old Adam in me, all my will to work. What I may say has reference to what I have seen in one little spot in Florida where I have been set to do my work. As to what may be under other conditions or environments I know not.

Of the immediate effect of cross fertilization I have no doubt. I do not speak from one experiment or half a dozen, or one year's work or two,

but from the fixed character of fruits and leaves, showing the percentage in leaf, rind, and pulp (if I may be permitted to so speak) of father and mother, for I think I can trace the fruit by the leaf of the Citrus—of *Limonium communis*—on the plates in the exhibit for your committee—two normal, three roughened by orange pollen and three flattened by same, and the mammilla or nipple showing navel tendency, and I have no doubt but the Bahia Orange is three fourths Early Oblong, a Seville Orange, and one-fourth a lime known generally as the "Rough Wild Lemon." There are eight specimens of Oblong Oranges flattened and smoothed by the lemon pollen. Some have wrinkles and sutures and puckers about the stem, like the Bahia. All of these eight have thin skins, very light colored, fine grain pulp with brisk acid resembling lemon.

Then there are eight medium specimens which will vary considerably when cut, some having light and some yellow pulp, and no two alike in flavor. There are also eight normal specimens from the opposite side of the tree, with rough and thicker skins, deep colored pulp, and now good eating. Some of the grape sugar this early, developed into the cane sugar. At least one-third of the Early Oblong Oranges I grow each year are so modified in flavor and distorted in shape by surrounding pollen that I dare not put them into the package of straight goods and brand them Early Oblong.

Again in this exhibit are two oranges picked from a Jaffa tree. On the east side is a Sweet Seville tree. On these two oranges are irregular patches of the Sweet Seville rind, promiscuously patched on, and when your committee come to cut these two oranges they will find the fruit cells deepened in color, and the flavor more like the Seville than the Jaffa, of which there is a normal specimen with them. These Jaffas adjoining the Sweet Seville are one-half roughened yearly, and can not be put under named varieties and branded, without a loss of fifty cents to seventy-five cents on gross sales per box. Your committee will doubtless report on all these.

#### DISCUSSION.

MR. PHELPS: I wish to add a few words; it costs no more to transport to Chicago a box of fancy fruits than a box of third or fourth rate fruits.

The freight is the same, the only difference is in the commissions we have to pay. There is a point I make, that the pollen changes the commercial value of the fruit. Here [exhibiting a plate of fruit] is a plate to which I will call attention. I will go back to the arguments I have made. It is well known to the President of this Society and others, that I have been growing and experimenting with lemons for some years. Here is a normal lemon from Naples, called the Lemon of Naples, the best variety of some ten or twelve that I got from Emory of Boston, John Babcock, and another man. I have said something in print on pollination heretofore, and sometimes I have been discouraged and sometimes encouraged. In the last meeting of the Pomological Society in Florida, I had the honor of meeting many of the Pomologists and entertaining them at my home. When a party of us were going through the groves, Mr. Berekmans pointed out to me an orange of this kind the Bigaradia, which comes from Ceylon, the roughest of the oranges I know, corrugated as roughly as an old squash, and I had sent before that time to Ceylon for this orange to demonstrate what I believed to be a fact, and generally one fact as we pass along is worth a good many theories. That same week that the Society was there I set some buds of this beside my Naples Lemons. This year some are fruiting. I show you some of the specimens. Most of our lemons in a degree are ever bearing. It is seldom that we cannot find blooms of some species of the Citrus every month of the year. Here on the tree of Naples Lemons on which this [exhibiting a lemon] grew, is the effect of this Bigaradia in the flattened condition of the lemon, and the Naples Lemon flattened, the mamilla all gone, the sutures not quite united as you can see very plainly. Here is another specimen not so large from the same tree, showing identically the same work. A lemon, as you gentlemen well understand, is an oblong fruit with the mamille or nipple. Well, this fruit which I show you is a lemon; who would believe it if he saw it on a fruit stand. I leave this plate for the Scientific Committee to examine. Here, gentlemen, is a plate which was all picked from one branch of a Villa Francha Lemon, the best lemon grown in Florida, I think, for all purposes save one. Here is one from the

same branch, on which the mamilla is entirely gone. Down here in regular lines are sections of the variegated orange. That, of course, I could not ship for a lemon. No one who saw it would say it was a lemon. Here is another one from the June bloom showing the same effects of that pollen; the father is a variegated bitter orange—a Bigaradia from India. Here is another which has lost the mamilla entirely. It is shorter and more rounded than the orange. When this committee come to examine this, I have no doubt they will find the orange impress to the very seeds. Many of you know probably very much better than I do that the Citrus fruit is perfected through its rind. One chemist says that from the starch first comes the grape sugar—it is turned to grape sugar—which I believe is correct; next it is changed to the cane sugar which is sweetest; and last of all these oil cells here which give the flavor—the intense boquet and flavor to a lemon—which are strained through the pulp cells and are changed to vegetable oil in the seed and from that plant life which the embryo feeds upon. This I think they will find and as to the boquet of our oranges I would say that there is never any boquet in a green orange—none of that boquet which leaves its pleasant taste, and makes the eater of one good orange wish for another. The boquet comes from the straining of the oil cells through the pulp, and in some two year-old oranges which I have on exhibition, you will find the boquet so strong that it is often offensive.

Now here is an orange that one of the Northern agricultural papers — *Forest and Garden* — had something to say about, and so have I, for I was one of the first to grow it; that is the Unasn. Here is one picked from the same tree, and this tree is standing next and close beside that Bogaradia Orange which shows the disunited sutures, and is even more flattened and greatly roughened, and yet there the bloom is of the same age but rendered smaller by the influence of that smaller orange. For years I have been doing a great deal of pollination on the trees, and booking and marking and keeping record, and I was first led to it by seeing these strange things on the oil cells of the oranges, and I have brought these rougher ones for the reason that all the oil cells of the Citrus

family are so close together that you have to watch closely for them. I never reach a conclusion unless I look for it. The oil cells are so near alike that it is often difficult to see this thing, but I brought this rough one here which is so manifest that I do not see how any one can escape the conclusion that there is some effect, be it pollination or something else, which does change the rind of this Citrus fruit, which is only a modification of the leaves of the fruit, and in that work of pollination I have done, I have been amazed. Last year in the presence of Messrs. Hart and Hubbard, two of our most progressive orange growers in Florida, I made some very interesting experiments in pollination. I believe that the influence of the pollen costs me on my fruit that I ship, at least fifteen hundred dollars a year in deteriorating the appearance of my fruit.

MR. MEEHAN: The question is, which of those that you exhibit do you consider to be the parents. Which were the normal forms that produced intermediates by the mixing of the pollen.

MR. PHELPS in answer pointed out certain fruits represented in a picture.

MR. MEEHAN: Have you any idea what intermixture of pollen produced those normal forms in the first instance?

MR. PHELPS: I do not know. I think the difference between the limes, lemons and citrons is very shadowy. I came here to learn, not to teach.

MR. CARY: Did you not say you had cross-fertilized the navel? Did the navel lose that peculiar appearance on the blossom end of the orange?

MR. PHELPS: Yes. I would like to ask Mr. Meehan one question. Last year I cut from a twig not longer than my finger a normal Navel Orange. This was a normal Navel Orange with the lemon-colored rind; and on this same twig was a dark blood orange, with no navel mark at all and blood cells full, which I have plates of on the tables and at home. What caused that? Again, at the last meeting of this Society I showed one cut from a Majorca tree. There are six divisions usually in an orange, and in this orange there were three divisions as red as blood, while the others were pale and the flavor distinct. What caused it? I ask for information.

MR. MEEHAN: I understand my friend asks me a question as to what is the cause of different colored oranges on the same plant and similar changes I suppose which we occasionally see. I should refer them to morphological and physiological laws, and not to intermixture of pollen. I asked the question in relation to those normal forms, as to what particular intermixture of pollen brought them about; because from what the gentleman has said it would seem natural to suppose that the parents were brought into existence by an intermixture.

MR. PHELPS: I did not come to discuss morphology this morning. Some other time I would be glad to discuss it.

MR. CUTTER: I have not made experiments in this direction, but some facts have come under my observation, and while I am not at all prepared to say that there may not be very much in what Mr. Phelps has presented, nevertheless I am not yet satisfied upon that. There are certain things in the subject which his theories do not account for. I was once in a seedling orange grove at the mouth of a mountain cañon which was at least forty miles removed from a Navel Orange tree. I do not know that there was no Navel Orange tree in the vicinity, but certainly there could not have been one within a mile or two of it, because there were no other orange trees within that distance and it was not an orange-growing locality. The settlement nearest to that where oranges were raised was Riverside, forty miles away. Now in the seedling Orange trees I have observed—with comparative rarity—a slightly developed navel, never a fully developed one; but on these trees removed so far from any other I observed some of this same slight navel development. Now, what caused that? It is hardly possible that the pollination was effected by bees, as there were no bees near the Orange trees. How then was the pollen conveyed which produced the navel development upon this seedling Orange tree? Again, where I have had an opportunity to see a great many of these abnormal forms—navel developments—upon other varieties of trees, I have noted that some varieties show many navel developments; the Maltese Blood Orange particularly shows more and better developed specimens of navel than any other

variety. The Maltese Blood is a weak grower but a heavy bearer and the bloom carries the yellow anther, indicating abundance of pollen. The next in abundance of navel specimens that I know of is the Paper Rind St. Michael, a tree of good growth and vigor, and carrying a bloom with very abundant pollen, amply able to take care of its own fruit in that respect. And still, although it shows as good a bloom development practically as the seedling, it shows a great many of these navel developments; I mean I can find them more frequently there than elsewhere. Now, as between the Maltese Blood and the Paper Rind St. Michael, the navel development assumes one form on the Maltese Blood and another form on the Paper Rind St. Michael. Now, suppose the navel pollen has produced it—if that is the parent why should it not impress the same form upon its offspring on all varieties? Why should it be a development much resembling that of the navel itself upon the Maltese Blood and instead of that a very little, beautiful, conical protuberance upon the Paper Rind St. Michael. Again, on the Mediterranean Sweet, a weaker tree than the Paper Rind St. Michael, weaker I believe in its development of bloom and pollen, we cannot find so many specimens. Now, the weaker tree should be the more impressed as it seems to me, and the theory of cross-pollination does not account for these circumstances. Again, we have been told in the paper read here to-day that the orange is nourished from the skin.

Now, in conversation with the gentleman who presented the paper, I find he states that he finds oranges in which there are segments of different varieties; he has also stated that in answer to questions put by others here—segments of different varieties within the orange; and in papers presented by him and others through the press it has been shown that these segments were also accompanied by a different development of the rind in segments corresponding in form to the variety. Now, I have taken some pains to observe that, but since the Paper Rind St. Michael has in its peel a very different conformation from all other oranges, making it exceedingly easy to observe any departure from its regular type, I have frequently observed upon that orange segments of rind of totally different character from that which was

commonly normal with that orange. Then I cut the orange in cross section to determine what was the interior character. Now, if the gentleman's theory is correct, then the internal segments of flesh should be co-terminous with these segments of rind; but this was most conspicuously not the case. The rind was laid on without any reference whatever to the internal structure of the orange, and I was unable to find any differences in the segments, and as I was observing, with special reference to this point, I took most special care to see whether that rind would be co-terminous with the internal segments of the orange. These facts are not accounted for in Mr. Phelps' paper. Again, one more fact I may state is this: I have found upon that Paper Rind St. Michael a tendency to sport which I have not observed in other oranges, possibly because of its very distinct character, and half a tree will sometimes grow out and produce year after year from the bud an orange of totally different character, and in all cases where twigs of this variety of orange have produced such a spore as that, there has also been produced a spore of uniform character, and both upon my own trees and those of others whom I have questioned in regard to it and obtained a description of the orange, the spore was of one uniform character in every case. Now, if cross-pollenization had been the thing which introduced the deviation in through the tree, then why, as cross-pollenization comes through great number of varieties, should all these spores be uniform in character upon that particular orange?

MR. VAN DEMAN: There is one question that I would like to ask not only Mr. Phelps—for I do not know that Mr. Phelps has taken exactly the position that some have—if the Washington Navel, or Bahaia, which is the same thing, affects through its pollen the other varieties of the orange in the same vicinity, so that the navel—the peculiar umbilical or navel mark—appears upon it as they claim, why in the name of reason is it that the other oranges which have a million grains of pollen to one that the Bahaia possesses—why in the name of reason do they not so affect the Bahaia that the navel mark is eradicated? That is a question I wish answered. If this theory is true, it must work both ways from one variety to the other.

It must work from other oranges to the Bahaia as from the Bahaia to the others. Now I wish to state this fact in regard to the pollen of the Washington Navel or Bahaia. In my office we have examined hundreds of flowers of this variety taken from our own trees right fresh as they bloom there in the Department of Agriculture's green houses, and others sent by Mr. Phelps and by E. H. Hart of Florida, and others sent by Mr. Cutter and different persons at Riverside, California, and in no case have we found under the microscope a single perfect grain of pollen—not any case—and how can this orange affect the others when it has no pollen to use?

#### Fruit Districts Geologically Considered.

BY E. S. GOFF, MADISON, WIS.

The proposition that certain regions are specially adapted to the production of certain fruits requires no proof. The Ionian Grape, which bears the little seedless fruit known in commerce as "Zante Currants," is scarcely grown except in two or three of the Ionian islands, and in a narrow territory on the northern shores of Morea, and almost all efforts to naturalize it elsewhere have failed.\* Oranges are produced over a considerable part of Florida, but the orchards in the vicinity of Indian River have healthier trees, and yield finer fruit than in most other districts. The Catawba Grape is grown more or less in gardens throughout the Northern States, but only in a few favored districts, as on the shores of Keuka Lake, and of Lake Erie, and the lower valley of the Hudson River does it ripen its fruit perfectly in the average season. In like manner the Peach tree endures the winters over the greater part of our Northern States, but only in a few localities in these States, as upon the eastern shores of Lake Michigan, and in parts of New Jersey and Delaware is it reliable for fruiting. Illustrations might be multiplied were it necessary.

Sometimes these fruit regions are circumscribed by very narrow limits. On a certain farm known to the writer in Southern New York, the growing of Peaches has proved highly profitable to its owner for many years, while nowhere else in their vicinity has the production of this fruit proved even mod-

erately successful. In parts of Richland county, Wis., in which the surface is broken by gentle hills, separated by narrow valleys, certain fields that crown the hillocks are adapted to the culture of hardy Apples, while others, often on the same farm, which extend down southern slopes, or form the bottom of the narrow valleys, offer such different conditions that Apple trees are not only unproductive, but rarely live more than a few years.

A knowledge of these fruit districts, and of the conditions that locate and limit them, is of the greatest importance to one who contemplates entering upon any department of fruit growing as a vocation, because, however great the expenditure of capital, energy or skill, in a location where natural conditions are unfavorable, the highest success in this industry cannot be hoped for. A brief consideration of this subject is therefore appropriate.

Fruits, in common with all other plants, prosper in proportion to the favorableness of their environment. A study of plant environment reveals the fact that it is the resultant of a complicated set of conditions that act upon each other in varying degrees. Thus, temperature, a very important factor in the plant environment, is modified, not only by latitude, but by exposure, by altitude, by the nature of the soil, the proximity to water, the prevailing winds, the humidity of the air, etc. In like manner, atmospheric humidity and precipitation are modified by many physical conditions. It follows, therefore, that climate is not necessarily coincident with latitude, as any isothermal map will indicate. But no isothermal map yet constructed shows this truth in its entirety, because in almost every individual township, we find the climate varying more or less as a consequence of varying physical conditions.

Were all soils and climates equally well adapted to fruits, or were all fruits equally adapted to different soils and climates, we should have one continuous fruit district wherever land extends. But since the adaptability of fruits is as different as soils are far from uniform, and since climate varies greatly in different regions, it results that fruits, in common with all plants, succeed very unequally in different localities. Within the tropics, where solar heat is not wanting, we find a continuous fruit belt through all fertile lands that have sufficient rain-

\* Marsh, Earth, as Modified by Human Action, 17.

fall, and of which the altitude is not so great as to neutralize the solar heat. But as we proceed northward, and warmth diminishes, this fruit belt gradually breaks up into isolated fruit patches, of greater or less extent. These patches, or as we prefer to call them, fruit districts, are found in localities, where for any reasons, the climate retains the qualities of districts less remote from the equator, provided only that the soil and rainfall are propitious.

This breaking up of the great equatorial fruit belt first occurs with the strictly tropical fruits, as the Pineapple, Coconut, Mango, and Banana. These, with the possible exception of the Banana, can scarcely be grown on a profitable commercial scale within the limits of the United States, except in isolated districts in the extreme South. The orange belt breaks up a little farther to the northward, this fruit being grown with some success along the gulf and Atlantic coast from the Rio Grande to the sea islands of South Carolina, and in the thermal belts skirting the coast valleys of Central and Northern California.\* The breaking up of the Peach and Grape belts occurs still farther to the northward, so that we find the culture of these fruits successful in specially favored districts in some of our more Northern States. The Apple belt may be said to include nearly our entire country, breaking up only in the more northern portions of the Mississippi and St. Lawrence valleys, while for the *Prunus Americanas*, the Currant, the Gooseberry, Blueberry and the Raspberry the belt of successful culture passes our extreme northern limits, the latter four fruits being found in their wild state as far north as Alaska.†

It should be added that some of our hardy fruits, as the Apple, Currant and Gooseberry, do not succeed in tropical countries. We have, therefore, for these fruits, a belt running through the temperate zone, breaking up into isolated districts both on the northern and southern edges, those districts on the sides towards the equator being located and limited by a set of conditions acting exactly the reverse of those on the side of the pole.

It is a fact of interest and importance to horticulture, that, other things equal, the further outside of the normal belt a fruit district is located, the more profitable is the culture of the fruits to which it is adapted. The reasons for this are various. Competition from the same latitude is not only restricted, but the cost of transportation enhances the value of the same fruit grown further south. In the more delicate fruits, as the Raspberry, Blackberry and Strawberry, the lateness of maturing in the Northern fruit districts effectually shuts out all Southern competition. In some other fruits, as the Apple, the longer days of the more northern clime develop a brilliancy of color that is not found in regions further south. In Wisconsin, successful Apple culture is limited to a comparatively few districts, and these are mostly of small extent, yet the profits realized from the few successful orchards often surpass those from the finest orchards of western New York. The high color of the Apples grown in Wisconsin and other Northern States is recognized wherever they are shown in comparison with those of the same varieties grown further south. In like manner the profits of small fruits in the more Northern States are often, if not usually greater than those realized from localities further south, where their culture is more generally successful. The same may be said of the Peach and the Grape in our more Northern fruit districts. These facts give an added interest to special fruit regions, and invite a study of the causes which serve to locate and circumscribe them.

Within a few years, the Eastern shores of Lake Michigan, particularly in the portion south of Grand Haven, have become famous for the production of Peaches. On the Western shore of the same lake, the Peach tree scarcely survives the winter, and rarely yields fruit, while a few miles further to the westward the Peach tree utterly fails, and only the more hardy varieties of the Apple can be successfully fruited. On the East shore of the lake, however, Apples, and even Peaches are said to succeed as far North as Mackinac,\* which is a degree North of the northern boundary of New York and Vermont. The causes for these striking differences of climate in a similar latitude, accord-

\* Van Deman, Tropical and Semi-tropical Fruits of the United States, 1887; 57; Klee, *Ib.*, 111.

† Dall, Rep. Dep't. Agr., 1868, 178.

\* Lyon, *Hist. Mich. Hort.*, 12.

ing to Professor Winchell, "must be attributed to the fact that the prevailing winds which bring frost or severe cold are westerly, reaching the easterly or Michigan shore only after having traversed nearly or quite one hundred miles of very deep, open water, to which, during the warm season, they will have surrendered a very considerable increment of heat, to be retained until it shall be wrestled for and re-absorbed by the colder gales of late autumn and winter, thus quenching their excess of cold by the transfer to them of a portion of the surplus heat of the warm season. \* \* \* It is also a fact well known to nautical men, that a current sets northward along the easterly shore of Lake Michigan, doubtless occasioned by the increased influence of prevalent southwesterly winds upon the waters nearest that shore; and also that there is a reverse current along the westerly shore, thus causing a slow, but constant transfer of the warmer waters of the South toward the northerly extremity of the lake and *vice versa*, much in the same manner as we see on a far grander scale, the tepid waters of the Gulf of Mexico transmitted by the gulf stream to soften the climate of Northwestern Europe."\*

In like manner the Southern and Eastern shores of Lake Erie and the Eastern shore of Lake Champlain present a somewhat softened climate as compared with localities more remote from water, making the former district well adapted to the culture of native Grapes, and the latter to that of hardy Apples. Even the smaller lakes of Central New York, aided doubtless by the larger Lake Ontario to the northward, surrounded by fruit districts in which varieties of the Grape and Peach succeed that cannot be grown in Northern Pennsylvania. Especially is this true of Keuka Lake, on the banks of which frosts hold off until the middle of October, and the Catawba Grape ripens to perfection in the average season.

The influence of physical features in modifying climate is perhaps nowhere more strikingly shown than in California. Here, the combined influence of the great Pacific Ocean, with its Japan current washing the coast with waters tempered by a tropical sun, and the mountain barriers to the

eastward, deflecting the northerly winds, actually cause the isothermal lines, which normally run east and west, to extend north and southward. Indeed, in some cases, fruits ripen earlier in the Northern than in the Southern parts of the State.\*

The influence of altitude in modifying climate is also admirably illustrated in the mountain regions of California. In the valleys, semi-tropical fruits are successfully grown even as far north as Shasta County. But above an elevation of two thousand feet, conditions gradually intrude which resemble those of colder climates. The Apricot and Peach are liable to winter injury, and give irregular returns. At four thousand to four thousand five hundred feet, the hardy Apple and Pear flourish, ripening late, and winter varieties possess excellent keeping qualities. Here, however, winter killing of trees begins, and locations even for hardy fruits have to be chosen with circumstances.†

At certain altitudes, in the mountain districts of California, and elsewhere, occur belts of greater or less extent that are singularly free from spring and autumn frosts. These locations have been called "thermal belts," and are peculiarly adapted to fruit culture. Their altitude secures free circulation of air, and immunity from violent summer heats, which makes them less subject to many fungus diseases than the valleys beneath, while their almost complete freedom from frost gives them a prolonged growing season. In seasons when premature warm weather in spring is followed by severe frosts, these thermal belts are sometimes conspicuous along the mountain sides from the lively green of their newly formed foliage, while both above and below the premature growth has been blasted by frost. The presence of these belts has been explained‡ by the merging of the ascending current of warm air from the valleys beneath, with the more rarified atmosphere of the mountains. The warmer currents ascend until they reach strata of equal rarification with themselves, where they cease to rise and merge themselves in the atmosphere of that region.

It would seem that the great mountain regions of our Western States and Territories must abound

\* Winchell, quoted by Lyon, l. c., 9, 10.

\* Wickson, California Fruits, 10, 11, 13.

† Ibid, 15, 17.

‡ McDowell, Rep. Dep't. Agr., 1861, 146.

in these thermal belts, and though comparatively few of them have as yet been developed for fruit culture, it is not impossible that the golden fruits and rich vintages of this vast mountain system may yet rival in value the outputs of their mines of the precious metals.

Certain fruits are especially susceptible to certain features of environment. The Cranberry, it is said, cannot endure a soil that contains any considerable admixture of clay or lime. The European wine Grape *vitis vinifera* is extremely susceptible to extremes of atmospheric humidity; the fruit buds of the Peach are very susceptible to the cold of winter. The area of successful culture for such fruits is greatly restricted as compared with what it might be, but for these special weaknesses. The Cranberry, though hardy enough to endure the climate of Alaska, succeeds in very few localities of the Northern States, not apparently from any unfavorableness of climate, but from its susceptibility to soil conditions. The climate of the Mississippi Valley possesses the requisite amount of summer heat and rainfall for the complete maturation of the European Grape, yet all attempts at its culture there have proved unsuccessful. The reasons ascribed for this failure are our violent extremes of meteorological conditions, especially of atmospheric humidity,\* though it is probable that the Phylloxera should be charged with one of the chief causes. In portions of the Rio Grande Valley, and in Southern California, this grape is being successfully grown under irrigation, which appears to defeat in a measure the work of this destructive insect.

I may add, in conclusion, that the subject of plant adaptation is one of great interest and importance, and which should receive much more study than has yet been devoted to it. It would seem that a thorough study of plant environment in our distinctive fruit regions should enable us to establish a formula by which the adaptability of any given locality for any particular fruit might be determined without resorting to the costly method of experiment. What expense and disappointment might have been saved could it have been determined beforehand that the European Grape could

not succeed in the Eastern United States! De Candolle, who gave much study to the geography of plants, was unable to explain this failure from any data that he could procure.\* Could he have had access to more complete meteorological data, it is probable that he might have assigned the true cause. So this indeed is the crying need. I have made some attempt at these studies, but have been disappointed at the meagreness of the available data. It is true that the reports of the signal service have very great value, but before the science of plant adaptation can be fully developed we must have series of observations reaching through years, not only of temperature, humidity, precipitation, cloudiness and wind, but of the intensity of sunshine, of soil temperatures and moisture, of the prevalence of fogs, and dews; and we must have these observations not simply from one or two localities in a State, but from every locality that has a specially interesting economic flora. Let those who are patiently making laborious observations at our signal service and experiment stations, and who often grow weary of their well doing, wondering if their patient labor will ever be appreciated, take new courage. It is from data of this kind that a new science is yet to be developed that will prove of vast importance to a future generation.

#### DISCUSSION.

MR. ENGLE: It is hardly possible for one man to know all and everything about it. I merely wish to correct the impression that might be gotten from the paper just read, that the successful Peach growing area is so circumscribed. We can find good places in Michigan and Delaware. I want to make a statement in reference to what we did in Pennsylvania for some time. Pennsylvania has not grown Peaches for commercial purposes in my recollection until recently. Eastern Pennsylvania grew quite a number for the Eastern markets—the large cities; but some twenty five years ago there was quite a fever for Peach growing in Franklin County, and they grew as fine Peaches there as in Delaware; but, I do not know for what cause, the enthusiasm subsided, and they have not continued, but later—probably twelve or fifteen years ago—the Smith Brothers of Juniata County, Pennsyl-

\* Lippincott, Rep. Dep't. Agr., 1863, 487.

\* L. C., 487.

vania, came to our place and tried to secure some of our Peaches to grow, saying that friends of theirs had a fine Peach orchard that did not amount to much and they were going to try it—they bought five or six hundred trees. In the course of half a dozen years, they had successful crops and began to ship Peaches. Now they are grown from year to year. For several years past they have planted one hundred and fifty thousand trees yearly just in Juniata County. Surrounding counties are also planting heavily. This spring early in the season I corresponded with the Smith Brothers in reference to the estimation of the Peach crop in Juniata County. They replied four hundred thousand baskets for this season. I have not heard from them since, but they generally understand the business. Now, I am satisfied that the area of successful Peach growing in Pennsylvania alone—that is just a small plat of it—the counties south of that on the border of Maryland—I am satisfied are as well adapted as Juniata County, and I think the enthusiasm stirred up there by the Smith Brothers will not subside. Around there where the Smith Brothers live, it is almost lined with Peach orchards, and all in consequence of their success.

MR. HALE: I think the remarks of this gentleman simply corroborate what the speaker tried to lay down in his paper, that there are certain local conditions and spots—little areas here and there everywhere—peculiarly adapted to some kind of fruit, and the only way is to hunt them out—find those spots and you will make profit.

### Physiological Effects of Pruning.

BY L. R. TAFT, LANSING, MICH.

Few of the operations of the horticulturist are of more importance, and none require greater judgment or more delicacy in their performance. All of the vital actions of plants are based on the laws of vegetation and any interference with their functions can only have an injurious effect.

When wisely performed, pruning, like all similar operations will contribute to the benefit of the horticulturist. He can regulate the quantity of fruit, and extend the bearing age and even the life itself of the plant. "The growth of a plant, the

size of its flowers and the number, size and quantity of its fruit, depend to a large degree upon the arrangement and health of its branches and leaves."—(London.)

The number of the branches and leaves is reduced in pruning, and as this modifies the structure of the plant and interferes with its functions it should be performed with more than ordinary care.

It is often the case that the saw, axe or knife are used when no definite reason can be given. No operation requires greater foresight than does pruning, and the successful pruner can see in imagination, before removing a branch, the tree as it will appear long after the operation is completed. The "doctors" often disagree as to the best methods of pruning, but we can safely say that no branch should be pruned away for whose removal a good reason cannot be given.

For our present purpose we may consider that plants are pruned for any one of three objects: First, the removal of dead or dying portions; second, to thin out plants in which too many branches have been allowed to develop; third, by the removal of one portion to affect in some way the development of other portions of a plant, either branch or fruit.

The first of these operations is comparatively simple, as it may be done at any time, without affecting the tree, and but little skill is required. For the proper performance of the second, a knowledge of plant physiology is desirable, as well as an acquaintance with the peculiarities of growth of the different varieties to be pruned, while in the third every one will find abundant opportunity for the exercise of his best judgment.

The fact that by the removal of a portion of the branches of a plant various changes can be produced in its internal economy is no new one, as more than three thousand years ago the Egyptians and Greeks were aware of it. The value of removing a portion of the wood of a Grape vine was brought to public notice by observing the effect produced by the browsing of a goat, or of an ass, as some have it, while the singing of the branches of a rose led to the pruning of that plant.

For a long period the art was an empirical one, and even to-day with many persons it has hardly passed beyond that stage. We still apply the saw

to our orchards at certain seasons, but have but little better reason for it than could be given for going to mill with the grist in one end of the sack and a stone in the other.

The development of a plant is due to the formation of new cells within its structure from various outside materials. A portion of these come from the air, but others are taken up from the soil in solution in water by the roots. Passing up to the leaves they are there assimilated and transformed into substances that can be utilized by the growing cells. The leaves also serve the plant as organs of respiration and of excretion, and a plant can no more live if its lungs, stomach and kidneys are removed than can an animal.

On the other hand a few well-developed branches are of more value to a plant than three times as many crowded together and each depriving its neighbors of needed air and sunlight.

Although the removal of these surplus branches will be injurious to the tree, the benefit of the removal will greatly exceed the injury.

So far as its immediate effects on the plant are concerned, we may in a general way consider that the injury is in proportion to the amount of leaf surface sacrificed and the size of the wounds inflicted. The judicious pruner depends largely upon "pinching in," "rubbing off," and such thinning out as can be done with the pruning knife, or better yet with the thumb and fingers. When surplus shoots are thus rubbed out and rampant ones pinched in, the entire vigor of the plant is exerted in developing the remaining branches and their leaves, and there will be no occasion in the future of checking the growth of the plant by their removal. It is generally impossible to carry this out in actual practice, but the theory is correct and the nearer we approach it the better.

*Remember that every blow of an axe or push of a saw in removing large branches is a blow against the life of the tree.*

Much pruning, however, is extremely injudicious and detrimental to the health and life of the tree; as in various ways it is possible directly and indirectly to injure them.

When we unduly diminish their respiratory and digestive organs, we lessen to a corresponding degree their capacity for growth and development,

and this is particularly true if the pruning is performed while the plant is in full leaf, and at the height of its activity, as the removal of a considerable portion of its leaf surface at this time lessens to a corresponding extent the food supply of the plant, disturbs the normal action of its different parts, and generally results in a serious check to the tree. If the tree is pruned while still dormant, there is less check to the tree, but the evil effects may still be very marked.

One cause of injury at this period is, that the surface exposed allows the moisture from the tissues below to escape, and serious harm may result. Even if no hollow or pocket is formed by the decay of the contiguous parts, the dead cells will prove a serious check to the circulation of the sap.

The pruning of trees at time of transplanting deserves especial attention. When dug from the nursery, the average tree has perhaps a half dozen prong-like roots, and at the top of a long stem a circle of branches several times as large. When planted in the orchard these apologies for roots are supposed to take up moisture enough to provide for transpiration from the leaves that may be sent out, as well as that from the woody portions. With ordinary care they often fail to do this, and the tree withers and dies. The best results in such cases would be obtained by severely cutting back the branches, somewhat in proportion to the length of the roots, as this would equalize the absorbing and transpiring surfaces; thus preventing the wilting of the leaves, and would also offer an opportunity for the proper formation of the head. If from four to six shoots are allowed to grow, and these are cut back from one-third to one-half, a well shaped head can easily be formed. Care should be taken to avoid the formation of crotches, and whenever practicable, the branches should be arranged in a spiral manner around the central shoot. If this can be secured it will make a wonderful difference in the number of trees that split down.

Much has been written as to the best time for pruning, and although a few points seem settled, there is a great divergence of opinion regarding others. One old saying is, Prune in the Fall for growth, and in the Summer for fruit. As noted before, the check to the tree is very slight if performed after the leaves drop in the fall, and on the

opening of spring the tree is in a condition to at once begin a normal development; on the other hand a tree pruned after growth has commenced, receives a severe shock and the growth is checked; at the same time the sap is turned into other channels, and is used in developing the fruit spurs for the next year's crop.

The advice is often given never to prune while the wood is frozen. While not a believer in winter pruning, I can see no difference between pruning on a cold January day and a warm one, except so far as the comfort of the pruner is concerned. There seems to be no valid objection against pruning a healthy tree in winter except that the drying out seems much greater at this season than at any other. The tree is then dormant, with little movement of watery sap, and especially as is often the case, if the wound cracks, the tissues may become dry to a considerable depth. During other periods of the year the sap is more mucilaginous and evaporation from the surface is greatly reduced, while an abundant supply of water is obtained by the roots. After the terminal buds are formed in mid-summer the surface sap is stored in the tissues, and at this time nature quickly repairs any damage by the formation of a callus from the exposed cambium. It is often said that a large wound will heal quickest if made in mid-summer. It is true that the callus forms quickly at this time, but if the wound has kept from drying out a scar made in November will be as well grown over in a twelve-month as one made in May would be at the close of the growing season.

Whenever it is necessary to make a large cut, the injury to the tree can be greatly lessened if the wound is coated at once to prevent drying; common paint, shellac, grafting wax or grafting clay, are all excellent for this purpose.

Perhaps the worst season of all for pruning is just after the buds start. At this time the trees are subject to bleeding, which will not only exhaust the tree, but the sap may run down the bark and cause its decay.

It has often been observed that if the growing end of a branch is broken off, side shoots will appear, and combined they will make an even greater growth than could be obtained from the development of the original single stem.

We know that by pruning in one way we can diminish growth and in another increase it; we can thicken up a plant by a certain method of pruning, and in another way render it open, with long straggling banches. All these variations produced by pruning are based on various natural laws that govern plant growth.

The development of a plant is due to the formation of new cells within its structure, from various outside materials. We can say that the growth of a plant depends on the amount of food with which it is supplied, and on the other hand the amount of food taken up by a plant, while modified by the physical conditions of the soil and air, is governed to a considerable extent by the rate of growth.

Everything else being equal, the amount of food furnished the different parts of a plant is the same, although this is modified by the fact that, up to a certain extent, the upper and newer portions of a plant receive more than the older ones. All elongation of branches is the result of the development of the internodes of the buds. This growth takes place within a very short distance of the end of the shoot, seldom being formed more than three or four nodes from the tips, and if cut off farther than this from the end, no extension of the branch can occur.

If the terminal bud alone is removed the elongation will cease as soon as the internodes nearest the bud have made their normal extension, and growth in length can only come from the development of some of the buds along the side of the branch.

By the removal then of the terminal bud we have checked the development longitudinally, and the food that would have been used for this purpose will be utilized in the development of side shoots, and the thickening up of that portion of the plant. When a portion of a plant is not making a proper growth, it may be cut back severely, and the entire vigor of that portion of the plant, being used in the development of a few buds, a strong, vigorous growth will result. This can be increased if other portions of the plant are pinched back. This result can in part be attributed to the increased amount of food that can be supplied through soft, succulent tissues, as compared with what can pass through the hard, compact structure of the original.

Nurserymen often prune their weak or crooked trees in this way and, as a result, trees cut to the ground in the spring, will by fall be larger and far straighter and smoother, than similar trees allowed to grow naturally.

When trees are making too rank a growth, and it is desired to induce fruitfulness, root pruning may be resorted to. By digging a trench two feet deep, in the form of a circle six or eight feet in diameter, around a young tree of bearing age, the supply of food is cut off, and the check to the tree, and nature's tendency to reproduction under such circumstances, leads to the production of fruit buds. This practice is not commended.

We may attribute another cause of failure in orcharding, indirectly, to injudicious pruning, and that is the practice of removing the branches from young Apple and Pear trees up to the height of six or seven feet. This not only makes them top heavy, so that they are blown about by the wind, but it exposes the trunk to the direct rays of the sun, causing it to dry out in summer or crack under the freezing and thawing of winter. The bark is also generally rough and broken, and the trees are far more subject to borers than those with low heads.

As rules based on the natural laws that have in part been outlined we may say in a general way:

Cut out dead limbs and small branches at any time.

In case of too rank growth, and too few fruit buds, prune in June, but if growth is to be kept up or stimulated, prune in the fall, or better yet in March or early April.

As a rule, depend on frequent pruning with a knife, and avoid in this way the removal of large branches. Do not have the head open enough to expose the branches to the burning sun.

Check growth of a rampant branch by pinching it in, and stimulate a weak one by severely heading it back, and at the same time throwing all the vigor of the plant into it.

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### Some Local Pomological Problems.

BY CHARLES W. GARFIELD, GRAND RAPIDS, MICH.

An assertion of any import is rarely made in a gathering of fruit-growers, but that some one is prepared to contradict it with facts from his own experience or observation. In our conferences,

then, we must couple with the record of experience concomitant circumstances that really give character and value to the statements. If the first Ben Davis Apple upon which Mr. Downing based his description had been sent him from Missouri, how different would have been his record from that made with a Michigan specimen as his sample. Two distinguished pomologists recording the qualities in various fruits may be wide apart owing to difference in taste. It is just as true, also, that comments upon any variety of fruit are as liable to vary in gatherings of fruit-growers from a limited area as from the breadth of a nation. This leads me often to remark that while one man's experience may aid another to some extent, it is doubtful whether the simple record of the experience of a wise man will benefit a novice.

The man of wide observation who is a successful fruit grower is apt to minimize the details which are essentials to his success, because they are so simple to him. While he who follows even the minutiae of the successful man's counsel will in a majority of cases fail. This is many times owing to local problems that may be peculiar to one farm or neighborhood. My father, in 1857, bought the farm upon which I now live, because there was a fine Peach orchard on it in full bearing. The following winter the trees were all killed and we have never had a crop of peaches on the farm to this day. Still my neighbor, two miles away, rarely fails of a good crop. He is thirty feet higher. Another neighbor with no difference in altitude is a successful peach-grower, but his orchard is surrounded by springs.

The Grand River and six miles of territory separate me from a colony of fruit-growers, my warm friends. We meet in council and they insist that the Gregg is a hardy Raspberry of good quality, that the Shaffer is a poor thing unworthy of cultivation, that the Ohio has nothing to commend it; while my immediate neighbors unite with me in combating them on every point and wildly proclaim that the Gregg is tender, the Shaffer a great success and the Ohio a model market black cap. The dissimilar judgments are based upon conditions that are widely at variance. The other day in discussing the merits of the Early Michigan Peach, one said it was firm, of good quality, handsome, an

excellent bearer and in general a model market fruit. Another remarked that it was not quite good enough to eat, and a third said there was so much wool on it that one needed to peel it to get any enjoyment out of it. I learned subsequently that the first man grew it upon an entirely different soil from the last, and while the first speaker knew not one Peach from another in quality, the second speaker was a connoisseur in fruit qualities.

The Hill's Chili has been condemned by a whole section of our State as too poor a Peach to grow, and as highly commended by another locality. Both are right. Each locality has its peculiar conditions affecting this variety differently.

The man who asks how to make his orchard bear is given counsel by another whose conditions are as dissimilar as it is possible to make them, and still the successful man knows he is right and gives his advice without reservation.

I would not minimize the value of our national gatherings in the interest of Pomology, but the man who goes a long way from home to get advice as to what varieties to plant or how to manage them, is liable to be misled. His local conditions are the ones to be studied, and hence the great importance of carefully conducted experiments in one's own neighborhood. All honor to the men who are willing to be pointed at as theorists, experimenters, book-farmers, etc., whose trials are but a few of them crowned with success, but whose failures are a perpetual help to their neighbors. Habits of thrift and scientific methods are of the widest application, but the dealing with one's environment so as to make the best possible use of one's ability is a problem one must largely work out for himself. He can only learn of his nearest neighbors, and he is greatly blest if these neighbors are broad-minded, careful people, given more to patient investigation than to elaboration of theories.

We think a great many things in relation to fruit growing, and often think aloud too quickly. We know very little, and even this grows less when we attempt to give it wide application. I have listened so often to discussions in which the relation of experience has taken a prominent part, and have noted so many false inferences taken that have proved disastrous in the attempt to utilize

them, that possibly I may magnify the importance of varying local conditions as affecting experience and counsel.

To be a successful fruit grower, one must be well grounded in general principles, in order to most quickly lay hold of his local conditions, and manipulate them in his interests, notwithstanding there may be sporadic examples of success that do not seem to involve the solution of any problem. It would seem, then, to be of considerable importance that people in a neighborhood having conditions similar should familiarly compare observations and experience, and thus by utilizing the consensus of opinion, elaborate to the fullest extent the capabilities of their condition. I confess in saying this that it is uphill work trying to induce people to have more confidence in the counsel of their neighbors than in that of strangers, and often when asked for advice by one far away and I have referred the interrogator to his own neighbors I have knocked a foundation stone out of my fame. Still I insist that the most serious problems we have to solve in striving after success in the growing of fruit, are those which are peculiar to our own locality, the solution of which we cannot safely intrust to a stranger.

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#### What are the Possibilities of Originating a Class of Pears Exempt from Blight.

BY T. J. BURRILL, CHAMPAIGN, ILL.

*Mr. President:*

For once I have consented to write a purely theoretical paper for a body of practical workers. At the outset it is proper to make the acknowledgment that I can say nothing with anything like absolute assurance of correctness upon the subject given me. No one can, until he can offer abundantly verified records of practical accomplishment and then the subject itself may be changed. All that can now be done is to point out what facts already ascertained have a bearing upon the problem proposed. That there are some such facts what follows may answer.

In the first place it must be conceded that blight, as we know it, of the Pear and Apple tree is due to a parasitic organism, now thoroughly well known and abundantly verified as the direct cause of the

disease. This is usually recognized by the botanical name, *Micrococcus amylovorus*, though the generic association is undoubtedly incorrect, yet no more so in my opinion than that of *Bacillus* to which some have referred it. Whatever the name, the object is a minute, living, self-propagating, rapidly increasing, lowly organized plant, belonging to the general class called bacteria, and included among what are now popularly called disease germs. They are individually only visible to us by the aid of high powers of the microscope, though when collected in masses as frequently happens in the case of the species now under consideration, the bulk becomes considerable. In this manner the substance sometimes oozes in drops or larger amounts like pus or thick varnish from the bark of affected trees. It is at first white and quite fluid, but on exposure to the air becomes brown and at length in dry weather forms a shining, resinous crust. Even in the latter condition, however, the substance is readily soluble in water, forming within a few minutes a milky fluid as it dissolves.

An examination with a suitable microscope invariably shows this to be composed of myriad numbers of exceedingly minute, oval or slightly elongated, simple bodies, without members or organs of any kind. Very often they appear in couples joined end to end, a consequence of their method of self-multiplication by transverse division. Soon the parts of the pairs become fully separated when each may again divide in similar manner. Structurally they are known to consist of a simple cell, having an exterior wall of woody substance (cellulose) inclosing a softer mass called protoplasm. In some conditions of growth each cell has a slender hair-like projection from one or both ends which by rapid vibrations propels the little submerged craft in an astonishing manner. Their nutrition is accomplished by direct absorption through the body wall and respiration is carried on in the same manner. There are no external or internal appendages, no limbs, no viscera, no roots, no leaves or anything answering to them, no sexual organs or differentiations. Still they are living things capable of assimilating food and of continuous reproduction. They are as specifically distinct from any other living things as are various kinds of grass or as the species of animals in our

pastures. Where they came from in the first place we do not know, but we do know that those at present in existence are descendents of pre-existing parents and that parent and offspring here are as similar as any where else in the organic world. Their relatives are numerous. No one can state how many species of bacteria exist even in his own immediate surroundings. Though similar in structure and not very widely varying in size and shape it is yet possible by the latter and other means to positively identify a hundred kinds as characteristically distinct as are the species of plants belonging to the Rose family. Some live only upon dead matter, others are true parasites and are known only in connection with certain hosts, or supporting organisms. The vital activities of some are harmless or even helpful to the being they tenant while others vary in degrees of injury. It has been ascertained that this one of the Pear destroys the nutrient substances stored within the cells of the plant, by a process of fermentation, while the cell-walls, except such as are very young and tender are not affected. It is also probable that some of the products of the fermentation thus produced are poisonous to the plant tissues, though this is not absolutely proved, so far as I know.

From what has now been said it is clear that these minute organisms can only reach a healthy tree by being carried there. They themselves have no power of locomotion except that of swimming just described. They seem never to do even this in the cells of the tree. No doubt in nature their distribution is mainly dependent upon birds and insects. When moist they are adhesive and thus cling to solids which they touch. When dry they form the resinous varnish spoken of, hence are not likely to be carried by the wind.

In a similar manner they require aid to gain access to the inner, softer tissues of trees, through the natural coverings of epidermis or corky bark; but they do blight flowers and the tender tips of growing shoots without previous mechanical puncture by other agents. Again besides man, insects no doubt are important factors in the result. If a plant louse smears its beak with the sticky substance and then after flying to another tree inserts the sharp organ into the leaves or young stems a sufficient inoculation may be readily made. Flower

visiting insects are active agents in their distribution. Trunk boring insects also provide an entrance through the thick bark. Man as often opens the way. Natural cracks in rough bark doubtless give ingress to the invaders. This is especially likely to occur in the forks of trees where the disease is often known to start in cracks made by the pressure of growth or by mechanical means.

No one who has carefully studied vegetable physiology need be told that neither these nor any other solid particles of anything like the size of these organisms, small as they are, can be carried through the tissues of plants by the movement of the sap. It is an altogether unwarrantable assumption that they may be absorbed with water by the roots and thus distributed in the tree. Their progress from cell to cell is always exceedingly slow and never takes place at all except through the breaking down of the structure to a greater or less extent. A maximum rate of progress in the bark of Pear is not over half an inch in twenty-four hours, during the most favorable weather. Though the organisms remain alive and active, in some cases they make no greater invasion than this of the adjoining healthy tissue during some months of time. Blight is never a sudden phenomenon as so popularly supposed. The final result only is what sometimes suddenly appears.

Having now restated what blight is, some phenomena of parasitism may be next considered. Here we have many curious facts each of which seems a law to itself, but from which we may derive some general conclusions. It is well known that half starved or otherwise debilitated cattle are exceedingly liable to become infested with lice. From this and a few other similar and well known cases, the too hasty opinion has been formed that a parasite generally requires some foregoing reduction in the vitality of the host. We ought however to have known better from hundreds of illustrations of opposing value. An athlete in full training is just as liable to have small-pox as is a consumptive child, on exposure to the bacterial parasites of this disease. Texas fever in cattle has no sort of respect for the age or condition of its victims. The thriftiest wheat on the richest soil is much more liable to rust than that of poorer growth in the same field. Vegetative vigor is no protection

against rot in grapes. The native or acquired ability to resist one injurious parasite is generally no indication whatever that to others the same host will be equally immune. The negro race suffer comparatively little with yellow fever, but die like flies on exposure to contagions which Europeans better withstand. The domesticated white rat is not susceptible to anthrax or splenic fever by inoculation, while their sturdy gray relatives quickly succumb after the same experimental operation. The Snyder Blackberry is almost proof against orange rust, but is specially susceptible to anthracnose.

It would be wearisome to continue these illustrations and especially so as every one can multiply them almost any number of times for himself. It needs only a little independent observation to enable anyone to confute the too prevalent idea that parasites generally demand some previous debility of the host; that, in other words, parasites are the results rather than causes of disease. If the popular idea is occasionally true it argues nothing whatever for the next case.

Because the skin of poor cattle has lost the oily protection against lice, it by no means follows that half starved Pear trees are more susceptible to blight. Put in this way the idea is ridiculous, yet not more absurd than much of similar kind that passes unchallenged in the current of popular thought.

The fact is, the vital functions of all living things, parasites included, are delicately adjusted to their environments, each after its kind. The relations of the life forces to the physical ones are wondrously complete and inscrutably compound. The woof of life has a web of chemistry and physics and the finished patterns from nature's loom are multitudinously various, with sometimes great divergences from very simple original modifications. No bystander can tell what modifications in the figure of a carpet may result by changing one thread in a Jacquard loom, nor having by experiment ascertained the result in one case can he predict what would happen in a second trial of similar kind. How much more uncertain must be our best generalizations in regard to the invisibly interlaced strands of life, even of a microscopic bacterium! The best we can possibly do is to closely and cau-

tiously watch for facts in each case by itself, keeping our eyes open and our minds absolutely free to follow whithersoever verified observation leads. Thus and only thus can assurance be justified. Prediction on any other basis is idle, a betrayal of ignorance and presumption rather than an exhibition of learning and astuteness.

I will not therefore hazard an opinion as to what will be the outcome of endeavors to secure a race of blight-proof pear trees, neither will you expect me to point out the exact ways and means of attaining so desirable an accomplishment. But it is safe to say that nothing will be done by folding our hands and dreamily speculating on the cosmos. If we want to know about pear trees we must study pear trees; if we want to know about pear blight we must devote ourselves attentively to the special subject; if we want to know the relations of these to each other we must patiently investigate this relationship and eagerly accept every reply Nature offers to our interrogatories. A definite beginning has been made in finding out what blight is, and this ought to stimulate hope that we shall yet know how to avoid its ravages. It is quite possible that some practicable method may be discovered of effectually banishing the destructive organism, just as noxious weeds may be eradicated by strictly preventing their seeding. It is also possible that spraying trees with certain chemicals in solution will yet be found effectual, and no one should be rash enough, even after all that has been said upon it, to deny that methods of culture may accomplish the purpose proposed; but it is far more probable than any of these that blight-resisting varieties will be secured and that from among them selections can be made to satisfy the most fastidious tastes as to quality. In fact we already have kinds that very rarely blight. In my own region I have never known blight to attack a Seckel or a Tyson, while Duchess (*Angouleme*) is very rarely injured. The same can be said of other well-known kinds, but the two first are especially marked in this respect. Many believed for a time that Kieffer and Le Conte were in this particular perfectly safe, but sad experience has unsettled the confidence once felt.

Here let it be noted that there is no relation between high quality, as we estimate it, and the liability to blight. Among apples, Siberian crabs

are especially subject to the disease, and our rugged American crab by no means escapes. The majority of seedling pears are more liable to blight than are the average named sorts. What is vaguely termed high breeding may be said to have nothing whatever to do with liability to blight. This in itself removes a mooted obstacle, and gives more hope to the originator of new varieties. But it does lead us to infer that much care in the selection and the most enlightened comprehension upon the subject is necessary in the attempt to breed blight-proof kinds. It can be done! There is no room to doubt this. Whether or not success will crown any particular series of efforts is quite another question. But the prospect is not too dim or too forbidding for us to be very hopeful, and to turn to the matter of experimentation with sanguine expectations. It is safe to predict that somebody will succeed, though the demonstration of success must be a work of extended time.

If, now, I attempt to point out methods of procedure, my first thought is this: Adopt known methods of originating varieties of good quality, breed for excellence according to the best information existing, and then abundantly test by *inoculation* the blight resisting powers of the new kinds. Do not wait to find results in the slow and uncertain processes of ordinary growth. These, as we too well know, are exceedingly deceptive. We think we have succeeded when there is not the slightest real reason for the belief. Artificial test methods must be mainly relied upon, before hope may be stimulated by a few years' of natural exemption in some given location or condition. The method by inoculation will also shorten the trial time almost infinitely. Instead of long years of indeterminate waiting, a few days will suffice to give working indications of what the ultimate results will be, just as laboratory investigations point the way to practical methods of smelting ores or improving electric motors.

To do such work intelligently of course requires trained investigators, and to do it at all there must be considerable resources. It would be folly to hope for large results from a few weak attempts at experimentation. A lucky hit might be made, but luck is a poor thing to use as the foundation of hope. Hundreds or thousands of well bred seed-

lings should be at command, and the experimenter should be well informed in his special line, that he can properly and correctly interpret the results. Guessing will not do. He must know.

Fortunately these conditions can now be realized. The State experiment stations render hopeful what heretofore may have seemed impossible. Both brains and money can be enlisted in the service. It only remains to be seen who will accomplish the abundantly fruitful result.

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### Sections vs. Whole Roots in Propagating the Apple.

BY J. L. BUDD, AMES, IOWA.

This subject has been discussed *pro* and *con* during the last thirty or more years.

The opposing opinions expressed beyond all doubt have been fixed by varied climatic and soil conditions.

In sections of our country where injury of apples in nursery and orchard by root-killing is unknown, the budded or crown-grafted trees are preferred. But even in these favored districts the use of healthy and vigorous seedlings has been urged.

In Iowa, and over great areas of the States west of Lake Michigan, the use of long scions and short roots has been advocated, for the reason that by setting down to the top bud, if the scion was hardy, roots of a like character would soon be thrown out from it. Observation has shown that nine trees out of ten when three years old will show roots from the scion if seven inches in length and set down to the top bud. As budded and crown-grafted trees on common commercial seedlings are subject to being root-killed in nursery and orchard while those rooted from the scion remain perfect, it is not strange that the belief in long scions and short roots is general at least north of the Missouri line.

But some of our careful experimenters have found that long scions and long roots have made the strongest and most uniform trees in nursery and the most enduring trees in orchard.

To illustrate: A few years ago the writer put up 3,000 grafts with scions seven inches in length inserted at the collar of the upper six inches of

strong seedling roots. These long grafts were set down to the top bud of the scion in thoroughly mellowed trenches made with our subsoil marker. By their side we set with a dibble 3,000 grafts made with inch scions set on two inch sections cut from what was left of the six inch crown roots. The results in nursery were very striking. The long crown grafts made a uniform growth of four feet the first season, while the lower section grafts ranged from one to three feet in height with many gaps where roots and scions died altogether. When three years old the difference in height of the best specimens of the section grafts was less, but a large per cent. of those that lived were short and slender and not five per cent. equalled the poorest of the crown grafts in height, stockiness or thrift. When finally dug, the roots on the crown grafts were by far the strongest and most far-reaching, but as a rule the section grafts had the most fibrous roots within eighteen inches of the crown. So far as I have been able to observe their behavior in orchard on the old homestead in Benton county (Iowa) and in that vicinity, the crown grafts of given varieties are yet ahead in size, uniform growth, healthy expression and bearing. As they were not of the varieties which have stood the test of our recent winters, their number has been sadly decimated, but the per cent. of good trees is much in favor of the crown-grafted lot.

Joining personal experience with that of hundreds of careful observers of Iowa, we must conclude:

1. That budded and crown-grafted trees are not adapted to our soil and climate so long as we are obliged to use common commercial seedlings. Were it possible to secure seedlings of apples as hardy as those of our native plum, we could use them for budding or whole root grafting with success and profit.

2. It is not profitable for nurserymen to use lower section roots, as they give us too many unsalable nursery culls, and experience has shown that they are less vigorous and enduring trees when planted in orchards than those made from crown roots.

3. The most profitable tree for the nurserymen to grow and for the orchardist to plant in the North is that produced from the long scion set on a

crown root not less than six inches in length and planted down to the top bud of the scion.

The argument of some nurserymen that these long grafts are expensive to make and set has little weight. The extra number of roots used is more than compensated by the larger number of good trees taken from an acre of ground, and the setting can be done quite as rapidly with the use of a subsoil marker costing about \$15 and lasting for many years. We set long grafts of pear, apple, cherry and plum in such mellow trenches about as rapidly as common grafts can be set with a dibble.

The only real drawback to their use is that the trees stand deeper in nursery and are harder to dig with a common spade. But in using long nursery spades or a tree digger the increased labor is more than compensated by the stronger and better distributed root system.

#### DISCUSSION.

MR. HARRIS: Mr. Budd has made his methods and recommendations very plain to us, but I still think that he has not quite got out into the long light of day on the subject. Though I am in favor of a crown graft with a root of considerable length—from four to six inches, anyway—when he says make the scion seven inches long and set it so deep that the top bud only is above the surface of the ground, he makes a very bad mistake for those who want to plant their nursery stock upon soft clayey soils. If we plant our trees at that depth, they are so long in getting the heat of the sun down to the

roots, that they will not grow strong and large the first year. In the part of the Northwest where I reside, if we could get our yearling trees to mature before the November frosts struck them, we could raise a great variety of apples without difficulty, but the majority of our trees become black hearted in the nursery the first winter. We must remember that on those loose, deep soils of the prairie country, it may do to set the root and the scion down so deep, but it will not on clayey soils. Then there is another disadvantage in having roots so deep, if you are going to use the common digger to dig your trees with, as I am inclined to think nurserymen generally do, and use long scions also, we either want the root nearer the surface so that the tree digger or the laboring of the nurseryman will give us more roots, or else we had better raise our own trees and put in long roots and short scions, and plant them where we want them to remain and root.

MR. LYON: This is a matter upon which probably most of us have an opinion, and that opinion, I apprehend, does and ought to depend somewhat upon locality. It is a subject that if taken and fairly entered upon, would be fairly interminable. It has been discussed in the press, in private assemblies and between persons until it is almost in my apprehension worn out, and yet we have arrived no nearer a conclusion than when we started. Now it seems to me it would be better for us to leave that to the nurserymen specially, rather than to a pomological society.

## COMMERCIAL POMOLOGY.

### Apple Orchard, Commercially Considered.

BY F. WELHOUSE, FAIRMOUNT, KANSAS.

Our orchards are in Eastern Kansas, in 39 latitude and 95 longitude, and are about 1,000 feet above the level of the sea on rolling prairie sloping in every direction. The soil is good and such as would be considered good wheat or corn land, with a red clay subsoil containing a small per cent. of sand. This soil and subsoil is sufficiently porous to require no artificial drainage.

Limestone rock underlies nearly the entire area, ranging from three to thirty feet below the surface. This limestone is full of seams or cracks which secure good sub drainage.

We planted our first block of trees, containing 117 acres, in the spring of 1876; the second block of 160 acres in 1878, and the third block of 160 acres in 1879. We also planted 800 acres in the past three seasons, but of them we have nothing to say in this paper, as they are not yet in bearing.

For the first planting of 117 acres we bought the trees at the time of planting. The trees were three years old. Since then we have grafted and grown our own trees and transplanted into the orchard at two years from graft.

We plant in furrows instead of holes, and all our trees were so planted. The furrows were thrown out from eight to ten inches deep and about twenty inches wide. This corresponds with the depth and width cut by the tree digger and gets the trees in at a uniform depth and about the same as grown in the nursery. And there is no danger of surplus water standing around the roots. We also find this a very expeditious mode of planting.

These trees are all planted thirty-two feet apart east and west and twelve feet north and south. This requires a little over 100 trees to the acre, and gives us plenty of room to do our work between the rows. Being close together in the rows, they help to shade each other from the hot sun, and as the area is too large to be protected by windbreaks,

we plant close so the trees will protect each other. Corn was grown in the orchards the first five years, then they were seeded down to clover.

We find corn the best crop to grow in young orchards. It secures thorough cultivation and the corn to some extent protects the young trees from the wind.

After the trees come into bearing, we regard clover as the best crop. Its roots run deep into the ground and being a biennial plant it is constantly penetrating the soil and subsoil, making it more porous. No crop has been taken from the ground since seeding to clover. After the clover seed has ripened, say about the middle of July, each year, we run over it with a rolling cutter, thus breaking down the clover and any weeds that may have come up; and we repeat this again in September. This leaves a slight mulch evenly distributed over the ground and the clover re-seeds itself.

This cutter is made of timber twelve to fourteen inches square and ten feet long. The square form is transformed into an octagonal by dressing off the corners. We insert eight knives, one on each corner, which run the entire length. This octagonal cutter is fixed in a frame in which it revolves, when pulled over the ground by teams, its own weight being sufficient to chop up or break the weeds and clover.

#### PRUNING.

We commence shaping up the trees to one year old in the nursery, training to one center shoot with lateral branches at proper intervals, starting the head at about one foot from the ground. By continuing this system we get a tree pyramidal in form, reaching from the ground upward; and after they are well grown and are in bearing very little pruning is done.

We have such an abundance of sunshine, and its rays are so penetrating, that if the bodies and limbs of our trees are not well covered with foliage when in the feeble or exhausted condition, they are sure to be sun-scalded and eventually ruined.

While this intense and continuous sunshine will destroy our trees if not protected, it will at the same time penetrate our dense tops and mature and color up the fruit as readily as in the high and open heads of other localities. We head our trees low to shade the bodies, and the fruit is more easily picked and the winds of our open prairies do not catch them so easily.

#### ENEMIES.

Rabbits are very plentiful here, and would ruin our trees if let alone. We set traps and catch them. This has to be done every winter. We use a small box trap made about twenty two inches long and six inches wide, of one inch lumber; one end is nailed shut, and a trap door is adjusted in the other end, with the treadle inside. No bait is needed, as a rabbit will go into a dark hole anywhere. These traps cost about fifteen cents each.

Round-headed Borers have given us considerable trouble, and have caused us many back-aches in digging them out. The woodpecker family assist us very materially in this work; in fact they have done the most of it, and have made a much neater job than we did.

The Flat-headed Borer has not troubled us very much.

The Twig Girdler and Twig Pruner have each done some damage especially the latter.

Mice girdle many trees; they have done us more damage in this way than the rabbits.

The Canker Worm defoliated large numbers of our trees and gave us serious trouble until we found we could destroy them by spraying with London Purple.

Tent Caterpillar, Fall Web Worm and Handmaid Moth, Rascal-Leaf Crumpler and Tarnish Plant Bug have each and all annoyed us to some extent at different times, but we find they can be destroyed easily by spraying.

Codling Moth or Apple Worm has damaged us more than any other insect. We commenced spraying last year with London Purple with a view to checking their ravages; the results were sufficiently satisfactory to warrant further efforts in this direction. We went over our trees again three

times this spring, commencing immediately after the bloom had dropped and continuing at intervals up to the fore part of June.

We catch at the same time any Canker Worm, Tent Caterpillar, Leaf Roller or Tarnish Plant Bug that may be at work.

#### GATHERING THE FRUIT.

In gathering apples, we use the common seamless two-bushel sacks, and fasten one corner of the bottom to a corner of the top with a hook and eye, and put a hoop in the mouth to hold it open. This sack is swung over the shoulder just as it would be for sowing grain, which leaves the picker with both hands free.

Our ladders are twelve to sixteen feet long, twenty four inches wide at the bottom, and tapering to a point at the top.

Platforms for the wagons are made forty inches wide and sixteen feet long, of two-inch pine plank, with two by four cross pieces behind, in front and in the middle, with a bolt through each plank where it crosses the cross piece; notches are cut in the sides to fit over the standards of the wagon. This platform is put on the wagon and sixteen boxes set on it; these boxes are made two feet long, sixteen inches wide, and eight inches deep. This completes our outfit for picking.

We now drive into the orchard with the wagon between two rows of trees and with twelve to fifteen men and a foreman commence picking, taking two rows at a time: the foreman's business is to see that the wagons are kept up even with the pickers, see that the men do not scatter too much and get too far from the wagon, also that they do not huddle together so as to interfere with each other, and to see that each man does his work properly: he also keeps the men's time.

Each man picks his sack as full as he can conveniently carry, say about half a bushel; then he goes to the wagon and raises the sack up and sets it in one of the boxes; he then unhooks the sack and pulls the bottom up when the apples roll into the box: this is repeated until all of the boxes are filled; then this wagon is driven to the packing house and another takes its place.

It takes two and sometimes three wagons to each gang of men.

The men average from thirty to forty bushels to the man per day, owing to the size and quantity on the trees. Five-sixths of all our apples grow within easy reach from the ground, and yet it takes three to four ladders to the gang to pick the balance.

#### SORTING AND PACKING.

We have three packing houses, one in each block of trees.

The dimensions of each are 16 x 32 feet, with a 16 foot platform on each end. On each side of the packing house is a platform thirty inches above the floor and two feet wide. The boxes filled with apples are set on these platforms from the wagon as they are brought from the orchard, and the fruit is sorted directly from these boxes on the platform.

The first grade, or "shippers" as we call them, are put into common wooden buckets and carefully emptied into the barrels, a row of which are along side the assorters. It takes nearly as many men to do the assorting and packing as it does to pick the apples.

The packing is done in the usual way, by facing the bottom of the barrel, then filling and forcing the upper head in with a screw press. We make three, and sometimes four grades; the first embraces all sound fruit above a certain size, usually seven inches in circumference. The second grade contains all below that size; and all unsound apples above the second grade are at the time sorted into two grades. The fourth covers all decayed and small apples that are unfit for use. These are left in the field and sometimes fed to the hogs.

We have a large warehouse here on the side track in which we store before shipment all the stock in barrels.

We get our barrel stock in earload lots in knocked down condition and set them up here. We do this in early summer. The stock usually costs us eighteen to twenty cents laid down here and setting up costs from six to eight cents more, so that our barrels cost from twenty-five to thirty cents each and the picking and packing costs about thirty cents more, so that by the time they are delivered on the cars they have cost us from sixty to seventy cents per barrel.

#### YIELD OF APPLES.

Our trees bore their first crop in 1880 and the following is the yield each year up to this time:

1880.....	1,594	bushels	of	apples
1881.....	3,887	"	"	"
1882.....	12,037	"	"	"
1883.....	12,388	"	"	"
1884.....	11,726	"	"	"
1885.....	15,373	"	"	"
1886.....	34,909	"	"	"
1887.....	33,095	"	"	"
1888.....	20,054	"	"	"
1889.....	11,952	"	"	"
1890.....	79,170	"	"	"

Total..... 236,185 bushels.

One hundred and twenty-nine thousand and ninety bushels of these were first grade or shippers, and the balance of 107,095 bushels were second and third grades. No account was kept of the last grade as they were not sold.

We have 225 acres in bearing, planted to Ben Davis; 70 acres to Missouri Pippin; 70 acres to Winesap; 40 acres to Jonathan; 16 acres to Cooper's Early and 16 acres to Maiden's Blush. We intended to keep an account of the yield of each variety and were able to do so with the first grade and with all except Cooper's Early and Maiden's Blush. These two got mixed and had to be counted together.

The second and third grades were all put in one pile and were not measured or weighed until they were sold, so we could not keep the count separate.

Thirty-seven rows of Missouri Pippin in the eleven crops yielded 31,239 bushels of shippers or 844 bushels to the row.

Thirty-six rows of Winesap in the eleven years turned off 20,499 bushels of shippers or 569 bushels to the row. One hundred and seventeen rows of Ben Davis in the same time made 61,518 bushels of first grade or 525 bushels to the row.

Twenty rows of Jonathan turned out 10,032 bushels or 501 bushels to the row of first grade apples.

Sixteen rows of Cooper's Early and Maiden's Blush made 5,802 bushels first grade or an average

of 362 bushels to the row. The rows are all one-half mile long. It will be seen that the Missouri Pippin takes the lead, followed by Winesap. Then comes Ben Davis, next Johnathan and lastly Maiden's Blush and Cooper's Early. Cooper's Early will not stand our climate and is the only variety that we have lost money on. Maiden's Blush would have made a much better showing if we could have kept the count separate.

Jonathan has paid us about as well as any. They brought from twenty-five to fifty cents and sometimes a dollar a barrel more than the others, and the trees are now in fine condition for future crops.

The Winesap, although it turns off heavy crops, the trees show signs of exhaustion and dealers complain of their size, although they have always sold with the Ben Davis and Missouri Pippin.

The Missouri Pippin up to this time has turned out more bushels and brought more money than either of the others, but the tree is becoming exhausted and the fruit is getting small.

The Ben Davis is coming rapidly to the front and in the end I think will take the lead.

#### SELLING THE FRUIT.

We sold the fruit crop of 1880 to a Leavenworth firm for \$1.50 per barrel.

The second crop was sold to a Denver firm for \$4 per barrel.

The third crop went to Denver at \$2.48 per barrel.

The fourth crop went to Denver, at \$3 per barrel, and the culls went to Kansas City at thirty cents per bushel. The fifth crop went to Denver at \$2.04 per barrel, and the culls to Kansas City, at fifteen cents per bushel.

The sixth crop went to Denver at \$2 per barrel, and culls to Kansas City, at twenty cents per bushel.

The seventh crop went to Denver, at \$1.45 per barrel, and the culls to Kansas City, at thirteen cents per bushel.

The eighth crop went to Kansas City, Leavenworth and other points, at \$2.11 per barrel, and culls to Kansas City, at twenty-seven cents per bushel.

The ninth crop went to Denver, Leavenworth

and other points, at \$1.81 per barrel, and culls to Kansas City, at fourteen cents per bushel.

The tenth crop went to Kansas City and Leavenworth, at \$2.49 per barrel, and culls to Kansas City, at eighteen cents per bushel.

The eleventh crop went to Chicago, Lockport, N. Y., Philadelphia and Cincinnati, at \$3 per barrel, and culls were sold to New York men at twenty cents per bushel.

All the prices named were for the apples delivered on board the cars here.

The first grade was always barreled and sold by the barrel.

The second and third grades were in nearly every case loaded in cars in bulk and sold by weight, fifty pounds for a bushel.

Our expense up to 1883 foot up \$20,352. This is about the time that all the trees came into bearing, but a part of this expense is for gathering and marketing the fruit grown previous to this time, and which I have not time now to separate from the other accounts, but I think it would amount to about \$2,500. This would leave \$17,852.48 as the cost of growing the orchards up to 1883 or until they all came into bearing. This would make a cost of about thirty-five cents per tree to bring them into bearing. This does not include the cost of land or rent, but simply the growing of the orchards.

The total amount for which the 239,185 bushels were sold foots up \$125,118.08, and the total cost of picking and packing and putting into market foots up \$44,737.30, leaving a net increase from the eleven crops of \$80,380.78.

The crop of this year promises to be about equal to that of last year.

#### Commercial Peach Growing.

BY J. F. TAYLOR, DOUGLAS, MICH.

Commercial life is a kind of occupation, in buying and selling or in producing and selling, that will give a man employment all the year, and every year.

But there are off years in every worldly work. Not all are alike prosperous. Not all are alike remunerative. Times do come when the work is heavy and the income light.

So, in Commercial Peach Growing, it is well to bear in mind that there are contingencies to be encountered at every step in the work and at every turn in the rolling year. While the peach tree will grow in various localities over a wide range of territory, and produce fruit occasionally, its adaptation to fruitfulness, from a commercial standpoint, has many limitations and conditions. These limitations and conditions are all to be taken into the account in an enterprise that involves both capital and labor. Soil, climate, location, access to market, facilities for shipping the fruit, varieties to be planted, the diseases of the tree, and the depredations of insect enemies are in the catalogue of queries to be considered in their bearings upon the success of an enterprise of this kind. These lie at the very foundation of prosperity. A mistake in regard to any one of them may destroy our highest anticipations.

#### LOCATION.

When Commercial Peach Growing is to be made a specialty, the selection of a suitable location is of the highest importance. If the work is combined with the growing of other fruits, a few acres may be found in different parts of our wide domain that will be productive a part of the time, and when productive may be exceedingly remunerative. But if a man turns his time, strength and capital into one channel he can not afford to work at random. He must have a location that will be highly favorable to the production of fruit. Comparatively small belts or tracts of country have a special advantage in this direction which make them of superior value.

Locality in this regard includes climate. Extremes of heat and cold during the winter months are often the cause of failure. A temperature low enough to prevent a large development of fruit buds until after the danger of spring frosts is over, is of great advantage. These frosts are the cause of failure in many places otherwise as favorable as could well be desired; and were it not for these untimely frosts, peaches would abound in nearly all latitudes south of the great lakes.

There are occasional failures in nearly all of the so called peach belts of our country, and there are choice hill tops and high lands which produce fruit with sufficient regularity to make the business

remunerative. A knowledge of these things is quite essential to an intelligent choice of a desirable location.

#### PREPARATION OF THE GROUND.

A thorough preparation of the ground in advance of planting is very desirable. In many respects a soil turned under late in autumn or early in spring is decidedly preferable. The advantage gained in this way is probably more marked on light soils than on those of a more compact character. A vigorous growth after the roots have been cut and pruned goes far toward overcoming the shock of transplanting. If this beginning of the work is properly done, very much is gained in uniformity of growth and productiveness of trees.

#### VARIETIES TO BE PLANTED.

Not all are desirable. Some are worthless; others are not adapted to the soil or the market. We might assume that a fruit being a peach is worthy of cultivation, and plant everything grown under this name by nurserymen. This has been done to the great disadvantage of many growers. It is the commercial value of the peach that is now under consideration, and this value is due to the productiveness of the tree, the quality of the fruit and its adaptation to transportation.

A desirable fruit from an unproductive tree is of little account, and yet there are many thousands of such trees growing in our best peach lands. Some valuable varieties may produce well in one locality and not in another. Slight changes in the surroundings of a peach orchard may have marked results for or against profit. Only a few varieties have stood the test of all localities, in all respects. Those most highly prized for size, color and quality are often most undesirable for producing fruit. Many a peach grower has waited long and is waiting still for fruit from the trees he purchased at fancy prices by looking at highly colored pictures that appealed to his eye with their beauty.

For commercial purposes, a continual ripening of fruit from the earliest to the latest is not to be ignored. The advantage of this process is not only in a long season for sales, but also on account of the climatic changes which so often have a deleterious effect on perishable fruit. If the early fruit is injured by too much wet or dry weather, the

later may be greatly benefited or the conditions may be reversed, so that what is injurious to one may add beauty and value to the other.

#### PLANTING.

The arrangement of plats and distance between trees is of some practical importance in facilitating orchard work. Sixteen, eighteen and twenty feet are the spaces commonly allowed for cultivation. Good results may be secured from either distance, but the wider, or at least sixteen by twenty feet on a fertile soil, furnishes better colored fruit and greater facility in all orchard work. Trimming the tree to a whip, and cutting back the yearly growth in spring time until the top is well formed, should by no means be neglected.

#### CULTIVATION.

This implies yearly preparation of the soil for growth of tree. It should begin in spring time when the grower wishes to aid nature in putting forth foliage and fruit buds. Not too early, lest an untimely frost blast the grower's brightest hopes. It should be continued during the growing season, in times of drouth as late as September, at other times August first will be sufficient. If Peach trees are allowed to ripen their wood before September, in the latitude of Michigan, the fruit buds are often developed by the warm days of autumn and become more susceptible to injury by the cold of winter. In the Michigan peach belt corn may be grown among the newly planted trees during the first and second summers. The shading of the ground in this way is highly beneficial.

#### FERTILIZING THE SOIL.

Nature does not recuperate her exhausted powers rapidly. Human agency must come in to help make up the deficiency. In peach belts this is no easy task. Commercial fertilizers are always accessible at some price, but how well they will produce the desired result may still be a question. Yard manure has its uses, and on some soils is very desirable, even in a peach grove. A faithful stirring of the soil is commonly a sufficient fertilizer until the trees come into bearing, after that something more is needed to maintain a vigorous growth. Some growers, in their haste to get large returns, have killed their trees by forcing them too rapidly. A moderate growth of peach wood is productive of

the best results. It will endure more cold in winter and more drouth in summer than if hurried into a rapid development. But impoverished trees will not bring desirable returns. A judicious use of fertilizers is among the essentials of this business.

#### INSECT ENEMIES.

These claim the growers' attention. The trees must be protected or saved from their ravages by continued vigilance. The Peach Borer is an insidious enemy, but the work of counteracting its ravages is not difficult.

#### DISEASES OF THE FRUIT.

These are the greatest source of discouragement to peach growing, at the present time. "Yellows," as the disease is called, threatens the destruction of the Commercial Peach Growing in the most noted belts in our country. It is doing a deadly work. Where can a remedy be found? Who can step in and say it shall go no farther? The man that can do this by any practicable means will be a great benefactor. Where the disease does not prevail, and where it is restrained by the use of the ax and cremation, the peach grove is undoubtedly remunerative; but unless its ravages are stayed by the potent hand of public sentiment and law, it may steal into every nook and corner of the land. It is already national in extent and will require a corresponding effort to eradicate it. Let every lover of the peach work for this end. Other diseases are less damaging to the interest involved and need not be dwelt upon here.

#### MARKETS.

When this fruit is in small supply, markets are open everywhere to receive and handle the inviting Crawfords and Red Checks; but when there is an abundance, every village and hamlet is supplied from its own surroundings, and the fruit of large groves must seek a distant distribution. The larger peach belts always require a distant market. The handling of such perishable fruit to the best advantage is still, after years of experience, a question of importance, and the grower is often at his wits-end to know how to carry on this part of his work successfully. Facilities for transportation are as essential as the fruit itself. The evaporator and canner come in for all that can be used or preserved by such means; but the fresh fruit, well ripened on the

tree, is palatable to so large a part of the human race that the demand for it is only limited by a lack of facilities for securing it. Let these be more extended and peach groves will soon be more abundant and more remunerative. Such perishable fruit must be put into the hands of the consumer without any delay. This fact always creates an emergency, and an emergency makes the carrying trade expensive to the producer. The demand for this fruit will always be great, and the field for Commercial Peach Growing has only those limitations which come from nature and its own environments.

### How to Make Small Fruit Culture Pay.

BY J. H. HALE.

I have not a paper, but simply propose to give a little talk. I think we can get a little closer together in a talk on this subject than in a paper, although no doubt had I taken the time to prepare a paper, I might have said some things better than I shall say them here off hand. Just how to make small fruit culture pay has been the problem of my life, but I am not quite sure that I have solved it; my bank account does not indicate that I have made a great success of my study if you look at it from a pecuniary point of view; but there are some things in life which are not to be judged by their value in dollars and cents, as you who are engaged in fruit culture all know, or at least ought to know—I believe you do, or you would not be here to-day as workers in this Pomological Society. I have grown strawberries for market since I was a small boy, and I have attempted to make a financial success out of it, and I have made some marked successes and some marked failures also, probably more of the latter than of the former; but I can see now in the light of the knowledge of the present time, how most of those failures might have been avoided. To begin with, in order to make small fruit culture profitable and pleasant there must be a thorough preparation of the soil, and that is about what three-fourths of the market growers omit. I think that more than three-fourths of the ground which it is pretended is prepared for the planting of small fruits, and their culture, is not well enough prepared to make the culture profitable. It may have been so prepared a number of years ago, but with the present

sharp competition and with the present greater production, and the improved varieties and the improved methods of the more successful cultivators, the man who does not build from the bottom and build with thorough preparation of the soil, cannot possibly make this labor profitable. Of course it depends somewhat on where one is situated. One may be situated on the prairies of the far West, or in some Southern section where the virgin soil is deep and rich, and there is no necessity for heavy fertilization; while along the Atlantic coast and in many of the Northern states, it is necessary to plow deep and thoroughly drain the soil in order to mellow it. In most instances it pays to sub-soil the land.

Mr. Smith has told us about gooseberries. He prepared the soil thoroughly to start with, and that was the foundation of his success in that small home garden of his up there in Massachusetts. It is also necessary to liberally manure all soil not naturally rich enough, and of course the majority of soils in the older portions of the country do need fertilization and require that it should be heavy. My experience has been that they need fertilizers rich in potash and phosphoric acid and lacking in nitrogen in the cultivation of nearly all the small fruits.

I noticed the question asked by Mr. Johnson in regard to strawberry blight. I suppose that what he means is the ordinary strawberry rust or leaf blight, judging from his description. He said that he mulched in the fall with straw and manure, and the combination that he used was not very rich in manure. Now that was in the fall, and he put on a nitrogenous fertilizer, and the first thing in the spring he started a tremendous leaf growth, and I imagine the blight did not appear until then. He spoke of a dusting of lime holding it in check. That is the best remedy I know of for the disease, but it will kill it on some varieties more than on others. The conditions he named are the best to breed it and bring it on, while the gentleman with the salt marsh hay was on the other side—toward production. But, to go back to plant food, my experience has been a heavy feeding of wood ashes is the best thing. Where you can get cotton seed ashes, that is the greatest form of potash of all to give color, texture, and solidity to the fruit. For phosphorus, I have always found it better to buy finely ground raw bone. Some buy

it in Charleston rock, and some in ground bone but the economical side must be looked to, and the finely ground raw bone is best; use that, and then trust to luck or nature, or whatever you call it, for the nitrogen. I have found some varieties of plants grown on soil prepared in this way, with perhaps one and a half or two tons of bone to the acre. Plant a portion of that with Cuthbert, and a portion with the Garden Queen, and a portion with Marlboro, and have found that to make it profitable the Marlboro requires a touch of nitrogen while the others do not. These are little points that you have to study and work out for yourselves. To stand up here and lay down any rules as to how to make small fruit growing profitable—absolute rules—is utter nonsense. You have got to have a few general principles of policy set up as guide posts, and then work out your own salvation in your own particular field. There is no use in talking about varieties. Look at your nearest market and see what they are doing. The Manchester strawberry was mentioned as rusting badly. I had something to do with bringing that berry before the public. It was a grand berry, but would rust and blight; and to day Mr. Smith, the Vice-President of the Horticultural Society, finds it the most profitable berry in the United States; but it would be absurd for him to come here and tell people to plant the Manchester strawberry generally, if they are after profits in the business. The foundation of all, as I said before, is in the preparation of the soil and then in the method of culture. One of the great mistakes—as I have learned on my own place, and from observation North, South, East and West—is that in the culture of raspberries and strawberries we grow perhaps ten times as many plants to the acre as we ought to grow. Perhaps it is not so bad as that, but I think that we often grow two or three or five times as many as we should. Take that Hensel berry which has been spoken of; it should not be planted nearer than six feet apart in the field. Mr. Lovett scowls a little, but I think I am right about it, even in poor worn out New Jersey there is more money in it planted six or seven or even eight feet apart. To get the most money out of the Cuthbert or Queen raspberry, plant eight or ten feet apart each way. I have seen it so planted that with this thorough

preparation of the soil that I have spoken of, raspberries will grow a great deal bigger than the end of my thumb, and will be firm enough to carry two or three days and sell for thirty-five cents a quart. The Cuthbert is the same way. The blackcaps may perhaps be grown down to six feet. As to blackberries and raspberries, I think the hedge-row business is all wrong. Grow them in hills and you will get larger, firmer and better textured berries, and if you do not get more quarts you will have reduced the cost of cultivation a great deal, and will get profit from it. Grow them so that the horse or mule can go between the rows easily. There are very few of those I visit who grow them in hedge-rows but that have more or less grass and weeds between the rows, while the average cultivator has a whole mass of grass and weeds that pump out the moisture just when their plants want it; and so I say the hill system will have to be adopted if you are to make this business profitable from a dollar and cent point of view. Strawberries are the same way. Most people are inclined to grow them in rows. That depends somewhat upon the variety, somewhat upon the soil on which they are planted, and somewhat upon whether you are able to irrigate or not. I think if it is possible for one to irrigate; it is unwise for him to plant a very great acreage of Strawberries and expect to make it profitable for any number of years without some plan of irrigation, because we prepare the soil perfectly, manure it as highly as conscience or pocket book will allow, bring the crop up to perfection and full bloom, and then nature refuses to supply the water, and half or two-thirds of the crop is gone after two or three weeks of dry weather. Irrigation should be provided for if you are growing on any considerable scale. Then, after the fruits are grown, I think three quarters of the growers lose all the profits they might otherwise gain, by not studying the business end of the problem. It is one thing to know how to grow, and another thing to know how to sell them. Too many of the commercial growers of small fruits do not study the market end enough. My notion is that the average small fruit grower works too hard and thinks too little. I believe I would take for a text a little judicious laziness—if you know what that means—a little less time for hard work on the

farm and a little more in the markets, studying the fruits as they arrive there, studying the ways in which they arrive. The man who puts fruit on the market, and small fruits especially, in the best style, and puts in the best fruit also, and then has it honestly packed from top to bottom, is the man who in the long run makes the most money. You can send nice looking fruit to market, topped up, and for a while it will sell with honest fruits; but the man who grows only good fruit, rejects the inferior and packs the best in the bottom of the case, and stamps his name and post office address on the box in big letters, and insists upon it that his fruit is first class and insists upon having a good price for it, will get it. I do not like to give Massachusetts credit for everything, but I know of a grower in the Western part of that State—not down Cape Cod way where some of you people come from, but up among the Berkshire hills—who grows small fruits on the plan I have indicated, doing everything in perfect system and order from the beginning, even to the making of his crates and baskets out of the best white-wood that can be had, for which he pays an extra price. He selects the fruit when picked, and puts a card into every single basket, giving the name of the variety and hour at which it was picked—six to seven, or seven to eight, or eight to nine A. M.—with a stencil. He gives his name and the name of the farm, and across the top the price, which is always five cents above the market. He tells them that, and they are glad to pay it, and he cannot grow his fruits fast enough. He had to cut New York City, because in the commercial business he could not make a living there, but there in Berkshire County, Massachusetts, he is making a pleasant, happy home for himself and family, and is making money and is supplying Boston people with fruit they delight to eat, and delight to pay him for at a rate five cents above the market price. Strawberries and roses come right along together in New England. I know another man who is producing strawberries to the best of his ability, not as fine as those of the other man, but fine fruit, and he handles it perfectly from field to market. He has a great field of roses that he grows purposely—well partly because he loves roses, partly because he has a taste for them, and partly because it is business—

it pays. He puts a nice little rosebud on top of each basket on top of the crate—eight rosebuds with every bushel crate. You say we do not “eat roses.” Now it is true he gives a quart of berries and that perhaps ought to be enough, but after all, the rosebuds do look so well on those berries that people buy them even if they do not want them. I have seen a dealer who had bought ten or fifteen crates for the day’s supply and did not want any more, come along to where this man had his crates laid out with the rosebud in each basket on the top row, and say, “Why, these are pretty. What do you ask for them?” and generally he would be given a price two or three cents above that asked by others, and he would take two or three crates because they looked so pretty in his store, and his customers when they came along and saw them there, would buy them just on account of these roses. You may say this is all humbug. Bless your heart, everything is humbug in this world. If you can please people’s eyes and make them think that what you have is nice, why not do so? You have to please the eyes of people before you can get them to open their pocket books, and that fruit grower I am speaking of is getting that advanced price on his fruit simply because he knows enough to put it on the market in an attractive style. Leaving for a moment the subject of small fruits, I would say that at Chicago about two years ago, I think it was, I saw a lot of asparagus that came down from Michigan in pound bunches packed in old pine boxes—shipping boxes to be returned—it was nice fresh asparagus tied with ordinary bass bark tying. It looked good, and sold for six cents a pound. On the same boat came another lot of asparagus from the same State, probably from the same county and perhaps from the same town, packed in nice new thin veneered thin white-wood boxes that probably cost eight or ten cents apiece. This asparagus was grown under the same sun and in the same soil and under like conditions with the other, but it was tied up with pink cotton tape that did not cost five cents a mile as the ladies here know, and yet it was tied in a nice bow-knot—some lady did it I will bet a cent. Somebody on the farm it came from had a little taste and style, and that asparagus sold for what? It was sold to the same dealers in the same city to

the same men and at the same hour for ten cents a pound—forty per cent. for knowing how to catch the market. I bought both and split them open, and one was no better than the other. The point is that persons who bought that asparagus thought it was nice and cooked it, and put it on the table and ate it, and it did taste better. You know that the same food put on the table with rough dishes and coarse knives and forks, is eaten because you are hungry, but with nice silver ware and the linen cloth, there is no tomfoolery about it. It means refinement to you and helps make your life better, and people will pay for it. And so it is with the small fruit business; we must grow it well first and then put it on the market in an attractive style, and then have it deserve the credit it gets. If you have to ship to a distant market and trust to luck along side of shippers all over the country, as you do in a great city, it will take some time to make a name; but make it and hold it, deserve it and you will hold it, and it can be made to pay, and people who are doing that in small fruit culture are finding profit in the business. I know men in almost every State in the Union making small fruit culture profitable, and I know others in the same neighborhood with them who are not making it pay, and the difference is in the men and not in the business or local conditions, and it lies with the grower to say whether small fruit culture shall be profitable or not. Another line which I believe to be still more profitable is the providing of the home supply. The average home of this country is not one-quarter supplied with the small fruit it ought to have. I know gentlemen who are extensive orchardists in some particular line whose families are famishing for want of a full supply of small fruits. They think they have not time and they will buy all the berries wanted, but they do not do it. They buy two or three quarts Saturday for over Sunday, or some in the middle of the week, or a few berries to can, but they do not think of bringing in a few every day from the early strawberries in May or June to the last grapes in December, and then have cans stored away as every well regulated family ought to have to get the best out of life. The average family of the country will use almost half a bushel of fruits a week, and do

almost the year through, if furnished in proper quality and season, and the best market in the world and the most profitable one, and the one from which you have the best chance to get money out of small fruit growing is right at home in the home half acre. Plant it in long rows so that the horse can cultivate it. Do not plant it in hedge rows or corners, but right out in the open field along with your corn and potatoes and other crops. Make the horse cultivate and do the work, and plant the best standard varieties for your own section. We Yankees are accused of looking at dollars and cents and doing a great deal of figuring. I have a friend up in Connecticut who has a little garden of half an acre, and charges up the family with the small fruits as they come in. He goes down to market every day or two, asks the prices of things and makes a memorandum to know what they are worth in market, and then charges it up to the family, and in the three hundred and sixty-five days of last year on the half acre set apart for the family, he found the profits of the business were at the rate of \$700 to the acre, and his family show it in their faces. They are happy all the way through, and do not look starved or dyspeptic. I believe that sort of business is profitable, and I believe we miss it if we do not take advantage of it. What do you want of money? Is it not to get home comforts? It is not for money's sake, is it? but for what it will bring; and in looking every day to get a lot of money, he leaves a lot in the home half-acre that might be brought out, and see the pleasure of a small fruit garden properly managed and cultivated. It is an ever changing painting from day to day, and you can get a lot of pleasure out of it. So it is with my peach orchards. I sat on the fence to see my buds destroyed, and then got more fun out of it than some of the Delaware growers got this year. It is fun to buy these new fruits and test them. To be sure not one in fifty turn out as the nurseryman's catalogue or pretty pictures lead you to expect, but it is almost as much fun to be fooled; but it is fun to work them up and develop them and get something a little better than your neighbors have. You take pleasure in it; I know hundreds of men who do, and hundreds of others who might. If you are

not going into small fruit culture for profit, go home and preach it to your neighbors that there is fun and profit in a small fruit garden.

DISCUSSION.

MR. GOFF: There is one point in Mr. Hale's paper to which I wish to subscribe—that of attending to the business end of small fruit growing. We have a banker in Wisconsin who, a few years ago, undertook to apply banking methods in the production of small fruits. In the methods of growing, of putting it up, purchasing supplies and marketing the fruit, he gave equal attention to every department, and during the past season he has won from a few acres something over eight thousand dollars, and he tells me that his profits are satisfactory. Now, if the profits received by careful attention will satisfy a banker, it is certain that small fruit growing may be made profitable. One of the greatest defects in the management of the ordinary grower, is that he attends to the culture of the fruit, but not to the marketing of it.

New and Promising Small Fruits.

BY T. J. LOVETT.

The subject may justly be considered a dry one. The horticulturist, however, like the scientist in other fields, never grows weary of his work; to him his studies never become monotonous and uninteresting, for the love of a true lover of fruits feeds upon its own growth; more thoroughly and fully absorbing his thoughts and time as years pass by. To him the mere description of many novelties is the most interesting *fiction* of the day. Then the pleasure of obtaining and setting the plants, watching the young sprouts put forth, the unfolding leaves, the opening blossoms, and at last the crowning joy of beholding the perfected fruit of a new and distinct creation is beyond the power of words to express.

In attempting to give notes upon the new and promising small fruits one is puzzled to know what standard to adopt; whether to include all that have been recently announced as promising or only those that have come under the essayist's personal observation and have, in his estimation, proved worthy a place under that caption.

Fearing the list might prove too long were the former method pursued, I have in these notes adopted the latter, for the crop of novelties this year is in keeping with the great abundance of fruit. Beginning with the season we have, first—

STRAWBERRIES.

*Cloud* or *Cloud Seedling* (*Pistillate*) is a variety of much value to the market grower by reason of its earliness, firmness and productiveness. The fruit is not large enough nor good enough in quality to satisfy the amateur. The plant is excellent, being a strong and vigorous grower and very enduring. Especially valuable to the Southern grower for shipment North.

*Michel's Early*, known also as *Osceola*, is still earlier than the *Cloud* in ripening and the plant is likewise enduring and free growing. With me, however, it has not been so firm, is smaller and less productive. Still it is valuable on account of its extreme earliness.

*Lovett's Early* is, I think, worthy of mention.

*Lady Rusk* (*Pistillate*) gives satisfaction in yield and the fruit is exceptionally firm, although of inferior quality. The plant with me is of moderate growth and evidently requires deep, rich soil. Under such conditions it would undoubtedly prove an exceedingly profitable variety. In this connection I would name *Shuster's Gem*.

*Jucunda Improved* is an improvement in plant upon the celebrated *Jucunda* or *Knox's 700*. It is a strong and vigorous grower even upon sandy loam, yielding good, though not heavy, crops under ordinary culture. The fruit, in all respects, resembles closely its illustrious parent. While speaking of fine strawberries, I wish to mention the *Crawford*. Very few indeed can vie with it upon the exhibition table, or in fact upon any table, for it is as good as it is large and beautiful. Beyond doubt the *Grandiflora* species enters largely into its make-up, hence it demands high culture and heavy soil. Otherwise the plant is of contracted growth and the yield moderate.

The *Yale* in a general way resembles the *Crawford*, although the fruit is firmer and not so large. The plant is of stronger growth and, with me, is peculiarly susceptible to attacks of the fungus upon the foliage known as "rust."

*Louise* is another exceedingly fine variety for the amateur, being very pretty and of surpassing excellence in quality. It also demands high culture, otherwise, with me, it is a decided failure.

*Edgar Queen (Pistillate)* has, I think, a bright future. In plant and fruit it closely resembles the Sharpless. It is, however, very much more productive than that valuable variety. It also ripens its fruit better.

*Eureka (Pistillate)* is another variety of the Sharpless type. The berries are not so large as the Sharpless, but are more uniform in size and shape, firmer and produced in much greater abundance. The plant, although a vigorous and good grower, is not so strong as its supposed parent.

For vigor of plant and productiveness, I have found few varieties that equal the *Mrs. Cleveand*. It is pistillate and in make-up is after the style of the old Green Prolific, the fruit being of light color, quite soft and of medium size. The plant is all that can be desired and its yield is enormous. To those who have a market near at hand, and prefer quantity to quality, this sort will give entire satisfaction.

*Waldron (Pistillate)* is a kind that should not be overlooked. In point of size and productiveness it has but few equals and the plant is of strong growth. Unfortunately it lacks firmness.

*Viola* I mention because it has recently been put forward as a new sort; in reality it is the Monarch of the West, or a reproduction of that grand old variety, so nearly identical that I can discern no difference.

*Iowa Beauty*, also being sent out as "Childs," is without exception the most beautiful strawberry I have yet grown. In form and color it is perfection itself. It is also of good to large size, high quality and fairly productive. The plant is of good growth and exempt from disease; but how well it will succeed generally yet remains to be determined.

*Parker Earle*. Of all the varieties that have appeared in a long time, there is no other that can be compared with this as a promising variety for general culture. The plant is phenomenal in vigorous growth. It is an everybody's sort—succeeding upon all soils and yielding enormously of beautiful, large and excellent fruit. No variety can be perfect for all purposes. If it were firmer it would

not be so excellent for the table, but it would endure shipment better. In firmness it may be classed with the Sharpless.

All the preceding varieties, with the exception of the three first named, ripen in midseason; that is to say, are not especially early nor especially late.

*Gandy* or *Gandy's Prize*, is a valuable very late sort, being the latest to ripen of any variety I know. The fruit is large, firm and excellent, the plant of strong growth. In common with all varieties producing very large berries it requires high culture. It is not very productive under ordinary culture, and I have received reports that the foliage in some localities is seriously affected with rust. With me, however, it has not yet manifested this weakness.

#### RASPBERRIES.

Although but few red raspberries of pronounced merit have appeared of late, there are enough black ones to fully supply the deficiency. Among those especially worthy of note may be mentioned the *Kansas* and *Lovett*. The former is a blackcap after the style of the Gregg—fully equaling it in size and ripening a week earlier. It is also far more prolific with me, has less bloom upon the fruit and is a freer and stronger grower. It is said to be much hardier. It has been thus far entirely hardy with me; but the Gregg is usually hardy also the first years of fruiting.

*Palmer* is a variety of the Doolittle type. It resembles closely the Souhegan or Tyler, ripening with it, and I have failed to note any property possessed by it wherein it is superior to that very valuable sort. These remarks apply to the Cromwell and Cairman with equal force.

*Progress* or *Pioneer* is an improvement upon Souhegan, in some respects, but it is not so early by three or four days. The fruit is identical in size, appearance and quality, but the canes are of much stronger growth and yield nearly double the quantity of fruit upon a given space of land. It also possesses the very desirable property of adhering firmly to the peduncle when fully ripe.

*Older* is a variety worthy of more than passing notice, being one of the very few entirely distinct

blackcaps that have appeared in a long time. In fruit, cane and foilage it is unlike any other variety as to be noticeable at a glance. In size it is large to very large, rivaling, though not equaling, the Gregg, is almost destitute of bloom upon the fruit, hence very black, and although firm is of superior, rich and high quality. In growth of cane and productiveness it may be compared to the Souhegan. Season second early, ripening with the Ohio, or with third picking of the Doolittle class. It seems to possess peculiar endurance, suffering less from drought than others, and always vigorous and free from disease.

*Thompson's Early Prolific*, an early red variety that has proved superior, all things considered, to any I have grown. Were the berries larger and canes of stronger growth it would approach closely the ideal raspberry for the market growing. It is among the earliest to ripen (with the Hansell, etc.) and is prolific. In size, compares favorably with the Hansell and Brandywine (although smaller than the Marlboro or Cuthbert) and in firmness and brilliant color it nearly or quite equals these two valuable varieties. Its quality is fair to good—better than Brandywine, but inferior to Turner or Cuthbert. In growth of cane it may be compared to the Brandywine; in yield, with Hansell or Turner. It endures the heat of summer well and has not as yet been injured in winter with me, although I have fruited it several years.

*Childs' Japanese Wineberry* is perhaps worthy of mention. It has been stated that anomaly is unproductive, but this is an error; judging from its behavior upon my grounds. The cane is of very strong growth and ornamental enough to be worthy a place upon the lawn. The berries, which ripen at the close of the raspberry season, are rather below the average size of red raspberries. They are deep amber in color, turning to the color of sherry, are translucent and sparkle in the sunlight rendering them very attracttractive. They are too soft for transportation and although rich are too acid to be enjoyed by any except those who are fond of acid fruit. Properly cooked I have found it exceedingly palatable and from it pretty and superior jelly can be readily made. The large calixes or burrs which enclose each berry until ripe, imparts to the hand a viscous substance upon the slightest touch,

that is decidedly unpleasant. With me it is entirely hardy.

#### BLACKBERRIES.

It is to be greatly lamented, yet must, I fear, be recognized as a fact, that the trend of this most important member of the Small Fruit Family leads to retrograde. Of the new varieties there are very few that are peers of the Kittatinny, Lawton or Wilson in their palmy days.

*Early King* is a variety that, however, seems to possess much merit as an early sort, especially for the home garden. In size it is about medium, larger than Snyder, Taylor's Prolific, etc., but smaller than the Wilson. It lacks firmness, for long shipment, but is of superior quality and is very hardy. Cane of moderate growth and quite, although not especially, prolific, giving us our first blackberries. It ripens with the Lucretia Dewberry and in advance of Early Harvest. It seems strange to me that a variety so desirable in many ways should be so long in becoming popular. I have now had it in bearing at least a half dozen years.

*Thompson's Early Mammoth* is evidently a seedling of Wilson's Early and very like it in many ways. It is said to be much hardier. With me it has been entirely hardy. Owing to the mildness of the winters the Wilson has also been hardy during the same period.

*Minnewaski* has with me proved the best substitute for the Kittatinny since we can no longer successfully fruit that old favorite. The canes are of good growth, fairly prolific, healthy and hardy; berries of good to large size, firm, attractive and excellent. It has not proved especially early, ripening with Snyder and Kittatinny, or ten days after the Wilson.

#### CURRANTS.

But little of interest is to be found among new varieties of the currant. *Fay's Prolific* is a success with me and I hear none but good reports of it from any quarter.

*North Star* gives promise of being a valuable variety, especially for the market grower. It is with me a fine growing plant, but I have not had it long enough to test it sufficiently to enable me to speak of it in definite terms.

*Black Champion* is an improvement upon the old Black Naples. Berries are larger and produced in greater abundance. I am told it is of better quality, but to me all the black currants are so repulsive, in both odor and flavor, that I am perfectly willing that the testing of the fruit be performed by somebody else.

The *Crandall* has, I am pleased to state, some merit for culinary purposes. It is of strong growth, exempt from the attacks of insects and disease and very prolific; but the fruit is too harsh and austere to be acceptable as a dessert fruit. The berries are exceedingly large, almost equaling in size the Delaware Grape, and are decidedly attractive. The claim that a good jelly can be made from it is founded on fact as I can bear witness.

The *Industry Gooseberry* has not proved the success with me that it has in many other places. In Monroe County, New York, and upon the Hudson River it is giving the greatest satisfaction. I also saw it fruiting in perfection in Atlantic County, New Jersey, the past season. Although the best of the foreign varieties I have yet tested, it loses its leaves prematurely and fails to ripen its fruit quite as often as it perfects it.

As these notes have consumed a good deal of your valuable time, I beg you permit me to omit Grapes.

### Berry Culture.—Profits and Failures in Georgia.

BY SAMUEL HAPE, ATLANTA, GA.

The comparative, rare and almost uniform success attending Strawberry culture in many portions of the South would seem to suggest large acreage and very remunerative results. While in few localities, viz., some regions of Carolina, Florida and Southern Georgia this may be true—yet as an industry it lacks much to make it anything to compare with the possibilities it is capable of reaching—and while we admit that heavy crops are not gathered every year yet entire failures are still more rare and unusual—with intelligent selection of varieties, well prepared soil favorably located, barring rare extremes of heat and cold a good yield can always be depended upon and no complete failure need be recorded. The very short time required to produce

a crop and the ease with which it can be marketed and the fairly remunerative prices usually obtained all combine to make Strawberry culture in the South a very desirable venture to the fruit grower. And yet the conditions upon which success depends can so easily be neglected or violated that failures are by no means rare. The causes which so often lead to disastrous results may be summed up in brief under four heads. First, selection of varieties. Second, culture. Third, over-production. Fourth, bad methods in marketing. In the selection of varieties it becomes absolutely necessary that actual experience and practical tests alone must determine what is best suited to your own immediate locality and later to the demands of the consumer and the parties who handle your fruit. Like the human family the perfect Strawberry has yet to be discovered. And right here quality in our southern latitude is always sacrificed to quantity and earliness. Even to the most casual or uneducated taste the earliest varieties of strawberries grown in open air are hard, insipid and tasteless, with a slight tinge of that peculiar flavor that no other fruit than the strawberry possesses. The reason of this is apparent. Nature designs and absolutely demands a certain amount of warmth, sunshine and moisture to perfect her “kindly fruits of the earth.” This the very early strawberry does not receive. Consequently we simply obtain a fair size lightly colored, hard and comparatively tasteless berry as our first marketable fruit. In Florida, Lower Georgia and Charleston, S. C., the Newman was for years the leading variety. Later years, however, has brought into notice a decided improvement in the shape of the Hoffman which to all appearances is superior in size, color and quality. In favored localities and propitious seasons the yield of fruit may be expected from February on until April in Florida and the coast regions of Georgia and the Carolinas. Of course some growers pick occasional specimens and even market their fruit the entire winter. The season of course has much to do with the crop. The prices obtained during the season named is generally remunerative and satisfactory ranging from fifty to seventy-five cents per quart in Northern and Eastern markets, but running down to twenty and twenty-five cents and even less in Southern towns during the winter months. Barring

severe freezes the early Strawberries keep in better condition and remain longer in eating order than later shipments, thus giving the grower a greater advantage over those who begin shipping after warm weather has fairly set in. But on the other hand the demand for very early strawberries during cold, disagreeable weather is confined to comparatively few. And not until warm weather fairly sets in do the masses long for this delicious fruit. So that after all the happy medium or the earliest fine berries, when the season fairly sets in, are the most sought for and easiest sold. In the vicinity of Atlanta the early strawberries come in from middle of April to first of May, and are in the market just as the Coast and Florida fruit is giving out and when prices are lower and weather farther south all militate against successful shipping from distant localities. The varieties mostly grown in the region in and around Atlanta are the Sharpless, Wilson, Crescent and Cumberland Triumph. All in all this last named variety has proven with the writer the most profitable and reliable of any yet cultivated in this locality. The large size and good quality of the Sharpless commends it highly. It has defects, however, that seriously impair its value on the whole. It is soft, does not color up uniformly, and is often illshapen. The Wilson maintains its good name, and barring its sudden let down as to size during the latter part of the season, is still one of the leading berries of the South and can always be relied upon for an average crop. The cultivation of strawberries through Middle Georgia dates back to a period immediately after the civil war. The writer's first introduction to this industry was through a kind hearted but thrifty Scotchman who, through sympathy for the sick wife of a neighbor, was persuaded to sacrifice his strawberries for the modest sum of two dollars and fifty cents (\$2.50) a quart. These figures were of course exorbitant, but for years the first strawberries in the market brought from seventy-five cents to one dollar per quart in the City of Atlanta. Such prices had the effect to invite and stimulate growers to enter the field of competition. While no definite figures can be had as to acreage in Middle and Southern Georgia, yet there is a steady flow into Southern and Eastern markets of ripe strawberries from January to June and often July.

Unfortunately for the intelligent and progressive grower, tastes are not cultivated nor educated so as to reward skill and painstaking methods in the grower. It is therefore not a matter of surprise that to most consumers a strawberry is a strawberry and "only that and nothing more." But as wealth, culture and educated tastes increase with population, we see with them a corresponding desire for fine, clean, ripe, luscious fruit, and a corresponding willingness to pay remunerative prices for the same. As a matter of course, cultivation has much to do with the size and quality of fruit, and large acreage and poor culture does a good deal to lower the standard of strawberry culture. Better have less land in fruit, fertilize higher and market more carefully and get correspondingly better prices; than to see your stunted, unsightly fruit go begging for ruinous prices. Large sized, well flavored, highly colored fruit will always sell for more than small, sour, illshapen berries. The success attending a small patch of fruit well handled and cultivated has often caused egregious failures later on. Reasoning from the standpoint of one eighth acre handled and sold under propitious circumstances, the beginner has been induced and tempted to try his hand on one or five acres, hoping profits would be proportionally large. The reverse is the rule in almost every instance; forced neglect, bad weather, inability to pick and pack, all contribute to make the majority of such ventures a failure, and often disgust and disaster combine to drive the grower out of the market entirely. Thus, over-production, in this sense at least, proves a most prolific source of failure in southern strawberry raising. The very great difference in preparing, planting, cultivating, and the final marketing of five acres, compared with one-half acre or even one acre, often produces a most complete failure, whereas the small plot would be a most gratifying success. After all one subject and the last to treat on, viz., proper picking, assorting and shipping is a most important factor in the final success of the whole enterprise. The great amount of ignorance displayed, coupled with carelessness in the matter of handling the fruit, not unfrequently causes in the end a complete failure and disaster, whereas the proper manipulation of the same would have made a success instead.

The neat, practical and very convenient packages now in use for shipping berries would almost seem to admit of no further improvement, and yet each succeeding year brings out something new with a view not only to present the fruit in better shape, but assist in its preservation during shipment. With us in the South, where long shipments are frequently the only hope of success in securing remunerative prices, ingenuity is taxed to secure a degree of cold necessary to prevent fruit from decay before reaching its destination. And right here comes in a very important point not to be overlooked. In examining a new device in the way of a small ice chest where the strawberries were surrounded with cold air, the writer noticed the almost perfect condition of a portion of the fruit, while other baskets in the same box were completely worthless. A little examination soon disclosed the fact that this difference was entirely due to the degree of ripeness when the berries were started from the point of shipment. So that in basing an opinion as to the causes that lead to either success or failure in such cases, we must intelligently take in all the surroundings. In this case had the shipper used all fully ripe fruit, his consignment would have been a complete loss and the inventor of the package named would have been discouraged and his invention pronounced a complete failure, and the real facts might have proven it a very useful invention.

Taken all in all there is a wide and profitable field

in the South for intelligent and practical strawberry growers. But no enterprise, however inviting or flattering in its prospects or outlook, should be approached more cautiously nor studied with more careful forethought. The strawberry plant itself in this region, Middle and South Georgia, is almost universally healthy. The fungus diseases attacking the leaf in other sections happily has not seriously affected the plant. Of course we have run the gauntlet of new varieties here too. And the survival of the fittest will apply with equal force in this as in other like enterprises or ventures. We can all avail ourselves of the experience of others, and as this great Society is largely engaged in disseminating valuable information to all, it is hoped this paper may not be entirely without its lesson. And right here, to show the importance of only a few days in the time of ripening, one cultivator in a Southern State north of Georgia covers his entire patch on frosty nights with canvas to protect bloom and young fruit. His plantation covers quite a number of acres too, so that it is no small task, but pays him handsomely. Ingenuity and a high order of skill in devising some means whereby nature's irregularities in the way of frosts and storms may be counteracted will be required and can successfully be carried out if persistently engaged in. And as "There's no charm in victory won with ease," so let eternal vigilance, persistent and never-ceasing effort be the battle cry of every cultivator and success will perch upon his banner.

## MISCELLANEOUS PAPERS.

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### Fruits of Western North Carolina.

BY H. S. WILLIAMS, ROCK LEDGE, FLA.

A resident for many years on the Eastern coast of Florida as far south as the 28th degree of latitude, caused me to feel that at least a temporary change of climate would be beneficial. A higher altitude presented many inducements, both desirable and agreeable. From the lovely orange groves of the far famed Indian River, where the guava, the pineapple, the mango, and many other semi-tropical fruits flourish, in addition to the better known Citrus family, to the high mountain section of Western North Carolina, is a complete and radical change. The climate, the soil, the fruits, and the diet are all changed. As a life of idleness, even during a brief Summer outing, would be well nigh unendurable, I thought it best to purchase a small place and try to amuse myself by growing a few apples, peaches and grapes, especially the latter.

I can assure those who have never ascended the Blue Ridge and explored the great mountain ranges and the quiet valley beyond, that the trip is well worth the time and cost. Ascending the mountain by the steepest grade in the United States—save one, going north from Spartansburg, S. C., one reaches the pleasant town of Hendersonville. Here I passed a part of the Summer, making frequent excursions to distant points, including Ashville, Marysville, Marshall, and other places reached by the railroad, making it a point to study the fruit-growing capacity of each section. Finally I left the highways of iron travel and started to explore the wilds and mountain fastnesses away from the well beaten track of the summer tourist.

Seven miles west of Hendersonville we strike the upper French Broad River. The fertile bottoms here stretch out to the foothills of the Blue Ridge to the southeast, and to the higher mountain range of the Balsam to the northwest. Away up in the center of Transylvania County the little village of Brevard is located, nestled among the low hills that skirt the bottom lands with an altitude of 2,600 feet above sea level. That particular summer the peach

crop had been totally destroyed by a late spring frost. There is nothing particular, however, about their late spring frosts, unless it may be their frequency.

Here, however, I found peaches brought to town by the wagon load, and very fair ones too for seedlings. A month or more passed here convinced me that it was as desirable a place to have a summer home as any, both for quiet and for fruit. A little valley quietly resting among the foothills of the Balsam range, with a babbling stream running through it, was purchased.

A score or two of apple trees that had stood the storms of half a century or more, scarred, defaced, broken down, but still struggling on and bearing fair crops, proved that there was no question as to the success of that fruit. Half dead peach trees with moss grown trunks six inches or more in diameter, with plenty of fruit on the younger growth, told me they too would succeed, barring those particularly late frosts, which, by the way, I was most solemnly assured did not reach this most favored place.

A settler still lower down towards the valley had a small vineyard, the vines running at will over the ground, almost covered with weeds, apparently totally neglected, and of course, never trimmed, which showed a remarkable crop of fruit. So I had hopes of grapes, to me the most desirable of all.

With that spirit of thrift, characteristic of all good citizens, I did not propose to have it all outlay, and a perspective making of wine held out some hopes of an income. Of course it was too far from the great markets of the country, and transportation too costly to expect any profit from the sale of table grapes, at least until a railroad should penetrate the valley. Even then, table grapes would never be a money-making crop, for, owing to the altitude, we are two or three months later than the table lands just under the Blue Ridge to the southward.

The present year, owing to a late spring, we are ten days later than last year. Thus you see we

would come in direct competition with Northern Virginia and Maryland, which fact, owing to the increased freight rates, would destroy all hopes of a fair profit.

First, in the way of improvement, I set a small orchard of both peach and apple trees, then a few hundred grape vines, of some twenty odd varieties, all the last for home consumption and to test the finest table grapes. A year later I set some few thousand wine grapes, consisting of Norton's Virginia, Bachus, Ives' Seedlings, and Cynthiana. I have just passed a week there and came direct to this meeting.

The first vines, which I call my experiment vineyard, set three years ago last March, have a fair crop of grapes. The wine grapes, two years set, are just beginning to bear. Now, as to the conditions. It is a principle of law that a jury, to return an intelligent and just verdict, should have all the circumstances of the case in the way of evidence presented for their consideration. In this case, my tenant who has charge of the place, is not much better posted on grape culture than myself, and I am the merest novice. Whether the vines were properly trimmed and tended, I do not know. The season was very wet during the winter until the middle of March, then a fair season until July, then extremely wet again until September 1st.

A late frost about the first of May fell like a blight on the low lands of the valley and killed all the fruit, but fortunately its effect was scarcely seen on the elevations of two hundred feet upward. Under these conditions, the only wonder is that we had any grapes at all. By extremely wet, I mean an almost daily shower or heavy rain for six weeks, during July and August. Add to all this, a hail storm in June that did much damage. Of course the "oldest inhabitants" never saw such a season before. No spraying whatever was done. Perhaps fifty bags were put on, but my man thinks he did not do it right, and they were a complete failure, for whether drawn down right or wrong, the hail-storm before alluded to, beat nearly all off. In looking over the experiment vineyard, I find the Concord, Noah, Goethè, Worden, Wilder, Delaware and Woodruff Red have fine crops of fruit, and promise well. Moore's Early had a good crop, but were all gone when I reached the place. The

Brighton and Charles Downing rotted somewhat. Some mildew showed itself on several varieties.

A few of my peach trees bore for the first time, and the fruit was exceedingly fine; apples the same. The old trees, after being trimmed and cared for, have a heavy crop of fruit, while all the orchards in the valley are fruitless, showing the value of elevation and consequent exception from late frosts.

I do not think any spraying has been done on the apple trees, or any means taken to destroy insects or mildew. So much for my own experience. Now a few words from the old residents: Mr. M. J. Orr of Brevard, a very intelligent and enterprising farmer, to whom I am indebted for several specimens of native seedling apples, now in the exhibition room, says that in his twenty years' experience in growing apples, this is his first failure. The early frost is what did the damage. Of course his orchard is in the valley. The seedlings above referred to are poor specimens, owing to the season. They are all, however, spoken of very highly as most valuable acquisitions to the list of apples in Western North Carolina.

Mr. Ernest L. Ewbanks of Hendersonville, a very intelligent amateur grape grower, has been quite successful, and at my request for his experience, writes as follows:—

"About five years ago, I began with a few vines of the Concord, Catawba, Moore's Early, Niagara, and Lutie (the last named my favorite). I chose a spot protected from the northeast winds by a mountain. Soil, a light gravelly character, recently cleared of a good growth of oak—a red clay subsoil with southern exposure and sufficient slope to drain naturally. I used coarsely crushed bone on a part, and super-phosphate on all. Holes dug from twelve to eighteen inches deep, and surface soil with the fertilizer named, placed in the bottom and one year old vines placed on this, then filled with surface soil. My vines were set from eight to ten feet apart each way. The second year posts were set, and wires stretched—three wires to the post, four would have been better. When one year set, I top-dressed with wood ashes and fowl yard manure. At two years, after a shallow plowing, I top-dressed with lime freshly slacked. I have never seen better grapes than those grown following this application of lime.

I used about fifty to sixty bushels of lime, after slackening, to the acre, and am convinced that lime thus applied improves the grapes in quality. A friend who passed the summer with me, said my Concords were the finest he had ever seen, and he had eaten that grape at different places from New York to New Orleans. My Luties he regarded as the best Grape he had eaten anywhere. A good sparkling red wine was made from the Concord, and a single test of the Lutie showed good results in a sweet wine of a clear yellowish tint. On the whole, I am much gratified with my experience, and feel fully convinced that brains and a small capital can make a success of grape culture in the mountain sections of North Carolina. The vine is all that can be desired; judgment should be used in selecting a location, and then with proper attention and fertilization, success is almost certain."

Of my wine grapes, the Ives, two years set last summer, are very promising. The canes are strong and the foliage healthy. The Bacchus shows some little sign of mildew. I hope for a good crop another season, when I shall test their wine-making properties.

If I live to attend another meeting of the American Pomological Society, I hope to have solved that question to my own satisfaction, at least. In concluding this brief and imperfect paper, let me hope that some attention will be drawn to a section that I think equal to any other part of our country for the growing of the fruits named. Since my arrival in Washington, I am pleased to learn that as high an authority as Mr. Wm. Saunders, stated as long ago as 1869, in the Agricultural Report, that he considered the mountain section of Western North Carolina and South-west Virginia one of the best apple growing sections of the United States.

#### Small Fruit Growing in Eastern and Middle North Carolina.

J. VAN LINDLEY, POMONA, N. C.

Being requested to give a short paper on small fruit growing in Middle and Eastern North Carolina, my first thought was, is there enough being done in the old Rip Van Winkle State, whose resources were formally only that of pine lumber, tar, pitch and turpentine, to interest this body.

But remembering I had the pleasure of visiting some three or four different points along the Wilmington and Weldon Railroad a year ago between Wilmington and Goldsboro, where I found fields of strawberries on lands where a few years ago only grew cotton and were only worth \$10 per acre as cotton farms, now worth, after being cultivated some eight years in strawberries, \$40 to \$50 per acre, it struck me as an inviting field. Judging from appearances some of the growers are getting rich and some admitted that their net profits were \$5,000 a year.

In examining the list of varieties I found that they were principally new seedlings that the public generally knew nothing of. Their main crop was the "Westbrook Seedling" a pistillate variety fertilized by the Hoffman. The former comprised about two-thirds of their entire planting. They ripen very early and are extremely prolific and you know the early bird catches the fly. The second ripening are May King and Crescent.

For a land fertilizer they used principally cotton seed. In autumn they burr away the dirt from the plants put in cotton seed on each side of the row, then throw the same back and cover the ground with fine straw to keep the berries clean.

Seeing those large strawberry fields caused me to remember what was said at a meeting of the American Association of Nurserymen at Chicago a few years ago by, I believe, Orange Judd. The question before the Society was "Southern fruits are ruining Northern growers." One party suggested "go south." Mr. Judd gave an account of a trip to a strawberry section in the South some years ago where he claimed it was overdone, many berries were wasting and too many had gone South already. This was some six years ago. I would like to hear from him now as it had just begun then. His advice was not taken as readily as that of Horace Greely some years ago when he said "go West young man." If he was alive to-day he would say "go South young man."

In Johnson, Sampson, Duplin, Lenoir and some other counties in that section of North Carolina, the wild Huckleberry is a paying crop. In one of these counties, Sampson I think, the farmers are compelled to keep their lands posted as the farm help (colored of course) would all quit the crops

and go to the Huckleberry field, as for a few weeks and just in crop time, they could find berry picking more profitable. By keeping their lands posted the farmers could hold their labor, as no one is allowed to hunt game or pick wild berries on posted lands.

In the spring of 1890 a party at Southern Pines in Moore County, N. C., planted eight acres of poor sandy pine land in Wilson's Early Blackberries. This summer he sold the fruit at fifteen to twenty cents per quart and netted about \$600. Some shipped to New York and Philadelphia. This land five years ago was considered high at \$1.00 per acre. What will be done in small fruit culture in these sections in the future remains to be seen. The outlook certainly is bright.

Up in the Piedmont sections of the State in the clay lands strawberries are only grown for local markets and home consumption, the same may be said of currants and gooseberries.

Cuthbert and Gregg are the leading raspberries and the Old Houghton gooseberry seems to do better than any other kind.

Blackberries and Dewberries grow wild everywhere and but few are paying any attention to the cultivated varieties. I will close as I have written more than I thought the subject would admit.

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### Pomology in the Eleventh Census.

BY MORTIMER WHITEHEAD, WASHINGTON, D. C.

*Mr. President and Members of the American Pomological Society:*

In accordance with the requirements of the Constitution of our country, at the end of each decade passed in the flight of time, the machinery is set in motion for an official census or enumeration of the population within the borders of all our land. From time to time as these ten-year mile stones have been reached, other inquiries and enumerations have been added to the central idea of a count of the people, until the United States Census has grown to be an extended and elaborate inquiry into all the industries, commerce and social relations of our national life.

Agriculture is our greatest, our most important calling. It is the foundation and great moving power of all other industries, trade and commerce.

It feeds and sustains all the rest. About one half of our population live upon the acres of our great national farm. This farm has its vast fields of hay, cotton, corn, wheat and other cereals; its great numbers of horses and mules; its mighty herds of cattle, sheep, and swine, on hill-side, prairie and in valley; its immense dairy turning out millions of pounds of butter and cheese; its crops of sugar, tobacco, hemp, flax, hops and rice; its poultry and its bees. All these to be counted, numbers, acres, product and value. And more, the buildings, the fences, the forests, the labor employed, all to be looked after and enumerated in the aggregate of our national wealth. But still other portions of this great farm of ours must be taken into account, and it is that portion so well represented by these our friends and co-workers here assembled, who, though coming from homes thousands of miles apart, have felt the "touch of nature that makes the whole world kin," representatives of that "higher art of agriculture," first and best, given to man in the earliest paradise, a taste of which comes to us in those beautiful morning hours when amid "bud and bloom, sweet perfume," or surrounded by the fruits of our labor we are wont to feel, if we do not always say:

"Oh! Maker of the fruits and flowers,  
We thank Thee for the wise design,  
Whereby these human hands of ours  
In nature's garden work with Thine."

Yes, we must count our wealth in orchard and vineyard, as well as in field, factory and mine.

In the Tenth Census, or that of 1880, the agricultural schedule, which was carried to every farm in the country, contained but a few inquiries relating to fruit growing, and even then the results obtained pertaining to pomology were never printed; and so no official national statistics in this direction have ever been given to our people.

Early in the preparations for taking the Eleventh Census I was honored by being called to a place at the head of the Division of Agriculture, having specially the entire charge of the work in connection with the live stock and horticultural interests of our country. A fruit grower all my life, I naturally felt particular interest in that part of my work, and knowing of the great lack of statistics in that direction, I at once determined to make special

effort to bring up this neglected branch, at least to the prominence given to the other crops of the farm, and to which I felt it was entitled by reason of the hundreds of millions of dollars of capital invested, the large number of persons employed, the immense sum its products added to our wealth, and the health and happiness it brought to so large a proportion of our people. Hoping, at the very least, to make a beginning or to form a basis upon which other workers in future decades can build a more elaborate structure.

Before commencing the details of the work I laid the matter before Hon. Robert P. Porter, Superintendent of the Census, and told him of my plans in the field of horticulture, that I desired to count up all our orchards and vineyards, to get the figures of floriculture, nurseries, seed and truck farms, our tropic and semi-tropic fruits and nuts, to enumerate the acres and trees of our apple, pear, peach, plum, cherry, apricot, our small fruits and vegetables and fruits and vegetables raised for canning. The Superintendent granted me full power to act, and I entered upon the details of the work with all the zeal that a love for the profession could give.

On the farm schedule of the Census of 1880 there were but twelve inquiries in the line of pomology, viz., the acres and value of products sold in 1876, of nurseries (2); the acres, bearing trees and bushels, 1879 of the apple and peach (6); total value of orchard products (1), and acres, grapes sold, and wine made from vineyards (3).

In preparing the agricultural schedule for the Eleventh Census, the questions relating to pomology were increased to fifty. To the apple and peach were added the apricot, cherry, pear, plum and prune and a general inquiry concerning "other orchard fruits." Small fruits were not forgotten and the blackberry, cranberry, raspberry, strawberry and a column headed "other small fruits," were given a place. The vineyard questions were increased to seven, and in view of a special investigation, nurseries remained at two.

Each agricultural schedule had space for the names of the owners or tenants of ten farms, with acres, crops, etc., etc. One million copies of the schedule were printed and turned over to general machinery of the Census with its 175 supervisors and their army of 43,000 enumerators, and within

the thirty days of June, 1890, in theory at least, every farm in the United States, of three or more acres (and less than three acres, if the annual product amounted to over \$500), was visited, and along with all the rest, our questions relating to pomology were asked. If all these 43,000 enumerators, fairly did their duty, our first real national Census of pomology has been taken, and we now have the names and location of every grower, be he owner or tenant. We have the acreage of all the fruits named; the crop of 1889, with its value; the number of bearing trees and young trees not bearing, and other important data.

The heaviest work has been completed; the count has been made. All that remains now to be done is the mere routine work of getting the figures into shape and having them published for the general good.

I wish to give one illustration of our efforts to make this pomological inquiry of the greatest practical value. Under the head of the various orchard fruits and the vineyard, in addition to getting the number of "bearing trees" and "vines bearing," we inquired for the number of "young trees not bearing" and "acres in young vines not bearing." When these figures are properly tabulated and printed, at a glance the student, be he home-seeker or man of business, can tell by counties in just which portions of our country any given variety of fruit is successful, and where its cultivation was being extended during the Eleventh Census year. Should this be followed out in the next Census, the percentage of progress made in any line of fruit production can be found in any county, and thus the very best sections for the growth of any one variety or varieties of fruit in all parts of our country can be clearly defined.

It has been the custom for a long time in taking the United States Census to make a number of elaborate inquiries and special investigations into some lines of productive industry, commerce, and business. Mining, manufacturing, transportation, insurance, etc., have been thus favored, and the work of thousands of special agents has resulted in large volumes of statistics of immense value to those most deeply interested.

Agriculture has in the past been favored with a few of these special investigations, and the extended

and published reports of the Tenth Census on Cotton, Tobacco, Cereals, Meat Production and Forestry, are well known. The Eleventh Census broadened its lines in the direction of special investigation, and special agents by the thousand have been in the field for months, and have traversed every portion of our country in search of facts and figures relating to Mining, Manufactures, Transportation, Insurance, Fisheries, Indians, etc. But Pomona and Flora had been slighted, the fruits and flowers that gladden our fields and homes, and bring millions to our revenues, had never had special place, and so the Superintendent was once more appealed to, the privilege for some special horticultural investigations was most kindly granted, and just three special agents were selected and appointed with the faith and hope that among all the thousands employed on other industries, these few could bring out something to show the importance of our loved branch of agriculture.

The first appointment for special work was that of Col. H. Gardner, of Hammondsport, N. Y., for the Viticultural investigation. A practical grape grower, a gentleman of extensive travel, and thoroughly endorsed by individuals and societies in the large grape growing districts of western New York.

Soon after, Mr. J. H. Hale, of South Glastonbury, Connecticut, well known to us all, was called to assist, and the special investigations in Nurseries and Seed Farms, Tropic and Semi-tropic Fruits and Nuts, and in those horticultural, if not pomological branches, Floriculture and Truck-farming, were placed under his special care.

Later along in the work, as our plans were developed, Mr. A. N. Brown, of Wyoming, Delaware, who, with his father, has 170 acres in apple, pear and peach trees, and who is well known by reason of his connection with the Delaware and Maryland fruit exchanges, as an organizer and manager, was appointed and given charge of the investigations of our great peach industry, which has become now truly national.

As a basis of this special work, transcripts were made from the regular agricultural schedule of the names of all individuals who grew any of the specialties named, together with acreage and products. Special schedules were then carefully pre-

pared, covering as far as possible all the details of each industry, and these were sent out with circular letters and franked envelopes to all the long lists of names of parties interested.

Without giving all the questions—amounting in the aggregate in the several investigations to over 2,000—it may be well to state that the statistics asked for in Viticulture covered area and production, values of property and products, profits of investments, distribution and cost of labor, distribution of varieties, shipment of products, capacity and out-put of wineries, soils, irrigation, drainage, meteorology, fertilizers, diseases, etc.

The data asked for on the special schedule of Nurseries—the infant school of all our orchards—included area, value, capital, labor, implements, fertilizers, soils and preparation, irrigation, propagation; acreage, quantity, quality and cost of production; distribution of stock and varieties in demand; expenses of distribution, insect pests, remedies, etc.

The information requested from growers on the Tropic and Semi Tropic Fruits and Nuts investigation covered area, unoccupied land adapted to each variety, trees and plants, and their cost, fertilizers and cultivation, trees in nursery, young orchards, bearing trees and plants, orchard values, markets, expenses of marketing, selling price of products, income, varieties, irrigation, diseases, insect pests, etc.

The special schedules for Peach Culture, Truck-farms, Seed farms and Florists, contained the same general line of inquiries as those before mentioned.

From the general agricultural schedules carried by the 43,000 regular enumerators of the census, from these hundreds of thousands of special schedules, from the personal visits of the special agents to all parts of the country, from an extended correspondence, and from every other available source of information, an immense mass of data has been collected, arranged, filed, and is now in the possession of the Census Office.

The raw material having been secured, the next step was that of tabulation and arrangement for publication. When we remember that schedules, transcripts, tabulation sheets, etc., have to be handled by the million, some idea may be gained of the work in this direction.

As in other parts of the census work, as results are obtained the facts and figures are published in the form of preliminary bulletins, while the preparation of the final reports with all their more elaborate details and arrangement of figures in tables, by counties, States, divisions and totals for the whole country, and for printing in the census volumes, comes later along.

Of these preliminary bulletins, six relating to pomology, or more strictly speaking, horticulture, have already been prepared; three have been published and sent out, viz: Viticulture, Floriculture and Truck farming; two, viz: Seed Farms and Nurseries, are in type and expected from the Public Printer at any hour, and one, that upon Tropic and Semi-Tropic Fruits and Nuts, is nearly ready for the press. In addition to the figures of the three bulletins already made public, by the kind permission of the Superintendent, I am able for the purposes of this paper to give some of the figures contained in the other three.

Much as we have been wont to magnify our calling, it is only when we commence to touch its figures, rolling up into the millions on all sides, that we realize the importance of our industry, the vast progress it is making, and that our country, great in so many things, is greater than all others in its production of fruits. A few only of the interesting and gratifying figures we have obtained can find place here.

It should not be forgotten that the figures of all census crops are those of 1889, and not those of later years, with more extended areas, or of years when the yield has been greater than in the census year.

Our Viticultural industry was represented by 401,261 acres, of which 307,575 acres were in bearing, producing 572,139 tons, of which 267,271 tons were table grapes and 240,450 tons were used for producing wine, making 24,306,905 gallons; 41,166 tons for raisins, making 1,372,195 boxes of twenty pounds each, and 23,252 tons for dried grapes and purposes other than table fruit. It would require about 60,000 railroad cars to move the commercial crop of grapes of 1889. The industry represented an investment of \$155,661,150, and furnished employment to 200,780 persons. The vines are now growing that will produce 8,000,000 to 10,000,000

boxes of raisins within three years, being more than the present entire consumption of the country, which is about 7,500,000 boxes.

*Floriculture*—This branch of horticulture was found to have, in the census year, 4,659 establishments, of which 312 were owned and managed as a business by women. These 4,659 establishments used 38,823,247 square feet of glass, covering a space of some 891 acres of ground. The establishments, including fixtures and heating apparatus, were valued at \$38,355,722.22; tools and implements, \$1,587,692.93, and gave employment to 46,847 men and 1,958 women, who earned in the year \$8,483,657. Fuel for heating cost \$1,106,152.66. The products of the year were 49,056,253 rose bushes, 38,380,872 hardy plants and shrubs, while all other plants amounted to 152,835,292, reaching a total value of \$12,036,477.66 for plants. Cut flowers brought an additional \$14,175,328.01.

The figures of the Truck-farming industry are equally large and interesting, showing an investment of upward of \$100,000,000, with annual products reaching a value of \$76,517,155 on the farms, after paying freight and commissions, using 534,440 acres of land, employing 216,765 men, 9,254 women and 14,874 children, aided by 75,866 horses and mules, and \$8,971,206.70 worth of implements.

Our Seed Farm investigation included only such farms as were devoted to seed growing as a business, and did not consider the large amount of field and garden seeds grown as side crops on thousands of farms, which would greatly swell the aggregate yield of seeds, but would not fairly estimate seed growing as an industry. Our figures show that there were in the United States in the census year 596 farms, with a total of 169,857 acres devoted specially to seed growing. Of these 12,905 acres were devoted to beans; 4,268 to cabbages; 919 to beets; 10,219 to cucumbers; 71 to celery; 15,004 to sweet corn; 16,322 to field corn; 4,663 to squash; 7,971 to peas; 5,149 to muskmelons; 662 to radish; and 4,356 to tomatoes. The 596 seed farms reported, represent a total value of farm implements and buildings of \$18,325,935.86, and employed in the census year 13,500 men and 1,541 women. Some of these seed farms are of large extent, the average acreage per farm in Iowa and Nebraska is 695 acres, several being of nearly 3,000 acres in extent.

I have before alluded to our peach crop as having become national. Our regular census inquiries and our investigations have located the extensive orchards of Connecticut, New Jersey, Pennsylvania, Delaware, Maryland, Kentucky, Tennessee, Georgia, Arkansas, Wisconsin, Michigan, Kansas and California. Our figures are not yet completed, but a few that are of interest can be given. Total acreage in the United States, 507,736; value of products, \$76,160,400; hands employed, 226,000; value of tools and machinery, \$5,077,360; cost of packages, \$3,800,000; cost of labor and teams, \$1,300,000. Upwards of \$90,000,000 were found invested in peach growing in the census year.

*Nurseries.*—From the tabulation of our regular schedules, and those of the special investigation, it appears that there were in the United States in the census year 4,510 nurseries, valued at \$41,978,835.80, and occupying 172,206 acres of land, with an invested capital of \$52,425,669.51, and giving employment to 45,657 men, 2,279 women, and 14,200 animals, using in the propagation and cultivation of trees and plants \$990,606.04 worth of implements. Of the acreage in nurseries 95,025.42 acres were found to be used in growing trees, plants, shrubs and vines of all ages; and the figures, based upon the best estimate of the nursery men, make the grand total of plants and trees 3,386,855,778, of which 518,016,612 are fruit trees, 685,603,396 grape vines and small fruits, and the balance nut, deciduous and evergreen trees, hardy shrubs and roses. The largest acreage is devoted to the production of apple trees, viz: 20,232.75 acres, numbering 240,570,666 young trees, giving an average of 11,890 per acre, while the plum, pear and peach have, respectively, 7,826.5, 6,854.25 and 3,357 acres, producing 88,491,367, 77,223,492 and 49,887,894 young trees, or an average of 11,307, 11,266 and 14,861 trees to the acre.

Far from being the least in importance in the grand feast that Pomona now annually spreads over our great national domain, are the oranges, lemons, figs, pineapples and nuts. Great strides have within a few years been made in the production of Tropic and Semi-tropic Fruits and Nuts in our country, and our special census investigation in this new field has proven to be one of intense interest. Its surprises have been many, but its facts and figures are

not yet fully in shape. A few are given as an evidence of the grand array we hope to present in the final report and in the Census volume devoted to horticulture. Of the almond: California shows 658,566 bearing trees, and 791,658 young not bearing; cocoanuts: Florida, 123,227 bearing trees and 1,199,549 young trees not bearing; fig: California, 109,525 bearing, and 203,421 young trees not bearing. Lemon: Florida, 85,052 bearing, and 304,584 young trees not bearing; California, 82,611 bearing and 196,760 young trees not bearing. Olive: California, 278,380 bearing, and 328,997 trees not bearing. Orange: Florida, 2,725,272 bearing, and 7,408,543 trees not bearing; California, 1,553,801 bearing, and 2,223,710 trees not bearing. Pine apple: Florida, 21,605,000 plants. In Arizona, Louisiana, and the Gulf Coast there are also some 500,000 to 600,000 orange trees, besides more or less of the other products named. Large new plantations are being made, so that even these figures cannot be called the figures of to-day. For each acre of citrus fruits already planted, our reports show 13 acres of land adapted to their culture. In Arizona, our figures show a new planting of the orange alone of at least 200,000 trees while California in this, as in every branch of pomology, fairly surprises us by her bold and extensive enterprises.

I cannot as yet give you the acreage and trees of our orchards of apple, pear, plum, apricot and cherry, nor yet the figures of our great strawberry, raspberry, blackberry, cranberry, and other small fruit fields, but we have them in the rough, and hope ere long to have them arranged and published in the first volume that horticulture has ever had in a United States census, feeling as we do an honest pride in having it worthy of a place beside the volumes of statistics of the other industries of our country. As is now quite generally well known, the census appropriations have run low, and in our Division, as in others, large reductions of force have been made, and much important work has been suspended when almost completed, and can be renewed when Congress shall have made additional appropriations to round up all in good shape. I doubt not but our horticulturists and pomologists will use their influence to the end that the statistics of an industry, which, in its various branches, as

we have shown, has over \$1,000,000,000 invested, have the attention they so well deserve.

In conclusion I wish to bear testimony to the great and important work being done by our Department of Agriculture, which in its broadened field and more extended lines is making and saving millions, of dollars for our people. The honored head of the Department, the Secretary of Agriculture, the Assistant Secretary, the various Chiefs of Divisions, especially those of Pomology Statistics, Vegetable Pathology, Animal Industry, and Entomology, have aided our work in every possible way.

Our investigations have brought out most clearly the immense value the Department of Agriculture has already been to our pomology. Our Viticulture investigation most clearly shows that in localities, states and sections where the black rot, mildews and other fungoid diseases of the grape had of late years been spreading, destroying the crop and discouraging the growers, even in some instances to the abandonment of the business, that the practical application and dissemination of the ways and means for spraying, that, almost as upon the command "about face," the industry has turned from apparent coming destruction to the brighter days of complete success. The same with the introduction of the little *redalia cardinalis* from Australia into California, which has protected the orange trees from the destructive cottony scale, and, as I have personally witnessed, has caused large orchards to rise almost phoenix-like from their ashes. And so with diseases of the vine, the Peach "Yellows" investigation, and others yet in progress. It is our duty as pomologists to give credit where credit is due and to see to it that appropriations somewhat in proportion to those made for other departments of our Government are provided for this department that is doing so much, not only for pomology but for all other branches of agriculture, and which means for the good of the entire population of our country who are fed and sustained by our orchards and farms.

Now that the project of the establishment of a permanent Census Bureau is being agitated, it is well for us to consider it for a moment in connection with the statistics of pomology. From experience and observation I am clearly of the opinion that owing to the vast extent of territory to be covered,

and the variety and magnitude of the interests and industries involved, that even with the most perfect system and arrangement of the machinery necessary to do the work well, that the temporary employment of so large an army of employes, supervisors, enumerators, special agents, clerks, etc., with little skill and but slight knowledge of the work upon which they are temporarily employed, does not conduce to the good results and exact figures that can alone make such statistics of real value.

Under the present system each succeeding United States Census commences its work *de novo*, few permanent charts, guides or land marks are established, hence the benefits of past experience, the corrections of errors in methods, and steady progress toward perfect results are largely lost. While experience in this and other countries proves that the shorter the time consumed in an enumeration of the population the better the results, I am clearly of the opinion, and I am sustained in the belief by the testimony of many intelligent farmers in widely separated portions of our country, that directly opposite is the case when it is applied to the count of the items connected with agriculture. The statistics of agriculture for census purposes cover the operations of a whole year; hence too great speed means only partial results. Two months in collecting the statistics of agriculture will, I firmly believe, result in more accurate data than can be obtained in one; and while the whole twelve months may not be required to gather all the statistics of all our farms, I do insist that more time and better work should be given to this industry; hence on general principles I believe a permanent census bureau would be a progressive step. Its central idea should be the count of our great population. Its other statistics I believe should be largely collected through other departments and bureaus of the Government, already having statistical divisions, and turned over to the central bureau for printing and distribution in uniform census volumes. A portion of the money appropriated for census purposes could be assigned to each of these other departments and bureaus for special census work at special times, simply requiring an enlargement of their force under the control of their regular expert employes. Whatever may be proposed for the collection of the census statistics of other industries, I shall insist

now that we have the great industry of agriculture in charge of a department of the Government, with its many important and constantly growing divisions, with a large force of experts in their various specialties, that *everything pertaining to agriculture, including its census, shall be under the control of the Secretary of Agriculture*. If the regular census of agriculture, including its pomology, is to be published but once in ten years, let the scientific and practical agriculturists, horticulturists, pomologists, florists, and stockmen, together with their clerical force and other assistants, with their farm and agricultural college training, with their love and enthusiasm in their chosen life-work, have their share of the census appropriation, and let them, with all their experience, their valuable data, always being collected, take, prepare and turn over to the Census Bureau the figures for the census of agriculture in all its diversified lines.

In gathering the national statistics of pomology and other branches of horticulture a beginning has been made, a few furrows have been plowed in a new field. We have tried to lay the foundation stones, rough as they may be, broad and deep; other workmen and builders in the future will, I trust, erect the superstructure and give to our industry the statistics that are considered of such great value by those engaged in other callings, enabling them to calculate intelligently on probabilities.

Our work in the interests of pomology in the Eleventh Census has been one of love and duty. Let us all strive to still more advance a calling that, in the words that years ago I heard fall from the lips of our revered Wilder:

Leaves no sting in the heart of memory,  
No stain on the wing of time.

MR. WATROUS: In view of the very great pleasure and interest with which we have heard the paper just read, I move that this Society give a vote of thanks to its author.

Carried.

### General Fruit-Growing: Notes and Suggestions.

BY G. C. BRACKETT, LAWRENCE, KAS.

At no time in the past has the importance of the horticultural industry been regarded in its proper estimation as at the present.

Thirty, yea even twenty years ago there was a notable scarcity of the product in the markets, and the demand was comparatively meager, and the frugal housewife hardly felt able to grace her table, even as a luxury, with the fruits of the orchard and the garden. The people, generally, were not fruit eaters, but more of meats and general field products; but generations following, became lovers of fruit, and in their childhood, nothing so much attracted their attention as the "golden and red cheek Pippin, or the crimson Strawberry," in the orchard or the garden, and nothing would tempt a boy to take great risks as a tree laden with red fruit just over the fence or by the roadside. To day these are so plentiful and cheap as to be within the reach of every one, and none need to violate conscience or honor to obtain them.

American pomology has become dear to American people, and scarcely a holder of even a suburban lot, as well as of broad acres, but what engages in the culture of some one or more classes of fruits with which to gratify the inmates of the home in various ways and at all times.

It stands preëminent as an industry with the American people, and its preëminence is largely due to untiring efforts and wisdom of the American Pomological Society. Its members are entitled to the distinguished and honored title of founders and guardians of the industry, as pillars of the noble structure wherein abides pure philanthropy, benevolence and charity, and which shall redeem, ennoble and elevate the human race.

As auxilliary to your work you have brought into coöperation a department of the National Government and the Experimental Stations established in the several States, and kindred organizations throughout the Union confer upon you the high honor of their confidence, esteem and support.

The pursuit of fruit growing has been regarded by the people as difficult, and an art involved in mystery, and the most intelligent men, not experienced have hesitated to engage in the work because of this impression. But the knowledge which this and kindred societies have disseminated through the press and published reports has dispelled the doubts and opened up the way to success in the most plain and simple manner, and fruit growing has become as general with the American

people as any other industry dependent upon the tillage of the land.

There are certain principles which govern largely success with all classes of fruits which we have brought under culture, and most prominent, as most important, are the sources and supply of nourishment, constitution, powers, conditions of climate and culture given to the objects of our care. Soils may, in most localities contain an abundance of plant food naturally to maintain a healthy growth for years. But a continual draw upon its sources will sooner or later cause a sterility. How to replenish the loss is a question not yet satisfactorily settled.

"Barnyard manures will do it" says one; and another, "Commercial manures are the best fertilizers," and to each of these respondents the question is clearly settled. But others find objections to the use of either of these means. Of the first the supply will not meet the demand, and when applied in sufficient quantity to produce an observable effect in growth tends to produce a succulent, tender plant, and such commercial manures as are now in use tend to solidify the particles of earth and a condition which often resists the best efforts of the culturist to overcome.

The soil of the western arid plains are samples of this condition. They are, by nature, the most fertile on the continent when brought under the influences of water. But the very means used to render the fertility available to plants as food restores the original compacted condition, unless the cultivator follows, at once, each flow of water and is constantly kept up, an analysis of these soils shows their fertility exists in certain mineral deposits, and that its tendency to solidify is largely due to the elements constituting its fertility, and the almost total absence of humus, and it is prominently noticeable that most any soil, excepting sandy land, divested of this element gradually becomes compacted as year after year the supply becomes exhausted by continuous cropping.

Thorough and deep tillage will, in a measure overcome such hindrance to a full and free action of the plant, but does not restore that active nature which primitively existed, and which is needful to render plants capable of enduring and resisting the effects of extremes of climate.

It is clearly evident that much of the premature decay of trees and plants and hastening of decay in ripened fruits are due to the weakening or debilitating effects of such conditions of the soil; the growth and maturation not being entirely the result of healthy action.

The massing of some of the small fruits causes a similar result, most prominently illustrated in the strawberry and such classes as increase by suckers, a system encouraging the compacting of soil. It is a well known fact that strawberries grown on the stool-system "stand up" in the market and endure carriage best, are of better quality and size; the same may be said of such varieties of the raspberry as the Cuthbert, Turner, etc.

There are other points relating to the industry which are not accepted as satisfactorily settled, and which are highly important to its general success, and it is due to the public that they should be, and by this Society, in such a manner that scarcely a chance will exist for a doubt.

I will close with a brief allusion to the success which has followed an intelligent and careful treatment of our orchards for the purpose of suppressing the class of insects preying upon tree and fruit.

Spraying with London Purple and Paris Green has been quite generally adopted in this State. The results as relating to the Codling Moth and Plum Curculio have been satisfactory. In some cases fully seventy-five per cent. of the crop has been saved in a single season, where heretofore not over thirty per cent. of sound fruit could be found.

There yet remains two other species which are seriously damaging, viz.: the Tree Cricket and Apple Curculio. The last threatens to become as damaging to the apple and pear as the Codling Moth has been, and so far the culturist has been almost powerless in combat; the means recommended being but little help in the effort to exterminate.

By a recent careful examination of my pear crop the following notes were made on five bushels of Bartletts, taken from trees which had been sprayed, once with a solution of Paris Green, and twice following with London Purple:

## CLASSIFICATION.

- 1st. Those injured by Codling Moth.
- 2d. " " " Apple Curculio.
- 3d. " " " Tree Cricket.
- 4th. " " " Fungi.
- 5th. " imperfect from other causes.

## RESULTS.

- 1st. Of the five bushels,  $4\frac{1}{3}$  were sound.
- 2d.  $\frac{1}{10}$  of the culls showed the presence of Codling Moth.
- 3d.  $\frac{2}{10}$  of the Apple Curculio.
- 4th.  $\frac{1}{10}$  of the Tree Cricket.
- 5th.  $\frac{1}{10}$  each by Fungi, and other causes.

From this it will be seen that the Codling Moth has been nearly exterminated, as in prior years fully one-half of the crops was ruined by this insect alone, and the Apple Curculio was not near as prevalent as during the present. Thus we have a little over eighty per cent. of sound and well grown fruit from a heavy yield. If in the future the Apple Curculio can be as effectually and easily handled as we can the Codling Moth, orcharding will become more profitable to that class of culturists who will give it proper attention.

General fruit growing cannot reach its highest paying condition until further progress is made in certain and important lines, and leading to greater success, a fuller knowledge of the essential requirements in culture and a more thorough and intelligent application is required.

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**Canadian Fruit Notes.**

BY L. WOOLVERTON GRIMSBY, ONTARIO.

Although the province of Ontario is situated pretty well to the north, yet, surrounded as we are by a chain of lakes, the climate of Southern Ontario is particularly well adapted to the growth of all the best varieties of apples, some of which attain greater excellency of quality and higher tints of color than the same varieties do when grown South. Another advantage of our Northern grown apples is their long keeping qualities, and for this reason we find that some of our best winter apples are bought up to be exported to the Southern States. No greater proof of the capabilities of our country for the production of this staple fruit can be given

than by referring you to an authentic table of the exports of apples from our Dominion during a period of years from 1881 to 1889 inclusive: greater portions of which were grown in Ontario. By reference to this table it will be seen that, while the exports in 1881 were not much over three thousand barrels, those of 1889 amounted to about a million and a half, and when one visits the leading fruit growing sections of the province, it will be quite plain that this is but a fraction of the quantity which will be produced in the near future when the orchards have reached their full state of development. The prices, too, have been all along quite satisfactory, even averaging as high as \$1.98 per barrel in the year when the quantity was the greatest.

One of the subjects which has been discussed at recent meetings of the Ontario Fruit Growers' Association is that of the judging of fruit at fairs. We have felt that a great injustice has been done to exhibitors by the employment of incompetent judges, who are themselves ignorant of the true value of the various fruits, and thus, while we find that a certain variety of fruit is given the highest value at one exhibit, the same is given a very much lower one at another. Fairs, we consider, should be educative in their influence, otherwise public money is being spent in vain. The first remedy which we propose is the employment of one judge instead of three, who should be a fruit expert, fully posted in the varieties he deals with, and well rewarded for his services. In addition to this, there should be placed in his hands some standard of the values of the various fruits, in order that judgement given at the various exhibits may be uniform, and as near as possible in accordance with justice. The preparation of such a catalogue, as the one to which I have been referring, was placed in the hands of a committee of our Association, and their work was brought before us at the meeting held last year. Further amendments will be made in the values given when we meet again. In order that you may have an opportunity of passing judgement upon this work, I will give you the rating of a few varieties to show the method adopted. It will be observed that only four general headings have been adopted, season, quality, commercial value, as the ratings under these heads are the only ones needed for judg-

ing the absolute value of these fruits. All varieties are supposed to be perfect specimens under each rated at ten, and inferior varieties by something less than ten. Imperfect samples are reduced one or more points for (1) lack of color, (2) undersize, (3) unevenness of size on plate, (4) wormy, scabby or ill-shapen specimens, (5) lack of stem or calyx, (6) polished fruits, i. e., having bloom wiped off; or for any other thing which tends to change the natural appearance of the fruit. The column "Total Value" is for use when prizes are offered for fruits, without designating the purpose for which such fruits may be required.

Another matter of importance which was discussed at the last meeting of our Association was that of fruit inspectors. It is felt by most fruit growers that the character of apples going from Canada to the British markets was being lowered by careless packers, and that no brand was sufficiently common to demand a price on its own merits. The same difficulty is experienced in selling fruit in our own cities. Buyers, when fruit is received, can claim a reduction on the score of quality, because there is no standard of grade.

The plan proposed to rectify this is by a system of fruit inspection. First, it is proposed to establish what is to be classed as No. 1 and No. 2 fruit; and in the second place men, who are practical fruit growers, are to be engaged as inspectors and trained to their work. This would be done at points of shipment, or at sections of the country where most needed. Their work would be to go through every tenth barrel, more or less, of each variety if so desired by the shipper, and brand each lot according to quality and condition. Barrels, so branded, would be purchased with so much greater confidence and so much better prices, that few shippers could afford to export apples without the inspection brand. The brand would also facilitate sales, for these could then be made at a distance as soon as the brand became known. There are some difficulties, it is true, in carrying out the details, but we hope that these may be overcome. We would be glad to have this subject further discussed by your honorable Society.

It would seem to be out of place for me to enter largely into the subject of varieties of fruits, but a few remarks may not be out of place. I have

already stated that in Southern Ontario we are able to grow nearly all the standard varieties as known to you, but of these some, which have been counted as most valuable from a commercial point of view, are now no longer so estimated and are condemned entirely by some of our leading growers. One of these is the Baldwin, which for the past few years has been almost barren. The Early Harvest and Fall Pippin, which were considered our principal summer and fall varieties are now no longer of value owing to the apple scab. Even the Northern Spy and Greening have of late been badly affected with this terrible pest. We feel exceedingly grateful to the Department of Agriculture of the United States for the exceedingly useful remedies which have been proposed for this and other fungi, and we are prepared to test them fully and give you the results. During this last season I have sprayed faithfully, with carbonate of copper, as recommended by your Department, but fortunately, or unfortunately, there has been scarcely any appearance of the apple scab in our orchard, whether sprayed or unsprayed, and, consequently we are unable as yet to judge of its effectiveness.

Concerning Russian Apples, we are scarcely willing to agree with some of our friends in condemning them wholesale, for we are finding among them some which we think will be suitable to the cold North, for instance, the Golden White, which has been tested in the province of Quebec and is exceedingly promising. Among native varieties, we think very highly of that American seedling, the Wealthy, which has been tested faithfully in the county of Renfrew, and some of the members of our Association look upon it as the very best variety that has ever been tried in that section. Samples were sent me last fall from there, and also some from points farther south, but those grown at the north were far superior, both in point of size and color, to those grown in more favored sections. I referred in my paper of last year to some Canadian seedling apples of promise, as, for instance, the Princess Louise and the LaRue, sometimes called Baxter. This latter is itself well worthy of notice; it originated with Mr. Billa LaRue, near Brockville, and should be given the name of its originator. The tree is vigorous and an annual

bearer of fine large fruit of good quality which keeps until January.

Plums and grapes are largely grown by our Canadian fruit growers, the Lombard taking the lead among the former, and the Concord among the latter. A new Plum has lately been brought forward by Mr. Warren Holton, of Hamilton, of wonderful earliness and excellent quality. It has been named by him the Early Green. It is of medium size, roundish in form with dark skin, marbled in two shades of green; the pit is smooth and free; the stem is black and about three-fourths of an inch long. A sample came to hand on the third of August and was then in prime condition. A variety of the German prune was brought under our notice at a recent meeting of our Association at Collingwood; it is called Baker's German Prune, from the person with whom it originated as a seedling. It is an annual bearer and wonderfully productive, the flavor is excellent. I do not know that this variety has, as yet, been propagated for sale by any nurseryman. The Niagara Grape has been very largely planted in the Niagara district through the efforts of the Niagara Grape Company; and, so far as I am aware, no one regrets having planted it largely, for it seems to suit the climate and soil of the Niagara peninsula, and in productiveness it quite equals, if not exceeds, the Concord.

We have to report a year of almost unprecedented freedom from the attacks of fungi and insect enemies. The Grape mildew is not so much dreaded in Canada as it is in the United States, as our vineyards are scarcely ever affected with the Downy Mildew and Black Rot; but we have the Powdery Mildew, especially upon such varieties as the Salem. We are usually successful in keeping this in check by the use of flowers of sulphur. This year we have also tried the copper carbonate and will report the result at another time.

I have some fifty varieties of strawberries which I have under test here at Grimsby, in the Niagara peninsula. The Williams, a Canadian seedling and a cross between the Crescent and Sharpless, promises well and may prove worthy of a place with the best. The great size of the Bubach, in spite of the drouths so prevalent in strawberry season, is much in favor of it; and, although it is a little soft for shipping, I find it readily brought eleven cents

in the market, when the common berries were selling for about seven cents per quart.

Of cherries, almost every kind may be grown in the Niagara peninsula, while farther north only such varieties as the Kentish and Hardy Mountmoreney will succeed. Farther still, even these will fail; but we are hoping that in the Russian Ostheim and Vladimir we shall find varieties that will endure the cold. I fruited the latter variety this year, and found the fruit to be of fair quality, almost equalling the Kentish in size; when fully ripe, it turns almost black in color. The flesh has a slight touch of bitter, but, this is almost undiscernible. Cherries of almost every kind have been an enormous crop with us here in Southern Ontario this season, and are more profitable than any other kind of small fruits.

### The Pomological Resources of North Carolina.

BY W. F. MASSEY, RALEIGH, N. C.

The limit of time allowed for these papers forbids my attempting more than a bare statement of facts. The peculiar topography of North Carolina, combined with her geographical position gives her a range for a greater variety of fruits than is possessed by most of our States. Stretching over five hundred miles from east to west, from the low, flat plains of the coast to the most elevated cultivable land east of the Mississippi, she furnishes suitable soils and climate both for some of the more tender as well as the most hardy of fruits. In the low coast region we first meet the most northern representative of the Palm family on this Continent, and on the highlands of the west we find the fir, hemlock, white-pine and other trees of high latitudes perfectly at home. The State naturally divides itself into three great regions—pomologically.

*First.* The low plains of the coast region, generally of a sandy character.

*Second.* The central oak belt, generally with a red clay soil and a rolling surface, on a granite formation.

*Third.* The upper Piedmont and mountain region. In this I would include all points west of a general line of 1,000 feet above the sea level. The elevation of the central belt will vary from 300 feet

on its eastern edge to 1,000 on the west. Within this region is included a large district quite distinct in character of soil from the other portions. This is the elevated, sandy, long leaf pine region lying between the Cape Fear River on the east and the Pendee on the west, which forms the beginning of the Sand Hill country stretching southwest through South Carolina and Georgia. This region, though included in our second geographical section is so peculiar in all its character that we will refer to it as the *upland* long leaf pine region. In all the red clay region of the central and western sections, the apple thrives in great perfection. But it is in the mountain region proper between the Blue Ridge and the Alleghany ridges that this fruit is peculiarly at home. The wonderful capacity of these elevated valleys and mountain slopes for the production of apples of a size, beauty and flavor unknown in the same varieties elsewhere, is rapidly coming to be acknowledged since the great displays made by this section at the Centennial Exposition and at the meeting of this Society in Baltimore in 1877. But the half has hardly been told of this, the apple region of America. Not only do apples grow to great perfection there, but the trees maintain a degree of health, and reach a greener old age and a greater size than in most other places. In one orchard in Haywood County we have measured over 100 trees averaging nine feet in circumference of trunk and most of them over this size. Trees of this size are common in most of the mountain counties, maintaining the most luxuriant health.

In the elevated valleys about Waynesville, in Haywood County, I have seen the Yellow Newton Pippin as perfect as it grows on the mountain sides in Albemarle County, Virginia, as the Albemarle Pippin. In the summer of 1890 I drove through a large portion of this mountain country. In all the country east of the Mississippi river, and in all other parts of this State there was hardly any fruit. And yet here in these mountains I found not only apple trees loaded with fruit, but peach trees breaking down with their crop. That there are extensive belts on these mountain sides when early autumnal and late vernal frosts are unknown, is a well attested fact, and this renders the culture of fruits there more certain than in any other section

of the Eastern States. Not only apples and peaches find a congenial home in these valleys and on these mountain sides, but grape culture in many localities is very promising as a culture for wine making. For shipment of grapes early in the season to the northern markets the mountain section can never compete with the central belt and particularly with the upland long leaf pine section. Pears, while thriving well in the mountain region, are not so peculiarly at home as they are in the eastern and northeastern coast region. The elevated region of mountain plateaus and valleys west of the Blue Ridge has a varying altitude of from 2,500 to 4,000 feet, while the mountain ranges tower far above this, and its soils are enriched by the decomposition of potash-bearing rocks, making the natural hardwood forests the finest in America. The same conditions of soil, elevation and climate make it the perfect locality for the apple, particularly. No region is so rich in native seedling apples, and hardly the half of those worthy of propagation are known in commerce. The ease and certainty with which apples are grown there was well illustrated by a remark of an old farmer at an Institute which I addressed in Cherokee County. I had been dwelling upon the preparation of the soil, planting, pruning and care of apples in orchard. After I had finished the old gentleman said, "No doubt, sir, all that care and trouble is right, but here apple trees grow just as naturally as old field pines do in the low countries, and we can get all the fruit we want merely by dropping the seed anywhere." The ease with which apples grow in this region has made the people very careless in their culture, and, having been long remote from railroad facilities for shipping the fruit, they have never learned how to cull and pack the fruit. So that, fine as the apples are, they have never yet made any impression on the markets even of the State itself owing to the careless modes of handling practiced. Now that railroads are penetrating this region and experienced fruit growers are taking up the propagation of the wealth of native varieties there, the future pomological prospects of Western North Carolina are bright. In no region North or South is intelligent orchard culture more certain of rich reward than in this country, where soil, climate and topography combine to make a country adapted

to a wonderfully diversified agriculture. In this connection I would call attention to a paper sent me by Dr. C. D. Smith of Macon County, a gentleman more familiar with the mountain regions than any one else, perhaps. This paper I send herewith and place at the disposal of the Society.

The central oak belt of North Carolina is as peculiarly the home of the peach and grape as the mountain region is of the apple. While many varieties of the apple thrive well in all this section, it is mainly to the culture of the peach and grape to which it is adapted. In the more elevated portions of this section, particularly the counties of Guilford, Forsythe and Wilkes, the cherry reaches a perfection seldom found elsewhere. Upon Brushy Mountain, in Wilkes County, which is included in the thermal frostless belt, all fruits come to great perfection and cherry trees of recent planting have attained a growth of over four feet in diameter of trunk, and produce wonderful crops of choice fruit. The central belt is, at no distant day, destined to be the peach orchard of the Union, as the dreaded yellows forces the culture of this fruit from the Delaware and Maryland orchards. Particularly is this true of the upland, long leaf pine section included in the geographical limits of the oak belt. On these sandy ridges, elevated 500 to 600 feet above the sea, grapes and peaches and small fruits thrive wonderfully. But of the small fruits I have nothing more to say, as the able pen of my friend Lindley will treat of them.

To show the wonderful vitality of the peach in this section, Professor Emery of the North Carolina Experiment Station, told me lately that in rambling through the forest near Southern Pines, a health resort on the Raleigh & Augusta railroad, recently, he came across what had evidently been once a cultivated orchard of peaches - but which is now grown up with pines - evidently twenty or more years old. Yet here, among these pines, were still a number of peach trees measuring nearly a foot in diameter of trunk, and full of fruit. Only one tree was standing erect, the others having been blown down, but had put out new heads and full of fruit.

In traveling through Davie County recently, between the forks of the Yadkin river, I was particularly struck with the abundance of wild peach trees along the fence rows and all over the old sedge fields everywhere, and all full of fruit though grow-

ing perfectly wild, as blackberry bushes. From Southern Pines, Moore County, grapes are shipped the first week in July, and the crop is cut out by the middle of August. So far the rot has not developed to any extent on these sandy hills.

Around the city of Raleigh, within a radius of three miles, there are nearly five hundred acres in grapes. Up to the present year, these vineyards have uniformly paid their owners \$100 per acre clear of expenses. No wine is made as yet, the shipping having been too profitable. The season of 1891, however, has been very wet and the rot has damaged these vineyards largely, while the great abundance of fruit has made the prices low. The growers are not discouraged, for the season has been an exceptional one, and they will at once go to work to fight the disease as growers elsewhere have been compelled to do.

In some sections the growing of the Scuppernong for wine is found profitable. Messrs. Garrett & Co., of Halifax County, are among the largest wine producers in the country, and their wine has a high reputation. Col. J. Wharton Green, near Fayetteville, grows the Scuppernong largely for wine-making and has a good demand for all he can make. In this sandy pine region and in all the eastern coast region, the Scuppernong and all its varieties of the *Rotundifolia* family are perfectly at home and it is to these that the future wine-makers must turn.

The flat coast plain is the paradise of the trucker and small fruit grower. It is also the best region of the whole State for the pear. This is practically true of that part lying north of Albemarle Sound and extending to the Virginia line. In all this region the pear reaches a size and quality unexcelled elsewhere, and only equalled by the pears of Delaware and the eastern shore of Peninsula.

In all the coast region and the lower part of the oak belt, the fig thrives wonderfully and produces fine crops with literally no culture. Some attempts are now being made to cultivate figs for commercial purposes. In Halifax County, one grower last year marketed his crop from five acres of figs in a fresh state in strawberry boxes, and realized a very profitable return. With modern facilities for canning and evaporating there is no reason why fig culture cannot be made profitable in all the coast region of North Carolina.

### Corrected Nomenclature of Japanese Fruits.

BY L. A. BERCKMANS, AUGUSTA, GA.

In a paper upon Japan Plums, submitted to the Georgia State Horticultural Society, at the session of 1889, at Griffin, a classification was attempted in grouping the several varieties in three types; since then several varieties which had not produced fruit at that time have yielded a crop and given additional material for correcting and adding to their classification.

We are indebted to Mr. Kizo Tamari, of the Imperial College of Agriculture, Komada, Tokio, Japan, for valuable information and a review of the paper above referred to. In order to elucidate these remarks, I beg to quote liberally from Mr. Tamari's letter. The extracts are prefixed with quotation marks:

"I regret to often hear of the confusing nomenclature in Japanese fruit trees, this is due to the undeveloped condition of pomology in Japan, and as there are no established names, only local ones are used. There are many local names for one variety, and some varieties are sold under three dozen names for the same thing. Local names are for the locals (*sic.*), but when brought before the public common established names are used."

From this we can readily understand the origin of the great confusion existing in the nomenclature of these fruits, and the discrepancy observed in nurserymen's catalogues. Now, as to the causes of this, Mr. Tamari says:

"There are two leading causes which bring this confusion: *First*, Fruits are collected by foreign travelers directly from those who have such trees for their own use, and do not care for the name; or importers collect them through middlemen, who have no knowledge and are not reliable. *Second*, The difference between the Japanese and English languages has brought great confusion. 1st, In writing a Japanese word in Roman alphabet, there is no longer any meaning as to the letter, and our aim in this case is only to approach to the original sound, for instance, Kaki, the Japanese Persimmon, may be written Kahky, or Kabkey, were the vowels in Kaki pronounced long, as Kâkî instead of Kâkî, as some do in Ameri-

ica. There is an example of a Japanese seedless Mandarin Orange: one party in San Francisco sells the plant under the name of Woonshiu, while another party offers it as Oonshiu. 2d, Japanese words may be said to be sorts of murmurs to Americans, and they cannot therefore correct any misnamed word when this happens, or even when a word is correctly written they will misspell it; so read it and copy it. This often occurs in reading handwriting. 3d, Unpronounceable names for English tongues cause perplexity and alter the original sound. 4th, As the translators may be either English, French or German scholars, it is natural that they should spell in their own schools."

Referring to the various catalogues and publications relating to Japanese fruits, we find from the above a plain and practical explanation as to the variation of names found therein, hence the *Among* Japan Persimmon is also called *Yemon*—both names apply to the same variety, but spelled phonetically.

After explaining the difference between the fruit known in Texas, Louisiana and Florida as Japan Plum, and which is really not a plum but a Medlar (*Biva* in Japanese, and known botanically as *Photinia Japonica* or *Eryobothrya*), Mr. Tamari states as follows:

"Mûmê (*Prunus Mûmê*) is also called Japan Plum, but is rather an apricot than a plum in all respects. There is a vast difference between Mûmê and Plum, and nobody can mistake one for the other; they are as readily distinguished here as Americans distinguish apples from pears. Botanists have classified it as *Prunus Mûmê*, and now they cannot be mistaken. Still some Japanese, who are not familiar with these subjects, as botany, may translate Mûmê as Plum, and in old dictionaries, English and Japanese translate it so."

Under Section I, *Apricot Plums*, on page 51, Proceedings of 1889, it is stated that from information received from reliable sources, the name *Virgata* seemed to apply to that class of fruits. We are now able to arrive at the generic name of this class, which we classified therefore correctly, and which formed a distinct class of fruits. We desire to also repeat that none of the varieties of this class, so far as tested here, are suitable for cultivating as fruit bearing trees where the orange is

not successful. As to the names of the varieties of this class, we have no means to translate the Japanese names which are given under the new classification: Yōrō, Hand-ka mi, Bungo, Katayama bungo, Kashiwagi, Naniwa rinshiu, Yatsu-busa, Gariobai, Komume, Yoshino ko-mume, Toko-mume, Kaga.

Twelve varieties are named, and from the compound names we infer that even in that class there are two or more forms or even types.

As to Japanese Plums proper, we again quote from Mr. Tamari's letter:

"Besides the above two Biwa and Mume, there are three sorts which are included under a common name in English, or *Smomo* in Japanese, they are *Hatankio*, *Beni-smomo* and *Smomo*. Should *Hatankio* not be a species in *Prunus*, it should form a group in the Plum family. Its habit of growth is of slender form, and young branches are straight and erect, leaves large and long, of light color, the fruit is not sour, but rather bitter when young, freestone, never colored as to flesh nor in skin, which becomes yellowish green and afterwards slightly tinted with purple red."

"*Botankio* is a variety of round shape in this group. *Kelsey Plum* is no doubt a variety of *Hatankio*."

"*Beni-Smomo* comprises a group of red fleshed plums. In Satsuma, my native home, *Hon-smomo* and *Yone-smomo* are the most noted and familiar fruits of this group, the first smallest in size and deepest in color, while the latter is the largest and highly esteemed. In some districts, plums in this group are called *Uchi Beni*, which means inside red. The skin of this group is not self colored, though its purplish color and mottlings are merely reflected from the flesh."

This describes minutely the variety cultivated here as *Satsuma*, whose Japanese name is *Yone-momo*, and so far as we have found is the only variety of the red-fleshed class that has been fruited in the Southern States.

"Another group of plums is that commonly cultivated in America and Europe and is the *Prunus Domestica*. The skin is either deeply colored or yellowish green, but the flesh is never colored and is sour and mealy to the taste.

"To summarize the above facts and to classify the three kinds of plums last named and referring

only to the color of the fruit, I will say *Hatankios* are never colored inside or outside, though slightly tinted on the skin.

"*Beni smomos* are those colored inside (colored flesh) and *Smomo* is either colored or not in the skin, but never colored inside (flesh not colored).

"Mr. L. A. Berckmans, of Georgia, gave full descriptions of Japanese plums and I believe these to be valuable for American as well as Japanese pomologists. I do not intend to alter or correct the names already fixed and used universally, but I take the liberty to compare some of the names given by him with the original Japanese. Mr. Berckmans says Japanese catalogues give *Botankio* the following synonyms, viz: *Botankin*, *Togari*, *Sonome*, *Hatankio*. I am sure that *Botankin* and *Hatankio* are never so pronounced by any person in any locality in Japan. *Togari* is correct, but means *the pointed*. *Sinome* may be *Smomo*, being *m* for *in* and *o* for *e*, and *Shiro-Sinomo* should be *Shiro-Smomo*, the white plum. *Masu* may be *Maru*, meaning round. *Ura-Beni* may be *Uchi-Beni* or 'inside red.'"

We had for some years past classified the Kelsey as a distinct type—this for our own guidance merely—and in this we are endorsed by Mr. Tamari, whose deductions are singularly accurate and denote a careful study of these fruits. We are indebted to him for the valuable information which will enable the unravelling of the confusion now existing in the nomenclature of Japanese fruits. Several varieties of plums have been received from California importing firms and growers which are nothing but well-known varieties of the European type, but being sent out under numbers only will likely be named to suit the pleasure of the grower and thereby create additional confusion. Well known varieties of this type must therefore be expected to appear under new names.

The following corrected classification is therefore submitted as based upon fruiting several new varieties and Mr. Tamari's suggestions:

Section I. *Apricot plums or Mâmé.*

(*Prunus Mume*.)

Bungo, Katayama-bungo, Hana-ka-mi, Gariobai, Kashiwagi, Kaga, Naniwa-rinshiu, Ko-mume, Yochino-ko-mume, Yatsu-busa, Yoro.

Section II. *Hatankio type* (freestone).  
(*Prunus Japonica*)

Kelsey, Hatankio-Maru (round), Hatankio-Togari (pointed), Botankio.

Section III, *Beni-Sumomo type* or red fleshed.  
(*Prunus Japonica*).

Satsuma, or Yone-momo,  
Uchi-Beni, or Housmomo.

Section IV. *Smomo type*.  
Botan, yellow fleshed. Botan white fleshed, Burbank No. 2, Chabot, Maru, Ogon, (this may be the Shiro-Smomo or common white plum), Red Nagate, Yesebe, Yellow Nagate.

Section V.

Simon's Chinese apricot plum.

ures, in fact as one of his "household gods;" and with and by him was planted on the verge of civilization, only to be again advanced from the place, where for centuries perhaps it had ministered to the comforts and necessities of those who were again to move forward in the van of civilization.

These certain methods of distribution carried it to Southern Europe and Northern Africa; and later on to South and North America, by priests of the Catholic church who knew so well its value as a food producing plant; and its oil furnished an ever ready medicine of such universal application, that to be without it was to find themselves handicapped. These Franciscan Fathers found it to be a most important adjunct in their efforts to hold supreme influence over the wild men whom they sought to raise to the dignity of civilized beings.

In San Diego County, California, and within twenty miles of the extreme southwestern limit of the United States, Father Junipero Serra, the most renowned and honored of all the Franciscan Fathers who came to the western shore of North America during the last century, planted the first olive trees, or possibly olive pits, but more probably cuttings taken from trees which he knew were good for producing both food and medicine; from this plantation, without doubt, all the "Mission" olive orchards have descended, and now, after 122 years have elapsed, the trees of this *old* orchard are infants in age, and a thousand years hence might not have reached their prime, had careless soldiers and vandal stock men left them undisturbed.

#### PROPAGATION.

The various methods of propagating the olive are by seed or more properly "pit;" this can only be done successfully by freeing it from oil, which prevents both air and moisture from penetrating to the kernel; this may be done by a bath of caustic soda, which readily combines with the oil, or by breaking the pits and removing the kernels, which, if carefully handled and properly planted, will readily produce trees—but they will be as various in description as apple trees will be when grown from seed; this is an unsatisfactory process, for only about seven or eight pits in 100 contain kernels, consequently more than nine-tenths of the time required in preparing seed from pits is absolutely wasted.

### Olive Growing and Manufacture of Olive Oil.

BY FRANK A. KIMBALL.

*Mr. President, Ladies and Gentlemen of the American Pomological Society:*

By request of Secretary G. B. Brackett I have prepared the following "paper:"

As a matter of convenience the subject will be discussed in what to us seems to be its natural order, viz., The Ancient History of this most remarkable as well as most useful tree—manner of distribution, and methods of propagation—planting in orchards and mode of cultivation, products of fruit for preserving, known in commerce as "Pickled Olives," and for oil, expressed from the fruit and known as "Olive" or "Sweet Oil," and last but not least, its wood, which in ancient times was considered little less than sacred. This will lead us, later on, to consider the steady advance made in the cultivation of the olive as a productive industry in its relation to the range of latitude and climatic conditions adapted to its profitable cultivation.

We need not inquire in regard to the origin of the olive tree, for the people of Western Asia who wrote our oldest history, found it in vast forests on the mountains; so at this point its written history begins, and here, in all probability, nature concentrated her forces and created the first olive tree.

It was slowly carried by the merchant as he followed or opened the channels of trade; by the emigrant it was carried as one of his choicest treas-

To produce trees which will bear the desired kind of fruit take limbs of any size, cut from the trees during the winter months, and before the new growth starts cut in pieces six to ten inches long and plant (either in nursery or orchard) in a vertical or oblique position, and nearly or quite cover them with earth, well packed around the cutting from top to bottom, or the limbs may be laid in trenches (for nursery planting) and covered about three inches deep. These will send up canes all along the cutting, in some cases not more than six inches apart; after the canes have reached a height of two feet (if at the proper season) remove the earth between the canes and saw the cutting off, giving to each cane a short section of wood, or with a sharp gouge remove the cane with all its roots, which secures an entirely independent tree with a large mass of fibrous roots, and of the variety desired and many years quicker than from "seed" to a bearing tree.

The cutting may be allowed to remain in the ground and the year following another set of canes will be produced from dormant eyes which failed to start the first year, this process may still be repeated.

With artificial heat it is easy to secure a vast number of trees by taking the growing tips of twigs, three or four inches long and planting them in moist sand; oftentimes these herbaceous cuttings will produce ninety per cent. of trees suitable to plant in nursery. And still another mode, take a gouge and carefully remove the spherical protuberances which are formed either just above or below the collar of large trees. These may be planted in nursery or orchard and will make beautiful trees. Olive trees grown from pits may be changed to any variety desired by grafting or budding, which may be done in many ways, all of which are illustrated in a small pamphlet published by the California State Board of Horticulture, in which are also illustrated all of the more desirable sorts of olives now produced in the State.

#### PLANTING.

From the nursery where Olive trees are generally allowed to stand two years they are planted in orchard at distances varying from 20 x 20 to 30 x 30 feet in squares, or on the "triangular"

plan with same distances on each angle which largely increases the number of trees to the acre, and properly distributes them over the area planted. The roots of an Olive tree should never be allowed to get dry, between the time of digging and planting, and no tree requires greater care in planting.

#### PRUNING.

When the tree is taken from the nursery the trunk should be cut off to the height determined on for branching, say two feet, and all the lateral branches should be cut back to balance the loss of roots necessarily destroyed in removing the tree. Future pruning may nearly all be done with thumbs and finger or a very small pair of pruning shears. The olive tree should never be allowed to grow tall. There being no compensation for the increased cost of picking the fruit and for thinning out the top to admit light and air.

#### CULTIVATION.

I need not say to any horticulturist that cultivation cannot be too thorough; good tilth is an exhibition of "Faith and Works" which comes very near being an absolute guaranty of success. But even this will not in *all* places succeed without another artificial help, viz., *water*, for it is the exception and not the rule where Olive trees will do their best without irrigation; and wherever nearly perfect conditions do not naturally exist and irrigation is resorted to to establish such conditions, it has become nearly or quite an established fact that for each dollar so expended at least ten dollars may be expected in increased growth and quantity of fruit.

When taken from the nursery, (at two years from planting of cutting), planted in orchard and properly cared for, the olive tree should pay all expenses of cultivation the third year. There are instances on record where *cuttings* planted in orchard have produced sufficient fruit the third year to pay all expenses of cultivation for that year, but this is not a safe basis for calculation, for it is only with *large* cuttings taken from vigorous trees, planted in a voluptuous soil and under the most favorable conditions, that such a result may be obtained.

In selecting a location for an olive plantation, great care should be taken to secure a well drained

tract, for there is no one thing which will so militate against success as a close, clayey soil with imperfect drainage.

Exposure also cuts an important figure in the profits to be derived from an olive orchard. A southerly exposure hastens maturity of the fruit, and it must always be kept in mind that when the olive approaches ripeness it must be gathered if first quality of oil is expected; true the quantity of oil is much less but the quality is much finer than that pressed from fully matured fruit.

A northerly exposure will prolong the period of ripening many weeks, so by selecting land having both a northerly and southerly exposure a person, by his own labor, can harvest at least one-half more fruit than if either one of the exposures was selected. It is often said that any kind of soil is good enough for olive trees—and inferentially the poorer the soil the more profitable the crop; if this be so, it is contrary to all other efforts of nature of which I have any knowledge—but it is *not* so. But it *is* a substantial fact, however, that an olive orchard which has long been cropped, poorly cultivated and not fertilized, will make a record of unprofitableness which the owner may not long disregard; in such cases generous fertilizing and good cultivation will cause a response which cannot be mistaken. Good location and good soil are two elements which will act as large factors in successful olive growing.

Few, and perhaps none of these suggestions need be made to the practical horticulturist; but there may be some one before me who has very little knowledge of horticulture, who may desire to plant an olive orchard, to him they may be of service. Nor should I stop here, but should further allude to the peculiar conditions under which we labor in California. As a rule, we do not care to see a drop of rain from the first of May to the first of December. During what is termed the "rainy season," and after any considerable fall of rain, the ground should be thoroughly "cultivated" or plowed and harrowed, and after the "rainy season" is over the surface of the ground should be well stirred at least once each month, so that it may be in perfect condition to absorb atmospheric moisture during the "dry season," and be all ready for the first rain of the succeeding "rainy season;" two purposes are

thus accomplished. The land is kept in good tilth and no weeds can raise their unsightly and unprofitable heads.

#### TIMBER.

The first historians, on almost the first page of history, record the value of the olive tree for timber. Are not the trees now growing on the Mount of Olives the same which were there 2,000 years ago? And can any one tell who planted them or how many centuries they had been planted at that date? Were not the doors of the Tabernacle of King Solomon's Temple made of olive wood? Do we not find dovetailed blocks of olive wood now holding together—as they have done for more than four thousand years—the great blocks of porphyry of which the Pyramids were made? Do not the Tombs and Temples, built "time out of mind," still contain solid and sound olive wood which, during the intervening ages, has resisted the "tooth of time?" To its durability add its beauty and one can readily understand why dealers in antique furniture place such value on the timber of the olive tree: truly it is a delight to the cabinet maker.

#### AS A FOOD.

The olive, as a food, has a value not usually accorded to it, for it is only immediately around the Mediterranean and Red seas that it is used as such. In the districts named, the olive is picked when fully ripe, dried and eaten with the black bread of the country, and nearly or quite occupying the *place* and fully doing the service of *meat*. In certain of the Mediterranean countries the lower classes of the people *may* taste meat twelve times during the year; but it is not *certain* they will, but it *is* certain that many of them consider it an annual luxury. The olive constitutes by far the larger part of their food.

It is quite possible that a majority of persons present are not personally familiar with olive eating people and cannot fully appreciate its absolute necessity in supplying their daily recurring wants. From the highest to the lowest all people are included. Only three things are said to be necessary for a Spanish soldier to take with him as a ration on a long and fatiguing march, viz., olives, bread and onions. The olive is a good flesh producer and (if I may be allowed to use a homely

expression) has the invaluable quality of "standing by;" the onion is not only a food but it is a stimulant and fully takes the place of wine. This ration is considered adapted to the soldier, as it contains all the elements required for nourishment.

The olives to which reference is made are not the green olives of commerce, such as are seen in every grocery and are found on the tables of every hotel and restaurant and are almost as indigestible as the cork of the bottle in which they were bought. These unripe unwholesome things will keep indefinitely and with much less care than the mature olive, but there is no comparison between the two products as food. The olive, properly prepared, will yet be regarded equal in value, pound for pound, with meat and far more healthy, and from experiments often made appears to be a natural food for man, for I have never yet seen a child, too young to walk or even to stand on its feet, which would not eat ripe pickled olives when placed in its way, nor have I ever seen a child made sick from eating them.

During the early years of olive culture by Americans in California, the fruit was prepared like the ordinary olive of commerce, fruit picked perfectly green, processed to remove its intensely bitter taste, packed in salt brine and in two or three days was ready for the table, and was eaten only as an appetizer or relish. Pickled olives have the peculiar property of removing all taste from the mouth and restoring it as though nothing had been tasted, and are universally used by experts employed to determine the value and quality of teas, wines, etc., and these purposes are invaluable, as no other known substance contains such qualities in equal degree. The preparation of green olives has almost been abandoned in California, as the fruit thus prepared is in no sense a food. Nor should it be forgotten that production of food in one form or another has become a large factor in the world's political economy, and that the nation or country which produces the largest quantity and most comprehensive variety of food has a handicap on all other nations or countries less favored, either by Nature's benefactions or the persistent efforts of its people.

From the early planting of the olive in California—prior to the year 1800 and down to 1867—I do not know of a single olive tree having been

planted in Southern California. From the last date to the present time large areas have been planted, so that where in 1867 there was one tree in the State there are now a thousand, and the area now ready to be planted is probably nearly equal to that already planted.

The well known thrift of the "Yankee," which seems to be an inherent virtue in the species, soon discovered to him that there was a great waste of labor and raw material in preparing a substance which had no value as a food, and that the purchaser of it had thrown his money away. Experience soon developed the fact that ripe olives, prepared by the same general process as the green ones, were not only toothsome but from their intrinsic value as a food product would be a counterbalance to the price of meat. This led to many experiments in their preparation, and the process which has been most generally adopted is as follows:

The olives are carefully picked (and must be handled without being bruised) when quite red and before they begin to turn purple, and immediately covered with a solution of concentrated lye, in proportion of two ounces of lye to each gallon of olives, great care being taken that every olive is completely covered. A portion of the solution should be frequently drawn off and poured on top, to keep the solution of equal strength. After twelve hours examine them to see how far the lye has penetrated, and when it has penetrated nearly to the pit (which is easily determined by breaking open some of the olives) draw off the lye and replace with soft water which may be changed once or twice each day till no trace of lye is left in the olives. This is best determined by testing with litmus paper. Then add salt to taste, provided the olives are to be used immediately; if to be kept for future use the brine must be made of same strength as for salting meat, and when required for use they must be freshened to taste, using cold water for the purpose.

Perfectly ripe Olives prepared in same manner are far more delicious but must be picked and handled with extreme care so that not an Olive is bruised, nor will they keep nearly as long as those not so near maturity. During the process of pickling the olives must not be exposed to light or

air. It is important that only one size of olives should be processed at same time, else the smaller ones will be spoiled before the larger ones are "done," and it is absolutely essential that everything used in processing olives should be perfectly "sweet," as any offensive odor will be absorbed and the olives be made not only worthless but positively offensive.

#### EXPRESSING THE OIL.

The mode of extracting oil from the olive, which was practiced thousands of years ago still obtains, but with machinery better adapted for economical work, steam being substituted for the labor of men and animals. To be able to obtain the largest quantity of oil possible from the olive, they must be left on the trees till *ripe* and shriveled—but quantity is at the expense of quality. The finest grade of oil can only be obtained by gathering the fruit while it is yet hard, but sufficiently ripe to allow the pit to be squeezed out without carrying any of the flesh with it. Early in the season the olive may become quite black before this condition is reached, but later in the season, when the weather gets cooler, the olive may be "ripe" when perfectly "green."

Immediately after being gathered they are spread, one or two inches deep, on trays or racks, which may be placed one above another, leaving space for circulation of air, great care being exercised to prevent them from heating (in which case the oil is spoiled for table use), and when a sufficient quantity of moisture has been evaporated they are ready for the

#### CRUSHING MILL,

which, with its appurtenances must be made of materials which cannot absorb odors—metal and stone, as much as possible, being used and the same care and cleanliness exercised in *making* the oil must be continued till it is in the bottle. After the olives are crushed (which is done under stone or iron rollers that are made to revolve in a large stone or iron basin, in which about 350 pounds of olives are placed and which constitutes a "charge.") The pulp is placed in a tub of proper size (made of very narrow staves placed a little distance apart and bound with strong steel hoops, which are hinged so that on being opened the pomace may be easily removed) and a light pressure brought to bear on it and oil of first quality or "Virgin Olive Oil"

is produced. The pomace is then removed and re-crushed and again subjected to pressure sufficient to secure a second grade of oil. It may be again crushed, at the same time adding hot water to assist in liberating the remainder of the oil, when a still greater pressure is used. This gives an inferior grade, which is used for light or lubrication. There yet remains some oil in the pomace, which may all be utilized by the soap-maker in the manufacture of castile soap. The residuum is applied as a fertilizer.

In the process of pressing the pulp, the fruit juice and oil, with a considerable quantity of pulp, runs from the presses into large tin tanks; the oil gradually rises to the top and is skimmed off and poured into the settling tanks, where it must remain for from sixty to ninety days, when a natural precipitation will have thrown down nearly or quite all foreign matter, and the oil is ready to pass through a filter, which is made by lining a conical bag, made of heavy filtering felt, with several thicknesses of white cotton batting. It is again filtered through druggists' filtering mats, after which it is ready for bottling. Care for olive oil does not cease when it is transferred from the filter to the bottle. It is exceedingly important that *light* be excluded and that it be stored where an even and reasonably cool temperature is secured, and when offered for sale only "sample" bottles should be shown, and these are *not* to be sold, and a purchaser should decline to take a bottle of oil which has been placed where the sun's rays or even light has been allowed to reach it, and when transferred to the kitchen the bottle should *never* be left uncorked, should be kept in a cool place and in the dark.

#### REASONS FOR UNIVERSAL CONSUMPTION.

The constant and universal use of olive oil seems in a considerable degree governed or perhaps influenced by latitude, and within certain limits it should supplant all kinds of fats, including butter and lard,—both of which may and probably should be used in the higher latitudes and at high altitudes—but are unquestionably productive of disease in the regions adapted to production of olive oil.

The attention and influence of physicians and political economists should be directed to the general instruction in, and constant use of, olive oil

by all classes of people; from the fact of its wonderfully nutritious character, whether taken into the stomach as food or applied to the surface of the body for the same purpose, and also that it is not only healthy, but at the same time is agreeable to the palate.

History records the fact of the wonderful strength and agility of the soldiers of ancient Rome, with powers of endurance equalled by no people of more northern latitudes. One of the chief causes leading up to this result was the constant use of olive oil and dried or preserved olives.

The dread enemy of English speaking people is dyspepsia, a disease almost unknown among the people whose diet is largely composed of the products of the olive tree, olives and olive oil.

Inquiry among educated people of Spain, Italy, Greece, France, North Africa, Syria, and in fact of all countries where like conditions exist, will develop the fact that dyspepsia is only known by its name. It goes without saying, among medical men, that oils, particularly of the olive, when properly used, not only do *not* interrupt or impede digestion, but are actual aids in promoting both digestion and assimilation.

In diseases of children, whether it be applied internally or externally there is no remedy to take the place of olive oil.

Out of forty-one cases of yellow fever in Barcelona, where the only remedy was olive oil, only *two patients died*.

For removal of "Gall Stones" it is an absolute specific, a fact which should be and perhaps is known to every physician in the land. The value of the products of the olive tree should be published far more extensively than it is, so that hundreds of thousands of people now crowded together in our large cities may be induced to occupy the millions of acres of land adapted to olive culture, now lying idle in the State of California.

### Does it Pay to Spray Orchards with Insecticides?

BY CLARENCE M. WEED, NEW HAMPSHIRE STATE COLLEGE.

This question, which your Secretary has asked me to consider, may be very briefly answered. Practical experience in the best orchards in America has dem-

onstrated, over and over again, that it does pay so to spray, provided the work is done with proper reference to the time, methods and conditions of treatment. As a radical change of location and work during the past season has prevented my being able to bring before you any new knowledge upon this subject, I can, instead, only point out some general cases of success and failures in this most recent of horticultural advances.

It undoubtedly is true that sometimes it does *not* pay to spray orchards with insecticides. I have known men to spray Wild Goose plum trees, which had never borne fruit on account of the non-fertilization of the seeds, and then to say that spraying was useless because the little unfertilized plums fell off a few days after the petals dropped. Spraying will not cause a crop of fruit to "set," although it will generally save it from destruction by insects after it is set. It also is often true that it does not pay to spray on a very small scale. It usually is not worth while to spray one tree, or ten trees surrounded by unsprayed trees of a similar kind, to prevent the injuries of the Codling Moth or the Plum Curculio, because the crop will be liable to injury from the second brood of Codling Moths reared on adjacent trees, and from the Curculios feeding upon the unsprayed trees. Neither does it pay to spray with too strong a mixture, nor too often, nor too late in the season, nor in a careless manner, nor without reference to the feeding habits of the insect you are after. Like most other horticultural operations, successful spraying requires the exercise of knowledge, judgment and skill.

As already indicated, the main factors of success or failure in spraying apples, pears or plums with insecticides are those of the time, methods and conditions of treatment. Some of the fundamental principles under these headings are the following:

#### 1. TIME OF SPRAYING.

It is as useless to attempt by spraying to kill the larva of a Codling Moth or Plum Curculio after it has gotten fairly inside the fruit as it is to lock the door of the proverbial barn after the proverbial horse has been stolen. To be successful the spraying must be done in time to destroy the insect at which it is aimed. This time varies with different insects, fruits and latitudes. In general, for the

Codling Moth and Plum Curculio, those arch-enemies for whose benefit the fruit grower's spraying machine is oftenest set in motion, the first spraying is to be made as soon as the petals of the blossoms are well off the trees. The best results appear to have followed in apple orchards when the application is repeated about a fortnight later; and in the plum orchard when two or three repetitions of the treatment are made.

#### II. METHOD OF SPRAYING.

The prime factors under this heading are the methods of making and applying the spraying mixture. In the early history of spraying a vast deal of damage was done by the use of too strong solutions, and it is better in this case at least to err on the side of weakness than on that of strength. But every progressive fruit-grower should learn to distinguish between the spotting of leaves caused by fungi—such as the rusts, scabs or blights—and that caused by spraying mixtures. An Ohio farmer to whom I had given some spraying instructions once demanded of me one thousand dollars for damages supposed to have been done by following the instructions, said damage proving on examination to be a case of Apple Twig Blight, confined to certain limbs on a row of Siberian Crab trees, and was so determined by both Professor Burrill and Professor Arthur, who examined some of the twigs. A small hand-lens will prove a useful auxiliary in determining whether spots on foliage are due to spraying or fungi. I have no doubt that damage done by the latter is often attributed to the former.

The strength of the spraying mixture should of course vary with different fruits. One pound of Paris green to two hundred gallons of water has apparently generally given good results on apples and pears and most of the European varieties of plums. On peaches a more dilute mixture is needed, one pound of Paris Green to 300 or 350 gallons of water having proven satisfactory. The application should be made with a nozzle giving a fine spray.

The recent demonstration of the saving effect of lime when added to London Purple solutions is an important step forward in the art of spraying. Professor Voorhees, in a recent report of the New Jersey Experiment Station, after detailing chemical

tests to show that lime added to London Purple and water mixtures renders the soluble arsenic insoluble, says: "We would recommend for ordinary use that a mixture in the proportion of one pound of London Purple to three-fourths of a pound of fresh lime be thoroughly mixed in one gallon of hot water and allowed to digest about two hours. If the water can be conveniently kept hot during the entire time it would be advisable to do it. Water can then be added in sufficient quantities to bring it to the desired strength." Instead of this, two pails of fresh milk of lime made by slaking lime in water may be added for each pound of London Purple in water mixture. It would apparently be possible for the manufacturers to render insoluble the soluble arsenic by adding more lime during the process of manufacture, and thus save the consumer the extra trouble.

#### III. CONDITIONS OF TREATMENT.

The conditions of profitable orchard spraying are frequently not well understood, and much of the existing prejudice against the practice is due to this cause. This ignorance, at least up to a very recent date, has not been confined to the mass of fruit growers but has shown itself in the plan of many so-called experiments in which a fatal fallacy was allowed to destroy the value of the results. It seems as though the conditions of a reliable spraying experiment concerning the Codling Moth had been sufficiently reiterated to prevent the wasting of time and money on the every-other-tree method in which one tree is sprayed and another beside it is left unsprayed to breed moths to lay eggs on the sprayed fruit for the late brood of worms, thus vitiating the value of the results in two directions. But while this principle is apparently generally recognized among experimenters, that it is sometimes practically ignored is shown by a number of recent reports and bulletins. On account of this every other-tree foolishness has arisen the experimental practice of spraying every two weeks during the season—a process as useless as it is dangerous—which has done much to prejudice the fruit-growing community against spraying. Some experimenters have also used bands about the trees thus introducing another factor of uncertainty into their results. In the early history of spraying experi-

ments errors of this kind were inevitable, but they are no longer excusable, and let us hope that we are through with them.

The commercial fruit grower, with large compact orchards, is the man who is to deserve most benefit from spraying. He will of course spray his whole orchard; and I believe that if he thoroughly sprays his apple trees twice and his plum trees thrice he will have little need to invoke the aid of bands with the former, nor jarring with the latter.

The time has passed when sound, perfect fruit can be produced without careful and judicious management. The history of spraying shows that only the more progressive and intelligent fruit growers will adopt the new practice, and as these are not so numerous that their products will glut the market, their fruit will command a far better price than the wormy, imperfect specimens of the non-spraying grower. Hence we are safe in answering the question of the title in the affirmative, and saying, that it does pay to spray orchards with insecticides, and I believe that very soon we shall be able to add that it pays to use fungicides in the orchard also.

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### Pruning.

BY D. W. ADAMS, TANGERINE, FLORIDA.

Looking backward along the shores of time, we see them thickly strewn with the wrecks of venerable errors, of cherished beliefs, of revered religious and abandoned scientific teachings.

The law, religion, art, agriculture, medicine and science have each contributed liberal quotas to this long vista of wrecks which (commencing at our feet) reaches back till it disappears in the lank shadows of oblivion.

These old wrecks were not beached by their commanders as unseaworthy. Their captains strained every nerve to keep them masters of the seas, but they were swept to the shore by the freshening winds and irresistible tide of increasing human intelligence.

It may be interesting to look at and talk about some of these ancient wrecks, and very likely their contemplation may give us profitable hints.

Among the wrecks of scientific mistakes is astronomy, as taught by the ancient Savants and known

as the Ptolemaic System, which made our earth the center around which sun, moon and stars revolved. To disbelieve this was not only scientific error but religious heresy. When Copernicus advanced his theory of the motion of the planets, it was bitterly combatted by scientists, and state and church united to persecute and punish him.

About two hundred and fifty years ago the physicians of the world were surprised and alarmed when Harvey announced that the blood of man circulated in a certain regular manner. Of course the medical scientists of that day fought his theories with all their might.

Then Isaac Newton promulgated his discovery of the law of gravitation, and very soon after another scientific craft became a scientific wreck.

It is not so very long ago that the most learned and incompatible Judges on the bench solemnly and with dignity heard and weighed the evidence, and sentenced to death fair women and brave men as witches, who were holding intimate and criminal relation with the devil.

Not ten, or a hundred or a thousand, but millions of innocent human beings thus ignominiously perished while the most learened clergy and most devout laymen assisted and said the most unctuous amen. Than this, the shores of time can show no more monstrous wreck.

Many of us can remember when children attending church on the Sabbath day, we were taught that

"In Adam's fall  
We sinned all,"

and if we died before being born again, eternal punishment in a lake of fire and brimstone would be our fate. That wreck is complete and wonderfully well hid for one so recent.

Many of us can remember when the first act of a "doctor" was to "bleed" a patient. The scars on my arm and no doubt on many of yours bear mute testimony to the alacrity with which the lancet was handled. In my boyhood days the most learned "doctors" treated the fever stricken patient by bleeding, followed by an emetic, calomel and merciless praying. A breath of fresh air or a drink of cool water were looked upon as fraught with indescribable danger and nutritious food was considered rank poison.

Less than forty years ago those true horticultural nobleman, Downing and Barry taught us that to plant a single native grape vine we should dig a pit twelve feet long, four feet wide and three feet deep and fill it with boulder stones, leather shavings, brick soil and manure to assure success.

That little bark stranded long ago and now we sail in faster boats.

Some years ago Mr. Meehan startled the ancients by teaching that the best possible cultivation for pears was close cut grass. Almost as one man the whole horticultural world rose up to condemn the innovation and defend the venerable practice of irritating the naked soil. The old way is not yet among the wrecks, but old, slow, laborious and inefficient, she will soon be passed by the modern, swifter, more efficient and more natural mode, and idly drift ashore.

This little glimpse of the past should teach us that "the world does move." Its progress has been over the graves of past generations and over the debris of past beliefs and practices. As it has been so will it continue to be so long as progress is possible. In horticulture this is as true as in any other occupation. If we are to keep step and keep up with this moving world, we must not anchor our ship in the calm waters of the sea of conservatism. If we do we shall soon find ourselves in lonesome waters and before we know it high aground among those ancient wrecks.

We must not accept an innovation because it is new nor reject it because it conflicts with our present theories and practice.

Remember that experience teaches us that the science, the religion, the law, the art of yesterday have grown and changed to satisfy the demands of the higher civilization of to-day—so does and so should horticultural theory and practice grow.

We hear nothing now of three to five feet deep trenching for a grape vine or asparagus bed. The Pennock apple, the Black Prince strawberry, the Isabella grape, with a thousand of their contemporaries, have been superseded and are scarcely remembered. Our modes of culture are changing and our practice of marketing has been revolutionized, but we have one venerable practice that seems to be bred in the bone, and that is pruning.

It really appears as though horticulturists were born with the ineradicable idea that a fruit tree comes into the world totally depraved and that its first and every subsequent impulse is to go wrong. I don't know how this idea came to be so universal unless it be because we were taught that the first taste (by our ancestor) of fruit caused succeeding generations of men forevermore to be born totally wicked. It might logically follow that a tree which was the fountain of all this woe would still contain an unlimited amount of evil tendencies. At any rate our present practice of pruning proves that we implicitly believe in the present totally depraved tendency of all fruit trees and that they can only be controlled for good by constant butchery.

As the physician of a half century ago attacked all human diseases with a lancet, so does the horticulturist of to-day attempt to correct the innate and universal cussedness of the fruit tree with the pruning hook.

The demon of the pruning hook is venerable and as shrewd as he is venerable. Nearly two thousand years ago he succeeded in getting some first-class free advertising by having a general recommendation issued that all the war spears then on hand should be beaten into pruning hooks. That recommendation gave his pruning hook business an impetus that has never been stemmed down to this day. We are still "in it;" we prune to make a tree grow and to check growth. We prune to make a tree bear, and to reduce the number of fruit. We prune to make upright trees spread, and to make spreading trees upright. We thin trees out to let in the sun and air, and we head them back to make them more compact. We prune them up to make them tall, and prune them down to make them short. We prune with axe, saw, knife, and thumb-nail. We prune in spring, summer, autumn, and winter. We prune because trees ought to be pruned, and finally and chiefly we prune because that was the way we were brought up, and it has never occurred to us that there is any other way to do. It has, in some way, become part of our horticultural consciousness that the mere act of cutting a fruit tree is beneficial, and nothing is more shocking to the sensibilities of the moss-grown practitioner than to behold a vigorous, healthy, prolific orchard which has *not* been "judiciously pruned."

Now I lay down this proposition, and I do it without fear of successful refutation, that *the first and inevitable result of cutting any tree is to do it a direct and irreparable injury*. I claim it to be a self-evident truth that whenever you remove by violence a single branch, or root, or leaf, from any living tree you just so far *threaten its vitality*. You just so far disarrange its circulation and make it susceptible to the attacks of diseases and insect foes. I believe no student of vegetable physiology, or clear observer of facts, will dispute this proposition. It then follows as a matter of course that pruning to make a tree grow is a myth. I am willing to assert here and now that there is no such thing as pruning for growth. The more you prune a tree the smaller it will be to-day, to-morrow, and ever afterwards. Correct theory teaches this, and careful experiment and observation corroborates the theory.

Those who prune for growth work in the assumption that a tree gets all its nourishment from the roots and say if you reduce the number of branches there will be more sap for the remaining ones and consequently more growth.

They ignore the well-known fact that ninety per cent. of the nourishment of a tree is taken from the air by the leaves, and when they cut off a leafy branch they actually destroy a producer more than a consumer of nourishment.

It is a fact the removal of a leafy branch is more of a check to the growth of the tree than the loss of a root, and to the superficial observer it is not so apparent for this reason.

There is a natural and proper balance between the top and roots of all trees. If you cut off a branch this balance is destroyed. The life and health of the tree is threatened—a general suspension of the regular business on hand occurs to meet the emergency. The loss of a portion of the foliage makes extra work for what remains. Clearly there is no need of more roots for this diminished top, and they cease growing. Every cell full of treasure is emptied and every energy of root and leaf directed to the one object of repairing damages. This is all done at the expense of the present and future growth of the balance of the tree, and yet our pruner for growth exclaims in triumph “see how pruning makes the tree grow.”

Now let us try pruning in another way. Let us cut off one-half the roots of a tree. Now the root is too small for the top and what is the result. The regular business of growing is suspended again and every leaf and twig and cell is called upon to give treasure and effort to repair damages and restore the balance. The superficial observer sees the yellowing and depleted leaves and pale shoots and says “root pruning checks the growth of a tree while pruning the top makes it grow.”

If we look deeper and see the strong growth of new roots at the expense of the top he would see the converse of his other experiment when he got strong new twigs at the expense of the roots. The final result of pruning either root or top is a smaller tree than if unpruned.

Some prune to make trees bear well. There is no doubt it does make them bear, for it is an accepted fact that anything which threatens the vitality of a plant causes it to make an effort to reproduce its kind. The only reason then why pruning does make a tree bear is because it threatens its vitality. Then comes the question; can we afford it?

Then we prune to open the bud and let in the sun and air. Such an act as that I can fitly characterize only by calling it a rape upon nature. Notice how quickly and vigorously and persistently outraged nature tries to repair damages by filling the aching void with innumerable water sprouts. Then one must keep up the quarrel with nature by pruning out the water sprouts again and again and again.

And thus we have labored generation after generation and still continue to labor to thwart nature and disarrange her processes. We remorselessly deprive trees of their foliage. We let the scorching and freezing winds burn and whistle among their naked branches. We expose long naked trunks and unprotected branches to summer heat and winter frosts. With gleaming plowshare and murderous mattock we exterminate every root and rootlet in that three inches of soil which is nature's chosen root-home. Thus assailed above the earth and below, its branches mutilated, and its most useful roots annihilated, its air feeders decimated and its soil feeders driven to forage in uncongenial depths, its circulation disarranged, its vitality

threatened, is it any wonder that general debility embraces it, that black knot cankers it, that yellows sicken it, that blight withers it, foot-rot attacks it and premature old age overcomes it? Then come the multitude of insects which find their most congenial habitat on trees of low vitality, and they sweep our orchards and its product with the broom of destruction.

We complain loudly of the rapid increase of these hostile insects and dangerous diseases which now attack our trees and fruits. In my opinion the prevalence of both is due almost wholly to the low vitality and disarranged circulation caused by our defiance of the laws of nature. In attempting to improve upon nature we have got so far removed from her that (continually thwarted) she is unable in her own chosen and proper way to control these diseases and insects, so that duty now devolves on us. With what success, satisfaction and profit, each can answer for himself.

That our fruit trees are each year more and more infested with insects and devastated by disease is sadly true, and I firmly believe that, more than changing climate, more than failing fertility of soil, more than degeneracy of sorts, more than all together our troubles originate in weakened vitality caused by the pruning hook above and the plowshare below, and so long as we continue to violate nature's law we must pay the penalty.

If we assist nature our reward will be rich. If we break her laws our punishment will be sure.

#### DISCUSSION.

MR. GOFF: I would like to ask if Mr. Adams had an orchard that was not productive, and he knew that pruning would make it so, whether he would advise pruning.

MR. ADAMS: If I had an orchard that was barren, and pruning would make it productive, I should certainly prune it; but before that. I should want evidence that it was going to accomplish the result. I have never known pruning to make an orchard productive, unless it were in very exceptional cases where orchards were very vigorous and then, as I stated in the essay, anything that threatens the vitality of the tree and checks its exuberance, will frequently cause it to produce fruit. I think you will find in all cases where the fruitfulness is pro-

duced by pruning, it is occasioned by that one principle, that anything which threatens the vitality of a tree always arouses that instinct of nature to attempt to reproduce itself.

MR. GOFF: Is not an orchard that is unproductive abnormal from that very fact? Does not the fact that an orchard is unproductive show that the trees are abnormal?

MR. ADAMS: Not necessarily; frequently the most healthy and vigorous trees are unproductive until they reach maturity. A tree that does not arrive at a fruitful condition until a later period is evidently a more healthy tree. To illustrate, if you find an apple that ripens prematurely on the tree—before its time—you may look for a worm; there is something wrong about it, and about any fruit tree that is prematurely fruitful. No tree ought to bear a crop until it has time to arrive at a suitable age and size, and any act, whether pruning or anything else, that will induce a tree to bear before that time, will give evidence that there is something wrong about the tree.

MR. GOFF: Suppose the proper time has come, and there is no fruit, then what?

MR. ADAMS: It is for you to judge how much responsibility you are willing to take upon this. If you are anxious to have fruit soon, and will sacrifice the vitality and future life of your tree to procure it right now, that is simply a matter of judgment.

MR. CUTTER: What would you do in case of forks, those forks of limbs which grow so close together that they do not form a good union, so that when the tree is bearing fruit, or when the growth has become strong and some heavy wind strikes it the tree splits down, leaving a long exposed strip?

MR. ADAMS: I see from the remarks of Mr. Cutter that he misunderstands my position. When I take the ground that cutting a tree is an injury to it, I do not mean to be understood as saying that there are no cases in which you can get advantages by pruning. I simply lay down the broad principle. Here, for instance, is a tree that is going to split, owing to some malformation, and when it splits it will do worse pruning of itself than you would do for it. In that case, of course, you should accept the lesser and more judicious pruning rather than the worse one which accident may occasion.

MR. CUTTER: Mr. Adams brings out the point I want to uncover, that pruning must in such cases be resorted to. Examining the trees in the forest, we find them running up twenty, fifty, eighty or one hundred feet without a limb. They did not grow so originally. Now what became of the limbs that originally grew along that at present naked trunk.

MR. ADAMS: If the gentleman will go into forests of different ages he will find that where trees grow thickly, as they grow the limbs are crowded out and die for want of light, but the protection that these side branches would afford to a tree standing by itself, and which it needs for its protection and which are useful for that purpose, when they grow in a thick wood that protection is afforded by the adjoining trees, and they die simply because they haven't access to the light, and the surrounding trees furnish the protection which side branches furnish to the solitary tree.

MR. CUTTER: Then the point is, nature has no use for those limbs after a time. The same is true of any tree. Lower limbs rot off gradually, and it is generally the case that there is a formation of rotten wood enclosed inside. The point I have to make is this, a judicious use of the pruning saw and knife would have benefitted the tree, removing that limb at such time as the experienced eye has detected that it has no further usefulness, that it cannot bear more fruit, but that the sap is passing above to better and stronger limbs. In such case, then, I presume pruning is necessary. Again, a tree may start to grow so to one side that we must prune. My point is, never to prune a tree so as to expose the trunk to the rays of the sun if you can help it. Again in certain parts of the country—the part which I represent—it is necessary to do continually what Mr. Adams deprecates, that is to use the plow and cultivator. No man can carry on the fruit business in irrigated districts without cultivating as often as he irrigates. We are under that necessity there. In this moist climate you may not understand it. Now, in that cultivation, whiffletrees will do some pruning unless we take it in hand and cut away those limbs that are in the way.

MR. ENGLE: Mr. Cutter, according to the principle laid down by Mr. Adams, I suppose would

be obliged to raise all seedlings. Grafting is certainly a violation of the law just laid down—grafting or budding; and that, according to his doctrine, would injure the health or vigor of the trees. Further, I would ask him whether he would not prune grape vines. Would he leave them to grow under all circumstances without pruning?

MR. ADAMS: In answer to that I would say, as I said a moment ago, it is my impression that this assembly, and the gentleman himself, will not contend that a grafted tree has any greater vitality or longer life than the seedling tree. It is generally accepted that the fact of grafting a tree decreases its vitality, and that it is a certain remove from nature, and we do not graft to increase the tree's life, but because we accomplish objects of value more than sufficient to counterbalance the little injury done by the grafting. I wish to repeat that the principle I laid down, is, that cutting a tree hurts it, but whenever we can get any corresponding or overbalancing advantage from it, we should do it. In regard to what Mr. Cutter says about cutting away these lower limbs after nature has got through with them, I have found the method of letting nature take them off in her own way, if she will do it, the method best adapted to my make-up. As to those one-hundred foot trees in the forest, did Mr. Cutter ever know a case of tree pruning in which the healing was as complete as it is when nature does her own pruning in her own forests.

MR. WILLIAMS: of Florida. As Mr. Adams is now an orange grower, I would like to ask him if he makes no difference between a budded tree and a seedling tree so far as pruning is concerned, does he not prune the inside of a seedling tree? The budded tree is more open, and requires but very little pruning. I am not a pruning man, but I prune moderately.

MR. ADAMS: I have some old seedling orange trees that spread thirty feet each way and are thirty feet high, and never had a pruning knife on them, and one of the choicest locations in the tree for a colony of Lady birds is on the inside. As they grow older, these inside branches drop over as they do in the forest, and heal up as naturally as they do there. I am so constituted that I can wait easier than I can work.

MR. BAILEY: I do not like to have this paper go in regard to the premises on which Mr. Adams founded his statements. I do not believe there is any proof that cutting off a limb weakens a tree. I do not believe either that it is an unnatural process; nature prunes her trees everywhere. We need not go to the forest. I have near my house an old apple orchard, and there is a tree there that has not been pruned for fifteen years. We can find nature pruning out the limbs there year by year. Nature necessarily must prune. It is one of the exigencies of a thick growth in all trees. Then suppose for the sake of the argument, it is unnatural, is not all horticulture in that sense unnatural? Is not all that we do for the cultivation and amelioration of plants opposed to nature? All the progress we have made and every new variety we have produced is in that sense antagonistic to nature because brought about under artificial conditions. It seems to me that Mr. Adams opens the gate to the overturning of his whole hypothesis when he says that while he thinks in general that pruning is a disadvantage, still he would recommend it when we can get a corresponding advantage, and that is just what we do. With pruning we get a greater advantage than we lose in whatever weakening of the tree may occur. Then, as a matter of fact, we all know as a rule we must prune. We have got to do it to get good fruit. I cannot say about Orange trees of Florida, but don't doubt that pruning is overdone in many parts of the country, but we must prune; it is a necessity, and it is a matter of choice as to whether we shall allow a tree to go wild, or prune it and get better fruit and more money.

MR. B. C. FERNOW: I am not a member of this Society, but I have been asked by a member of this Society now absent to present a resumé of his paper, and I was to be put upon the programme for to-morrow if there were no objections. I think five minutes would settle the paper now, instead of ten or twelve or fifteen for to-morrow. May I present the remarks now?

THE PRESIDENT: Unless the house is willing to change the order of business, I cannot grant your request.

On motion of Mr. Watrous, Mr. Fernow was given the floor.

MR. FERNOW: It is only for the purpose of

expediting your own deliberations. Mr. H. M. Stringfellow of Texas has chosen me as his spokesman, but I suppose only for the same reason that has been back of several of the honors thrown upon me without my seeking—one calling upon me to make rain, when I do not believe I could. Here is Mr. Adams trying to overturn our theories in regard to pruning. The theory he wants to establish is that fibrous roots in the transplanting are a snare and delusion and an objectionable feature, and he adduces a number of observations of his own and others showing that a tree will grow more vigorously when it is deprived of its fibrous roots and even of its tap root, and he adduces a number of observations in which he states that reducing the root of the seedling to within three or four inches, cutting the top at the same time, has produced trees more vigorous than others. One of the effects, especially in his neighborhood—Texas—shows the longlivedness of the tree entirely antagonistic to the ideas just proposed, while in Texas he contends pear trees will die out in ten or twelve years. He refers to three or four specimens of pear trees cut off in this way, and they are now thirteen or fourteen years old. I have nothing to add to this because I do not suppose Mr. Stringfellow wanted me to say anything more than his own statements, only I suppose all such questions are best referred to the experiment stations, because in the case of Mr. Stringfellow there is lacking the element of comparability and the experiment stations can answer this in any one year I suppose to some extent. I agree with Professor Bailey in saying that our orchards are unnatural, and that we simply are after a different object than nature's. I thank you for your attention.

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### Results of Recent Experiments with Small Fruits.

BY T. T. LYON, SOUTH HAVEN, MICH.

The earliest of the small fruits—the strawberry—within the memory of many of us, rarely if ever found a place save in meadows and neglected grounds.

The Hovey and the Wilson mark almost, if not quite, the first notable steps toward popularizing

the cultivation of this now highly prized fruit. The latter has from the first been stigmatized as acid and poor in quality, largely, we fancy, because it colors early and is gathered before acquiring its full flavor.

The great mass of modern originations and introductions of the strawberry, in common with other fruits, have been accidental seedlings, and so pronounced is the popular preference for size and color that quality seems to have been almost if not wholly overlooked, till, as the rule, its importance may be said to hold but an inverse proportion to size in the varieties of to-day as compared with the primitive type.

The now fully recognized fact of the existence of unisexual or pistillate varieties was, not more than forty or fifty years since, made the subject of question and discussion through the public press. That these are so notably abundant to-day and so obviously increasing in number may, we fancy, be reasonably attributed to the objectionable, though very convenient and common, practice of employing pistillates in the process of reproduction from seed—a result in accordance with the universal law of nature that like may be expected to produce like.

#### THE RASPBERRY.

The European or *Idaeus* varieties of this fruit prove so far unsuited to our American climate that modern originations, in this country, have been mainly confined to our native *Strigasus*. With this fruit, however, as with the strawberry, originations have been almost wholly incidental.

*Cuthbert* (parentage unknown, possibly a hybrid) remains one of the best for general purposes.

*Golden Queen* (liable to the inference that the name was chosen as an advertising dodge), alleged to be a sport from the *Cuthbert*, to which it possesses many similarities, may fairly be considered as a queen among the yellows.

*Herstine* and *Rider*, while not quite satisfactory, so far as the plants are concerned, are so beautiful and so high in quality that the private or home plantation should scarcely be considered complete without one if not both of them.

*Blackcaps* have more recently received their baptism into the family of cultivated fruits; and (prob-

ably for that reason) so far, their peculiarities are subject to but slight variations.

Certain varieties, such as *Purple Cone*, *New Rochelle*, *Shaffer*, and a few others, possess so many characteristics in common with these, and also with *Idaeus* or *Strigasus*, as to indicate a possible hybridization; and, if such, pointing to at least the possibility of even greater improvement in the same direction.

#### BLACKBERRIES.

With these, as with the other small fruits, the efforts of originators seem to have been for size and productiveness, rather than for quality, with the result that, as yet, few if any of the "improved" varieties compare favorably with the wild product in this last particular.

White, light-colored and spineless varieties have from time to time been brought before the public notice; but so far few if any such have proved valuable, indicating at least a possibility that these variations may be due to lack of constitutional health or vigor. True to its character as an undergrowth, no variety has, so far, shown absolute hardiness in the open ground, and it may fairly be deemed impossible that such condition can ever be realized.

Hybridization is alleged to have been recently effected between the blackberry and raspberry; but if so improbable a result has been realized, the character and ultimate value of the resulting plant appears to be, so far, undetermined.

#### CURRENTS.

The memory of man runneth not back to the time when the currant was first subjected to cultivation, yet there is, even now, abundant warrant for the claim that none of our modern introductions surpass, if indeed they equal in real value, the oldest varieties upon our list. The chief alleged improvement, and that a very slight one, is increased size of fruit.

Somewhat recently, a supposed hybrid between the cherry currant and the wild, yellow, flowering currant of the West, has been introduced, with, however, no apparent evidence of such hybridization, either in the account of its origin or in the characteristics of either plant or fruit; while a very notable variation in the habit and growth of different

plants, as well as in their productiveness, and in the size of their fruits, warrant a suspicion that the propagation may have been from a batch of seedlings, rather than from a single plant.

#### GOOSEBERRIES.

*Houghton*, even yet, is scarcely exceeded, except in size. Downing and Smith, although reputed to be natives, possess certain characteristics, indicative of at least partial foreign origin. Although claimed to be proof against mildew, such is not certainly, if even generally the fact. At least in some portions of Michigan, both frequently lose their foliage about midsummer. *Industry*, and several other foreign varieties, reputed to be less subject to this malady than most other foreigners, are apparently only tolerable in this respect, under specially favorable conditions.

The increased popular demand for this fruit has apparently drawn into public notice several novelties: some of foreign origin, and others of at least partial native parentage; nearly all of which, however, have yet to establish a reputation.

#### SERVICE BERRY.

This has been known, in portions of the Northern States, since their early settlement, as a tall bush, or small tree, under the name Juneberry; blooming very early, and fruiting sparsely. More recently, a dwarf variety, with larger and more abundant fruit, has been introduced to cultivation; and yet, more recently, a variety of this, named "Success," and claiming still greater productiveness, has been introduced to planters. Yet another has still more recently been advertised under the name, "Mammoth," claiming superiority in some undefined particulars. These alleged improved varieties can scarcely yet be said to have passed the experimental stage. Plantings have, so far, been generally of limited extent. The fruit, which ripens somewhat in succession, proves so specially attractive to the birds, that its value, when planted more extensively, can scarcely be said to be yet determined.

If we may judge from cuts, published in certain quarters, advantage has apparently been taken of its similarity, in its dwarf form, to the whortleberry, to palm it off upon the ignorant and unwary, as a

variety of that very intractible fruit, but amenable to artificial culture.

#### WHORTLEBERRY OR HUCKLEBERRY.

None of the species—*Vaccinium*—seem to have, thus far, been successfully subjected to either garden or field culture; although occasional alleged successes are reported. Apparently the most promising species, for such purpose, is the swamp blueberry, (*vaccinium corymbosum*). Success has been reported, (we think from New Hampshire), with one of the others, (probably *v. canadensis*), in field culture, by burning over the grounds to destroy other growths; and thus securing a crop of this fruit, after a subsequent growth of one year.

#### COMMERCIAL INFLUENCES.

We indulge in the consideration of this branch of the subject somewhat at large, since the particulars treated apply equally to fruit culture in its several branches.

The growth of commercial fruit culture, consequent upon the increased demand for fruits, in our cities and larger towns, together with an increased demand from abroad, has had the effect to bring into its ranks a class of persons with no special liking for either pomology or horticulture, and who regard strictly the profitableness of the venture; and that, but too frequently, with a narrow reference to immediate rather than ultimate results.

It is also true that very many if not a majority of commercial planters come from the agricultural ranks, bringing with them the too common failing of drawing upon the soil but failing to make adequate returns, and between this and the slight and diffusive cultivation so common among average farmers, degrading the character of their products, and, between such practices and the kindred one of rough handling and not unfrequently even dishonest packing, coupled with a choice of varieties of little value beyond that of productiveness and attractive appearance, so demeaning the appreciation of consumers that fruits come to be far too generally banished from our tables and consigned to the kitchen to rank with potatoes and other vegetables.

Not only is this far nearer the truth than it should be, so far as city markets are concerned, but even farm orchards are but too frequently made up

of a similar class of varieties with similar effect upon the consumption of fruit by the family. So far, indeed, has this process of subjecting quality to mere appearance been already carried that, apparently, there is danger that many of our *superior varieties* will be shelved and perhaps ultimately even exterminated, with nothing of equivalent value or character to replace them.

With the modern growth of fruit culture and the nursery business, a system of agencies for the sale of trees and plants has been developed, doubtless with many good results. Meanwhile, yet another class of "agents" has sprung up, representing only themselves, and dealing in Tree Strawberries, Blue Roses, Plum Grapes, and various other impossible though "taking" products which betray the imposture only after the "agent" has passed well beyond reach.

Yet another outgrowth of modern pomology is the origination and introduction of novelties as a commercial or money making business. Legitimate and highly important as such pursuit unquestionably is, along with it have grown up practices by no means unobjectionable. Among such we may mention the too common practice of foisting comparatively or even notably valuable novelties upon the public under names calculated to convey unwarrantable ideas respecting their characteristics or value, and in so doing, while perchance securing increase of sales, misleading and disappointing purchasers and planters.

With the purpose to purify and elevate its nomenclature as a science, a purpose to which doubtless the Society should aspire, it years since expressed its purpose respecting this whole matter in a series of Rules of Pomology, in which it placed its ban upon the use of "long, inappropriate, or otherwise objectionable names," and prohibited the use of such in its discussions and reports. Subsequently, by resolution, it was determined that in case objection is made to the name of a fruit proposed for discussion, such *name* shall be first considered and determined by reference to a committee or otherwise.

That this action of the Society was wise and judicious is evinced by the circumstance that it may be supposed to have prompted similar action respecting the nomenclature of vegetables, while

manifest indications exist of a tendency to apply a similar simplifying process to the somewhat cumbersome nomenclature of botany and entomology.

#### DISCUSSION.

MR. SAUL: I have grown nearly all kinds of currants but I have yet to find any that will equal or exceed in value the true "Red Dutch"—Not all the currants grown or sold as dutch are by any means the true Red Dutch, which makes the richest jelly of any currant grown. The Red Dutch currant is also the most productive according to all my experience.

MR. LYONS: I can very fully endorse Mr. Saul's conclusions in regard to the Red Dutch. There is only one which I would place beyond it as to quality, and that is the White Dutch. These two are among the oldest and best varieties I have had occasion to test.

MR. STRONG: I would like to have Mr. Lyons explain his allusion to the Golden Queen raspberry which is very prominent with us in Massachusetts. Mr. Lyons alluded to this name as an advertising dodge, a little insinuation that I would like to have him explain.

MR. LYONS: I will explain very cheerfully. It is one of the rules of the Society that no inappropriate or fancy name shall be used to catch the unwary. There was no necessity for putting the word "Queen" in as part of the name. The name "Golden Queen" is one of those names which are very liable to be picked up by men who have something worthless to present. I did not mean to express any idea that the Golden Queen, as we now have it, is not a valuable berry—an excellent one; in fact I think I said that it was, and I wish still to emphasize the fact that I consider it a very valuable berry—the very best of all the yellows I know except the Brinkle, which, as we all know, we can do hardly anything with; and secondly I am well disposed to put it well up in the list.

MR. MARBLE: I have tried the Golden Queen and am satisfied it is very prolific, but it is too soft for a market berry. For a garden berry—a home berry—I do not think there is anything ahead of it, it is so prolific. It is like the Cuthbert in size.

MR. BARRY: I would like to say a word about the names of the new fruits. The American Pomolog-

ical Society has done a great work in the past by reducing the number of varieties and grading the nomenclature of different kinds. We live now in the different parts of the country, and are greatly indebted to the Society for the work it has done in that way. But nowadays new fruits are being introduced, and this Society very properly adopted a resolution to the effect that parties having new fruits should endeavor to give them appropriate names and in that way make a variety popular. There are two ways of rendering varieties popular in this country to-day, and one of them is in giving them popular names. This seems to be almost a necessity. This is the reason why some disseminators have given to fruits the names which they now bear, yet the names I refer to are in direct opposition to the wishes of this Society. Now you can see the difficulty the disseminator labors under. If we were to give the new fruits an ordinary name, it probably would not have any sale at all. He is almost obliged to give it an attractive name in order to get the attention of the public. It is unfortunate that this is the case, for really the names attached to some of the fruits to-day, are, to say the least, very inappropriate, and members of this organization who desire to comply with the expressed wishes of this Society, certainly are not doing what the Society wishes to have done in this respect. Praise them as highly as their merits will justify, describe them as attractively as possible, but to give them names which we will not be ashamed of. The President in his address very appropriately referred to the names adopted in California to designate fruits that I believe have been known here for a period of years under certain other well recognized names. These names appear upon the goods as they are sold in our market to-day, and are very confusing. Now I do not know to what extreme this has been carried, and I may be wrong, and these fruits to which I see these fancy names attached may be entirely new fruits for aught I know; but I object as this Society does, to these peculiar names being attached to fruits, because they are confusing, and this Society has for years been at work to avoid this very confusion, and to put an end to it. The younger men are coming forward, and the older members of this Society are fast leaving us. They have done a noble

work, a work lasting long after they have themselves disappeared. But the younger members who are now joining our ranks and who are bringing in these new fruits, are so numerous (and these fruits themselves are very numerous)—these younger members I say, can do a grand work by giving appropriate names to the varieties they introduce. Moreover, we must endeavor to avoid having duplicate names, that is, giving to the new variety a name which is borne by an old variety. It is very easy to create a great deal of confusion in this way, and a great deal of time has been spent in the work of properly naming our fruits. Let us strive in the future not to make mistakes of this kind, which will have to be corrected sooner or later by somebody.

MR. B. G. SMITH: With regard to the English gooseberry, it is maintained in Massachusetts that it is almost useless to cultivate it, but I think that if it is given the proper location and treatment it can be grown successfully. I have imported fifteen varieties this year. My old plants were somewhat too venerable. I am careful not to plant the new ones where they get the mid-day sun, and they ripen perfectly and in great abundance, and have done so for fifteen years. It is well known to some who are here, that I have been a rather successful exhibitor in the Massachusetts Agricultural Society with the English gooseberry. If my friends tell me I cannot do a thing, I am very much inclined to begin the next morning and try to do it.

MR. CAMPBELL: Do you mulch them?

MR. SMITH: No. I cultivate only a small area. I had a whole acre subsoiled about two feet some years ago, and the field stones taken out were used for a blind drain. I knew that the English climate was somewhat different from our own, but I tried to give to all the kind of location they have in England, and I think that is about the whole of it. I fertilized abundantly, and have always used the excrements of the cow for manure, and have done no mulching and have given them no extra attention, but I have succeeded for fifteen years, took the first prize thirteen years, and have had no difficulty.

MR. MANNING: I am aware of Mr. Smith's success in raising gooseberries. I was on the committee

many years, and he never failed to appear from year to year and carry off the prizes.

MR. SAUL: I have no doubt that the English gooseberry can be grown very successfully in Massachusetts. I have seen many plants do infinitely better there than we can make them do here in the District of Columbia where the climate is different altogether. We cannot grow them here. The climate will not admit of it. It is a matter of climate and nothing else.

MR. SMITH: I will devote a few minutes to the blueberry. Some twenty years ago I thought I would like to cultivate the blueberry in my garden, and I was told by ex-President Breck (a distinguished botanist and nurseryman) that I might as well try to tame a North American Indian as the wild blueberry. A few days afterward I visited the Botanical Garden in Cambridge, and observed a bush which was there as a botanical specimen and labelled, and I went home and concluded that if they could grow it there I could grow it in my garden, and I planted the seed and have succeeded admirably for years, and have had abundance of blueberries in my own grounds.

### Novelties in Pomology.

BY H. E. VAN DEMAN, WASHINGTON D. C.

*Mr. President:*

The following notes are based upon information received at my office direct from those who have grown the fruits described and in many cases from the originators of the varieties.

#### APPLES.

*Lacon.* From Lacon, Illinois. An apple of yellowish color, very hardy and keeps well.

*Peffer.* A variety originated by Mr. George P. Peffer, of Pewaukee, Wisconsin. This is also a hardy winter apple of good quality.

*Windsor.* Originated by Mr. J. C. Plumb, of Milton, Wisconsin. Very hardy in size, reddish in color and of good quality.

*Garfield.* Originated in Illinois, but just where is not exactly known. A very handsome, large red striped apple, something near the size and shape of Ben Davis, and if it proves hardy in the north as it is in Northern Illinois, where it has already been

grown to a considerable extent, it will undoubtedly be worth an extended trial.

*Paragon.* This is the true name of that variety which originated in Tennessee, and having been transferred to Arkansas was taken to the New Orleans Exposition and re named Mammoth Black twig. This is simply an improvement upon Wine-sap, being larger, very much of the quality, perhaps not quite so good, but certainly a very desirable apple.

*Arkansas Black.* This is also much like Wine-sap, but larger and extremely dark red in color, and very handsome; good keeper.

*Halley.* A variety originated at Latham, Arkansas. A fall apple of very superior quality, red in color, and of medium size.

*Hills.* Originated by William Hill of Oden, Illinois. This seems to be of the Ben Davis type, and is about the same in size and general appearance, but is, I think, better in quality than that variety. The tree is said to be fully equal to Ben Davis, and it certainly is worthy of trial in the Central States as a market apple.

*Hennepin.* Originated at Lacon, Illinois, by A. H. Gaston. It is an apple which Mr. Gaston contends is one of the coming market apples. This is also as yet very little known.

*Morren.* Originated in the vicinity of New Castle, Delaware, and introduced by Dr. J. J. Black; it is a small dessert winter apple, something the size and shape of Lady, but is very much more brilliantly colored, being an exceedingly brilliant scarlet.

*Jackson.* Originated by Thomas Jackson of Wyoming, Delaware. It is a very late keeper, not attractive in color, but of a dull, brownish red, and of very good quality.

*Brinkley.* Another apple that may perhaps have originated on the Delaware peninsula. Medium size and of very good quality; a very late keeper.

*Smiley.* Originated in the vicinity of Hugo, Missouri, and brought to my notice by F. Lionberger. It is a fall apple of very superior quality for dessert purposes, somewhat like Jefferis, although I think not quite so attractive in appearance.

*McMahon.* This has been brought to notice by Mr. A. L. Hatch of Attica, Wisconsin. It is a large apple, ripe at this time, and which you may see in

the Exhibition Hall, making the most beautiful show of any apple there, being about the color of Maiden's Blush—a beautiful yellow, with a bright cheek, and of large size and good quality. It is said to be very hardy, and the people in the North will do well to give it a fair trial.

*Seavers.* This has been brought to notice by Mr. C. L. Watrous of Des Moines, Iowa. It is an apple which I should like to have Mr. Watrous mention in particular.

Mr. WATROUS: This is an old sort; has been in cultivation, just near Des Moines, for twenty years past. It is thought very highly of there. It is not widely disseminated, but is valuable there locally, and how much further we do not know, because it has not been disseminated. It is a long-keeping winter apple; fine growing tree; of good quality, and sells well in market.

*Whinnery.* This has been brought to my notice by George J. Streator of Garrettsville, Ohio. I do not know its origin, but suppose it is one of the local apples there. It is of very good quality, bright red in color, well worthy of trial.

## PEARS.

*Philopema.* This originated from a seed planted by Reuben Ragan of Indiana, and is a fall pear of very excellent quality.

*Krull.* This has been brought to my notice by Mr. C. T. Mallinekrodt of St. Charles, Missouri. In size and shape it is very much like Lawrence. Also a very late keeper. It seems to be a pear of very much better quality than Lawrence. I have had it three different years.

*Gans.* This is an entirely new pear. A gentleman living in the neighborhood where it originated says:

"In 1871 Mr. Joseph Gans found it in a woods near his farm, which is near Cheviot, Ohio, in Hamilton County. He removed the original tree from the woods to his own farm. When it began to bear the fruit was found to be very desirable, and Mr. Jackson, a nurseryman, showed it at the Cincinnati Horticultural Society, where it was named Gans. The old tree is six or seven inches in diameter at this time, and twenty-five feet in height, of a conical shape. The twigs are heavy and upright in habit. The present owner, a Mr. Harder, says that he sold

five barrels from this tree this year (1891) at \$2.20 per barrel, in Cincinnati, when Bartletts were selling at \$1.50."

It certainly is a pear of most excellent quality, ripening about with Bartlett, and a beautiful yellow when fully ripe.

*Lincoln.* This has been brought to notice by W. E. Jones of Lincoln, Illinois, and there are specimens here on the table now, exhibited by Mr. Jones. It is of very good quality, and I think well worthy of a trial.

## PEACHES.

*John Haas.* Specimens from Charles Wright of Seaford, Delaware. As that is all on record here, I presume it will be unnecessary to say more about it.

*Champion.* Let me here say there are two Champions, one in Michigan of inferior quality. The one I here mention is from Mr. I. G. Hubbard of Nokomis, Illinois. It is a very large, fine Peach and well worthy of trial.

*Gold Dust.* Originated in Kansas City, Missouri. Has been grown so far as I know only at Olden, Missouri. There they have a number of acres of it in bearing this year. It is a deep yellow cling, with abundant red to make it attractive, and is an excellent shipper, and superior in quality. It is of medium size.

*Olden.* This originated at Olden, Missouri, and is grown there on the Olden Fruit Farm only. It is a large white free stone, ripens a little after Crawford's Late, and of very highest quality, and large in size.

*Orange Smock.* By J. W. Kerr of Denton, Maryland. Ripening with Smock, and a very good quality as a market peach.

*Chair's Choice.* This is now on exhibition here. It is a large yellow peach, very desirable for market, ripening after Crawford's Late, and well worthy of trial. I know there are gentlemen here who have it bearing.

*Crosby.* By J. H. Hale, of South Glastonbury, Connecticut. It is a yellow freestone peach, of very good quality, beautifully colored, being striped something like the Columbia, and it is certainly one of the most attractive you will find.

## THE PLUM.

*Botan.* This is of medium size, that is, among Japanese plums, being fully as large as the larger of our common cultivated plums, (*Prunus domestica*). Heart-shaped, of very good quality and I think will be hardy over a large part of the country. I have received specimens for several years from Connecticut, so that I know that it is hardy in that part of the country. Of a greenish red color.

*Ogon.* Is medium in size, round in shape, clear yellow in color, and seems to be quite hardy, it having produced fruit and endured the winters for a number of years past as far north as Connecticut.

*Kelsey.* Certainly this is not new to any of you, I suppose, but the Kelsey is one of the very largest of the Japanese plums.

It sometimes reaches a diameter of fully three inches. It is truly heart-shaped, is a cling stone and the stone is very small, having a cavity in nearly all cases partly around the stone. It is of very good quality when fully ripe, very firm in flesh, making an excellent shipper. Now the Kelsey, I have repeatedly stated in public, has proven tender in the north. How far north it may yet be found to succeed is a problem, but the true Kelsey, even at Baltimore, has proven tender at times, and has winter-killed nearly to the ground. I saw it in the grounds of J. T. Lovett, at Little Silver, New Jersey, and the trees were damaged there. I saw it badly damaged at Denison, Texas, and I am ready to state here that I believe at this time that it is scarcely more hardy than the hardier varieties of the fig. I hope I may be mistaken.

I hope my opinion about this will change. It is a well known fact that trees will prove tender when young, and get hardy as they get older. I know if Mr. Lovett was here he would bear me out in saying that his trees in the nursery rows were very badly damaged. Of course that occurs with other fruits sometimes.

*Burbank.* This, in my opinion is the best Japanese plum for general cultivation that I have yet seen. It was first imported by Luther Burbank of Santa Rosa, California. This year I got specimens from Mr. S. D. Willard of Geneva, New York, that he had grown at his place, so you see it has proven

hardy there. It is medium in size, nearly round, being slightly heart-shaped, of a most beautiful yellow color, nearly colored with scarlet and carmine making it very attractive.

THE PRESIDENT. I fruited Burbank three years ago. I have had this year magnificent specimens of it. I have had it three years in fruit, ripens before Kelsey.

MR. VAN DEMAN: *Clyman.* This originated in California. It belongs to the *Domestica* type. It is of medium size, of a bluish purple color, and differs from the common varieties of *Prunus domestica*, principally in its extreme earliness.

*Golden Prune.* This is very much like Yellow Egg, originated in Oregon, and I think it distinct from any of the other plums that are growing there.

MR. UEBER: I did not hear the *Abundance* mentioned. I would like to ask if it is the same as the Botan? I am led to believe it is by seeing the two — is it the same plum?

MR. VAN DEMAN: I think so; and in conversation with Mr. Lovett, at this meeting, he acknowledges the same thing.

MR. WRIGHT: Did you mention *Satsuma*?

THE PRESIDENT: I have fruited that for three years. It belongs to the red flesh class of plum. It is an entirely distinct type.

MR. VAN DEMAN: *Satsuma* is as hardy as Botan, and I think as hardy as Burbank. It is of large size, being sometimes nearly two inches in diameter, and nearly round in shape; sometimes heart-shaped. The stone is very small and the quality excellent, and it is just as the President has said. It is as red inside as the reddest cherry you ever saw, clear to the stone.

MR. HALE: It grows well in Connecticut, and has fruited there for the past two seasons. I could have brought specimens, but I supposed you all knew about them here. I had specimens picked on the 13th of September, and it seems to me that it is going to be a hardy variety there and productive, and, as the Professor says, it is of most excellent quality. It cuts like a beet—solid flesh.

MR. VAN DEMAN: Beginning with Missouri, all the Mississippi Valley, as far north as the Dakotas, is filled along the streams with varieties of *Prunus Americana*, many of them of very superior quality. There are thousands of them, dif-

fering, some of them very slightly, and many of them well worthy of cultivation. I might notice among these some that have proved themselves worthy, at least, of general trial. The Charles Downing is one. The Hawkeye, which I think is one of the largest and very best, and has less bitter skin than almost any that I have tried.

In my work-shop we cook these different plums and try them, and see how they compare with each other. The Cheney, Ludloff, Gaylord and Rollingstone; the LeDuc, a little plum but very nice; Kopp and Rockford, the latter one of the very best of them, and has been, by the Iowa State Horticultural Society, or by the Fairs at least, awarded premiums, and is one of the very best of these species. In Texas and Indian Territory there are entirely different species of the wild plum, and we may as well say that there is so much confusion as to the true names of the different species of this genus that as yet it is hardly safe to venture upon a name. I will simply give the name of one that has originated in that region, which Mr. T. V. Munson of Denison, Texas, claims belongs to the species *Prunus Umbellata*, as Wayland. This is certainly a very fine plum: large for a wild plum and brilliant red in color, and very excellent in quality.

#### THE GRAPE.

*Delawba.* From Dr. L. C. Chisholm of Spring Hill, Tennessee. These are Mr. Chisholm's words:

"A seedling of Delaware and Catawba. Cluster moderately compact, cylindrical, tapering slightly, very slightly shouldered. Is like a Catawba that ripens immediately after Delaware. Color, brownish amber, with light lilac bloom. Skin quite tough."

We have examined specimens in the office, and I think this is really a red grape of some promise, and is certainly worthy of trial. He has combined the words *Catawba* and *Delaware*, and made it, as you see, *Delawba*. Regarding the next two, I object to the names; but I will give them just as they are, and we can perhaps prevail upon the introducer to change them. But they are of such worth that I think we ought to give them a trial. The first is *Magnificent*, originated by A. F. Rice of Griswoldville, Georgia. The color is dark red, with purplish bloom; of the highest quality. The next is

*Superb*, by the same originator. It is a very good black grape; of high quality and well worthy of trial.

#### STRAWBERRY.

*Dr. Morere.* Imported from Orleans, France, by Jules Fonta, New Orleans, La. Received from him early in March, 1891. A large, long conical, rather light colored berry of high flavor, but too soft for long shipment.

*Strickland* (Pistillate). A berry grown to a considerable extent in Tangipahoe Parish, Louisiana. Highly prized there for market.

*Salter.* An earlier berry than Strickland, originating in same locality; more subject to rust than the preceding.

*Alice* Received from F. B. Hancock, Casky, Ky., May 18, 1891. A very large, conical, light colored berry, of only medium quality.

*Westbrook* (Pistillate). Originating in North Carolina, and sent out two years ago, is not a success at Norfolk, where it has been tested to a considerable extent.

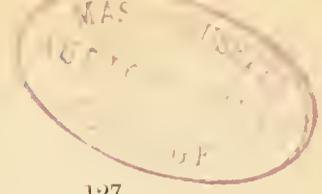
*Crawford* (Pistillate). Is a handsome, broad, conical berry, with some gloss and apparently a good shipper.

*Lehigh* (Pistillate). Received from W. B. K. Johnson, Allentown, Pa. Is identical with Crescent in form, size, color and flavor, but is claimed to be five to seven days later in blooming and in ripening fruit.

*Banquet.* Sustains the opinion expressed in the Report of Department for 1890, except that it is more irregular in form than the previous season.

This *Banquet* is the best strawberry that I have eaten in the last three years. I do not except any of the old standards. It is claimed to be a cross between the Miner's Prolific and the wild strawberry, originating at Mountainville, New York, and is certainly of most superior excellence for table purposes, ships remarkably well, is very dark colored, and stands the sun first rate so far as we know. In size it is medium.

*Enhance.* Received from Henry Young, Ada, Ohio. Is exceedingly fine and of good color; rather sharp acid till fully ripe, and in the early ripening specimens exceedingly rough, being furrowed from calyx to apex with deep channels. Late specimens are smoother and very satisfactory as a market berry.



*Perfection.* From Missouri. Resembles Enhance, but is not equal to it in quality.

*Fairmount.* Received from Oakley Apgar, California, N. J. Is a promising, medium sized, regular, long conical berry; bright crimson with firm flesh, and of fair quality. Is promising for market.

*Farnsworth.* Is of excellent quality, and as grown by Mr. Green, at Rochester, is productive. It is too soft for shipment.

*Van Deman* (Bisexual). Early; regular in form and good quality.

*Australian Crimson.* Imported from Australia, and grown in Los Angeles County, California. Is highly prized there as a berry for long distance shipment. Has not yet been fruited east of the Rockies. Plants have been procured for testing at two or three experiment stations.

GOOSEBERRIES.

*Strubler.* Phil Strubler, Naperville, Illinois. A number of these have been received and examined; fully one half show no evidence of English parentage, and extend from early to late.

*Bennet's Eureka, Cedar Hill and Oregon Champion,* from Oregon and Washington, are evidently English. They succeed in the climate of Washington.

*Pugallup Mammoth.* Origin, Washington.  
*Randolph.* " Missouri.  
*Triumph.* " Pennsylvania.  
 Are identical in fruit and are all of the English type.

RED RASPBERRIES.

*Royal Church.* From Royal Church, Harrisonville, Ohio. Is large, of fair flavor and very productive, but soft. Apparently more productive than Cuthbert. Mid-season.

*Hiram.* Received from W. J. Bradt, North Hannibal, N. Y. Very large, sharp conical, core large and rough; not so firm as Cuthbert, but a fair shipper; rather sharp acid. Shows traces of Antwerp parentage.

*Perfection.* Originated by F. W. Loudon, Jaunesville, Wis. Large, good color and productive; of good flavor, but also softer than Cuthbert.

BLACK RASPBERRIES.

*Kansas.* By A. H. Griesa. Is larger than Gregg, as received from Kansas and Michigan, and of good

quality. The bush is exceedingly thorny. Earlier than Gregg.

PECAN. (*Hicoria Pecan.*)

The following is a list of some of the valuable varieties: Biediger's Early Giant, Idlewild, Stuart, Van Deman, Gulf Coast, Barron, Lyles, Wilson, Turkey Egg, Ribera, Repton, Georgia Melon, Favorite, Helen Harcourt, Black Jack, Longfellow, Petite.

CHESTNUT.

Botanists are divided as to whether the Japanese, the European and the American chestnuts are different species, or only different varieties of the same species. While they are settling this question between them, pomologists want distinct names whereby to readily designate such of these nuts as may enter into cultivation. For purposes of culture, and for the fruit, it will be conceded there is marked difference. The European chestnut stands first in point of time and in amount among cultivated chestnuts, and is entitled to be classed No. 1, for purposes of cultivation. It affords a tree medium in size, between the tall American and the dwarfish chestnut from Japan. Its fruit is also medium in size, between the very large nut from Japan and the ordinary American nut.

In the 2d class for pomological purposes, we place the American Sweet Chestnut; and designate as the 3d class, the Japanese Chestnut.

4th class, the Chiucapin.

It would seem that the names might stand, in point of history, in point of meaning of words, and in point of fact:

- American Sweet Chestnut, *Castanea Americana.*
- European Chestnut, *C. Sativa.*
- Japanese Chestnut, *C. Japonica.*
- Chiucapin, *C. pumila.*

CHESTNUT.

*Castanea vesca.*

NAME.	ORIGIN.	DESCRIPTION.
"Ridgety."	Original tree is on the farm of Mr. Edward Ridgety at Dover, Delaware. In 1822 was sent as a sprouted nut to his father by Mr. Dupont, of Wilmington, Del.	Is of the European chestnut type and probably of similar parentage as the Paragon; from the old gardens of Philadelphia.

## CHESTNUT.

*Castanea vesca.*—(Continued)

NAME.	ORIGIN.	DESCRIPTION.
"Paragon."		A nut from one of the old gardens near Philadelphia was given to Mr. W. L. Schaffer, Pres. of Girard Bank. Mr. S. planted it, and when in fruiting, deemed its quality superior to the ordinary Spanish chestnut, and at the request of Mr. Thomas Meehan grafts were sent to Mr. H. M. Engle, of Marietta, Pennsylvania, who introduced it.
"Numbo."		Is not an original imported tree nor has it any Japanese "blood" in it. It is a seedling from the European Chestnut, trees of which had fruited in this country. Its name is a contraction of <i>Mag-num Bo-num</i> .

## CHESTNUT.

*Of Japanese Origin.*

NAME.	ORIGIN.	DESCRIPTION.
"Early Prolific."	Is a selected Japanese Seedling.	Are very similar in growth, making an upright and at the same time spreading growth. The Early Reliance, however, is more dwarf than the others, making a close, compact head, and is said to be enormously productive.
"Advance."	A seedling of Japan Giant.	
"Early Reliance."	A seedling of Japan Giant.	
"Success."	A seedling of Japan Giant.	
"Japan Giant."	A seedling of Japan Giant.	

## CHESTNUT.

*Castanea Americana.*

NAME.	ORIGIN.	DESCRIPTION.
"Clark's Early."	Far, Lawrence Co, Penn.	A large, early and productive variety.
"Broadbent."		"A productive nut of large size."
"Ligo."		"Of superior quality and productive."
"Watson."		"A quite large nut from young tree."

The above shows the disposition now prevalent to divide the chestnut according to varietal difference, and the application of names.

## CHINCAPIN.

*Castanea pumila.*

NAME.	ORIGIN.	DESCRIPTION.
Otto.	Otto, Tenn.	"Tree 7 9-12 ft. circumference 2 ft. above ground." Nuts $\frac{7}{8}$ in. broad, and generally produced more than one in burr.

This and many similar Chincapins from various sections differ pomologically, at least, from the ordinary Chincapin *Castanea pumila* as much as from the chestnut, *Castanea Americana*.

The claim of hybridity is not proven, but on the contrary the facts seem strongest for making these a separate species.

## PERSIAN WALNUT.

*Juglans Regia.*

Owing to the fact that the great bulk of Persian walnuts grown are propagated direct from seedling nuts and that the variations thus obtained are quite beyond the control of the propagator, it seems almost a hopeless task to designate by varietal names. Yet such names obtain in regions of large plantings, and within the bounds of careful selection, aided by some grafting and budding, there is something even in the name of a Persian walnut.

Mr. Felix Gillet, of Nevada City, names fourteen varieties as selections he has made for propagation.

NAME.	ORIGIN.	DESCRIPTION.	
"Mayette."	Are among those selected and propagated by Felix Gillet, Nevada City, California.	One of fine dessert nuts; above medium; sweet.	
"Franquette"		Named after its originator early in this century; blooms late in spring.	
"Parisenne"		Large; excellent; starts growth late in spring.	
"Cluster."		Produces in clusters of 8 to 15.	
"Chabert."		Late starting in spring.	
Proeparturiens.		A popular variety that bears early.	
"Mission."		The old Los Angeles nut; by some called hard-shell and by others medium.	
"Grand Noblesse."		Sent by L. L. Bequette, Rivera, Cal.	A very fine nut.
"Improved Soft Shell."		Propagated by Geo. W. Ford, Santa Ana, Cal.	

The following are also among the named varieties in California: "Santa Barbara Soft-shell," "Papatino," "French," "Mesange," "Gant," "Barthere," "Meylan," "Vonrey," "Vilmourin," "Weeping," etc.

## STATE FRUIT REPORTS.

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### Report of the General Fruit Committee.

*To the President and Members of the American Pomological Society:*

GENTLEMEN: In presenting his report the chairman begs to surrender to the states all the space available, rather than occupy it with remarks of his own. He has been compelled to cut out much valuable matter which would have been printed had space permitted.

Respectfully submitted,  
C. L. WATROUS, Chairman.

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### Arizona.

Reported by Wm. A. Hancock, Phoenix, Chairman of the State Fruit Committee.

Fruit growing as a business in Arizona is of recent date, and yet in the Salt River Valley it is fast becoming the leading business. The fabulous profits realized from the production of the Citrus and other Tropical fruits in Southern California and similarity of our soil and climate have stimulated the planting of large orchards and vineyards within the last five years. There are now in the Salt River Valley about four hundred acres in orange trees and all are doing well. A few trees that were planted ten years ago are bearing and produce a seedling of excellent quality. One orchard of twenty acres planted two years ago with trees two years from the bud, is now in full bearing, many trees having one hundred and fifty oranges.

In no place have I seen orange trees make a better or more healthy growth than here. A few lemon trees have been planted, and their vigorous growth indicates that they can be raised here successfully.

Figs, both white and brown, are produced in great perfection. The White Adriatic is very vigorous and fruitful.

Grapes are produced with great success in many varieties. Wine and raisin grapes are profitable productions, and the varieties for table use grow in great perfection. Pomegranates seem to find their natural home here and are very large and prolific.

Peaches were among the earliest fruits planted here, and are produced in great perfection. Strawberries have been raised here but a few years, but they have proved to be very profitable, the fruit being in the market nearly the whole year.

Apples and pears are grown successfully, some varieties giving promise of being very profitable when the orchards are more extensive and the trees older. The White Winter Pearmain and Yellow Bellflower being notably successful in all parts of the Territory.

The Bartlett and Winter Nellis pears are also very prolific bearers, and the fruit compares favorably with that of other long tried fruit-growing countries.

Whatever we produce here must be grown by artificial irrigation, and thus far experiments have only been made where the means of irrigation are more easily obtainable.

My information is confined almost exclusively to Maricopa County, as I have not succeeded in interesting the people in other portions of the Territory in furnishing information.

The Citrus belt is not supposed to extend north or east of Pinal, Maricopa and Yuma Counties.

The list here given is furnished by the Hon. H. R. Patrick, fruit inspector for Maricopa County. The stars are used as in the catalogue of the Society.

Species of fruit in the order of value of product:

*Deciduous Fruits.*—1, grapes; 2, pears; 3, apricots; 4, figs; 5, apples; 6, pomegranates; 7, quinces; 8, nectarines; 9, plums; 10, prunes.

*Small Fruits.*—1, strawberries; 2, blackberries; 3, mulberries.

*Citrus Fruits.*—1, orange; 2, lemon; 3, tangerine.

*Miscellaneous.*—1, almonds; 2, olives; 3, dates; 4, guava.

### OBSTACLES TO SUCCESSFUL CULTURE.

We do not find any obstacle to the successful culture of nearly all fruits that have been tried here. No progress has been made in the cultivation of the cherry in this county. In the mountains of

Gila County one hundred miles east of us, I have gathered wild cherries that were delicious when fully ripe, and I believe the better varieties may be cultivated in such localities.

#### CULTURE AND PRUNING.

Our methods are for the most part purely experimental. It is pretty generally admitted that we must cultivate a low, bushy tree, that the top may protect the body and the roots from the extreme heat of the sun. Even grapes are kept low down close to the ground.

I have no statistics as to the extent of cultivation. More than 5,000 acres are in all fruits and large tracts are being prepared for the raisin grape and other fruits.

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#### Arkansas.

Reported by S. J. Mathews, Monticello; Chairman of the State Fruit Committee.

The species of fruits successfully grown in the State are the apple, apricot, cherry, medlar, mulberry, nectarine, peach, pear, pomegranate, plum, quince, grape, blackberry, currant, gooseberry, raspberry and strawberry.

Of the peaches, the varieties Amsden, Gov. Garland, and several others of the extra early ripening sorts are indistinguishable from the Alexander, and the varieties of grapes, Norton's Virginia and Cynthia, seem to be identical.

Of insects, the peach-tree borer is prevalent, and a malady recently made its appearance which answers in several particulars the description of the "yellows." These are the principal obstacles to the culture of peaches. The curculio continues to be a formidable enemy to all the smooth-skin stone fruits except the Chickasaw family of plums. "Fire blight" in pear and apples has not abated much, if any. The Le Conte pear is not as exempt from it as some of the older varieties. But the Keiffer has so far proved to be blight proof. Grape rot and mildew continues about the same as in the past.

Thorough culture not continued so late in season as to induce a luxuriant growth for a while before frost is of great advantage with young trees. A good plan is to plant in the spring, or sow broadcast in the summer the orchard with the Southern field

or corn pea, and plow under the vines in the early fall and sow to rye to be also turned under the next spring. This is a cheap and rapid means of increasing and conserving the fertility of an orchard.

If the land is very poor it may be well to use some mineral manure containing potash and phosphate. But the pea vines can be depended upon for furnishing the needed nitrogen.

Trees should be given more distance than has heretofore been the practice. It will not do to crowd them with the view to have the shade of one protect the body of another from sun scald. They should be given good distance—say peaches not less than twenty-four feet and other sorts in proportion—and then let them branch out within six inches of the ground, particularly on the south-west sides.

There has been considerable orchard extension along the lines of railroads in this state within the last two years. Elsewhere very little.

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#### Colorado.

Reported by D. S. Grimes, Denver, Chairman of the State Fruit Committee.

The condition of all classes of fruit adapted to this elevated region of country is generally good.

The possibilities of raising fruit, once believed to exist only in a few favored localities has extended over all of the state.

Owing to the large area our state covers, the peculiar influence the mountains have on climate in various localities, it would be impossible to recommend a list of fruits for general cultivation; and yet, from our early pomological experience, it is difficult to decide what varieties of the hardy fruits will not succeed under intelligent management.

The influence of altitude, climate, irrigation and cultivation are so peculiar that Eastern pomological experience is no advantage. New methods, adapted to such conditions, must be used. The excessive use of water in irrigating is practiced to a great extent, and is injurious. By flooding the land continuously for days causes the same effect upon vegetation as excessive rainfalls.

Many planters of orchards have planted the trees too closely, ten to twelve feet apart, and the error is being discovered.

While our ranchmen, as a rule, spread themselves over more land than they properly cultivate, they are "close communion" in fruit tree planting and "sich" down their orchards to the smallest possible space. In this connection we assert there are more varieties of fruit adapted to the state than fruit growers adapted to the business.

The twig blight, hitherto but little known in the state, was very injurious to some orchards this year, while others in the same neighborhood escaped with slight injury. Orchards that were excessively irrigated last year, were the greatest sufferers from the blight.

Irrigation in fruit culture is a subject we have long studied and experimented with, and we are fully convinced that our fruit trees suffer more from artificial wet weather than those grown in the rain-favored states.

The benefits of water by irrigation changes when applied to small fruits. Strawberries, raspberries and blackberries grow "big" fruit and lots of it, under a liberal use of water, but they will not keep. Strawberries can be shipped from Southern Illinois to Denver in good condition, while ours would spoil in half the distance. Grapes require less water than any other class of fruit. Irrigation retards the ripening of this fruit often to the loss of the entire crop for early frost.

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#### Connecticut.

Reported by T. S. Gold, West Cornwall, Chairman of the State Fruit Committee.

Of new native varieties of fruit the Burnham Sweet Apple has been lately brought into notice. It is a yellow apple of large size, keeping well into the winter and of very fine flavor. Is productive.

The Yale Strawberry had its origin here, and proves to be a very good *late* berry, firm, high flavored and high colored, of fair size.

The Middlefield Strawberry also originated in Connecticut. The seed having been planted by our late Pomologist, Mr. P. M. Augur. It is but little tried as yet, but from the fine appearance and flavor of the berry much is hoped for it.

The Cromwell black cap raspberry originated in Cromwell in this state and is a worthy berry.

Of new foreign varieties of fruit, some of the Japanese plums are very promising. The Ogon and Abundance have fruited for three successive seasons, yielding fruit that is of fair quality and very handsome. Their ability to withstand the attacks of the eurolio and also their resistance to rot, which is so troublesome to ordinary plums, especially commend them.

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#### Idaho.

Reported by Jno. H. Evans, Lewiston.

It is a difficult matter to report on the adaptability of fruits to either the states of Idaho or Washington for that variety which will probably succeed well in one portion will probably be an entire failure a few miles distant. I have seen apples grown here on the river that would not be recognized as the same variety grown ten miles distant at an elevation of 2,500 feet. The area of fruit land on Snake River is quite limited, but is being rapidly developed and is gaining quite a reputation abroad for the quality of its fruit. A shipment of plums and apricots was made to Chicago a short time since. Although farther north than your place we grow successfully the European varieties of grapes—and as yet the grape has not an enemy in this country and other fruits but few.

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#### Illinois.

Reported by A. C. Hammond, Warsaw, Chairman of the State Fruit Committee.

During the last five or six years there has been a remarkable increase in fruit growing for commercial purposes. The varieties planted are generally those that have been well tested and known to be adapted to the soil and climate.

The Oldenburg, Benoni, Jonathan, Grimes' Golden, Ben Davis and Willow Twig are the most popular apples. Pear growing has been abandoned by the majority of fruit growers on account of the blight. But those who have cultivated and pruned but little and avoided stimulating manure are now reaping their rewards as we have had several successive crops, and but little blight for several years.

Keiffer is becoming quite popular and being extensively planted. While not absolutely blight-proof, it may, by proper management, be made practically so. Although poor in quality it will always sell on account of its good size and fine appearance. Seckel, Tyson, Bartlett, Flemish Beauty, and Clapp's Favorite are the popular varieties. Lincoln is a promising new pear, but not yet sufficiently tested to recommend.

A number of new apples have originated in our State during the past few years and those apparently the most valuable are being tested in the experiment stations. Among these the Akin is probably the best. From personal observation I know it to be an apple of good size, handsome appearance superior quality and a good keeper.

The many years of failure discouraged peach growers, and orchards were generally permitted to run down. But 1889 and 1891 gave a partial crop in many portions of the state and the present year a full one wherever trees were found, showing the folly of neglecting the plant.

The plum is one of our most valuable fruits and a number of new varieties are passing the ordeal of the experiment stations.

My attention has, the past season, been called to a new gooseberry and currant that originated in Marshall county. They are both remarkably prolific, the gooseberry large, free from mildew, and of superior quality. The currant is a vigorous grower with large, white translucent fruit.

The chief obstacles to fruit growing are insects and fungoid diseases. Many of our most intelligent orchardists practice spraying as regularly as the season comes around, but we find in the minds of some a prejudice against it and it must be admitted that these arsenical applications should be made with intelligence and care, or very serious injury may result. Recent experiments, however, prove that they can be used in such a manner as to destroy Codling Moth, Canker Worm and other leaf-eating insects without serious injury, also that the curculio, if not destroyed may be held in check.

In regard to the efficacy of fungicides the weight of testimony is largely in their favor, and it is altogether probable that we shall be able to control "Scabs," and peach and plum rot by their use.

In the vineyard these copper solutions have, where properly and persistently applied, in all instances proved a partial and in many a perfect remedy for grape rot.

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### Indiana.

Reported by A. Furnas, Danville, Chairman of the State Fruit Committee.

The two last years represent two extremes in the fruit crops. That of 1890 was one of the poorest for many years; that of 1891 one of the best. Especially is this true of peaches. Apples are very fine in some localities, while in others the yield is not so good.

Indiana cannot be called a good fruit growing state. This certainly is true in the aggregate, yet some very fine results have occasionally been had with the apples. The north portion bordering on the lake shore has produced some very fine apples, but it now seems as though the south western portion in the vicinity of Bloomington, Spencer, and Mitchel produces as fine apples as any. A few localities directly on the Ohio river, produce the largest apples in the State.

Some of the old varieties, once so valuable and popular, are almost entirely rejected. Among these may be mentioned the Yellow Bellflower, and White Winter Pearmain. A good substitute, however, for these is found in the Grimes' Golden.

There is little to encourage the growing of pears, the blight being the principal difficulty.

Plum culture is receiving more attention than formerly,—the Wild Goose and Robinson are succeeding reasonably well,—the latter yielding heavy and profitable crops where it originated—in Putnam County.

The grape, or many varieties of it, continues to rot if the weather is showery just before ripening.

There is a new grape, in color and size somewhat resembling the Ives, but of much better quality, was originated by J. F. Coffin of Westland, Hancock county, and named by Mr. Coffin, Mary's Favorite, after his wife Mary. It is said to be exempt from rot, mildew or winter killing.

The new strawberry called "Hattie," which *promises well*, originated with Adam Jones, of Plainfield. It has been grown side by side with

the Crescent, and with similar soil and treatment, doubled its yield. Its flowers are not perfect, though by itself, will produce some fruit, but when supplied with a fertilizer same as the Crescent, it is immensely productive of good-sized red berries, fair shipping quality and of superior excellence in flavor.

Obstacles to successful fruit growing in this State are principally the changeable weather in the winter season; sometimes cold, with sudden changes to warm weather, and *vice versa*. These sudden changes seem to present an almost insurmountable difficulty to the growing of any fruit that cannot be protected. Such changes are often productive of incalculable mischief, not only to the fruit buds, but also the permanent health of trees. Apples, peaches, pears and cherries suffer most from this cause. The temperature seldom goes so low as to do mischief if it occurs gradually. Strawberries can generally be protected against winter's frost, but in mild winters the plants have to be uncovered so early that a late frost does more or less injury. The grape can also be laid down during winter and thus carried through safely, and sacking the bunches is a safeguard against rot and birds.

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#### Iowa.

Reported by C. G. Patten, Charles City, Chairman of the State Fruit Committee.

Perhaps no state in the Union has entered upon a larger experimentation with foreign and domestic fruits, and upon the production of new varieties by cross-fertilization than Iowa.

A lack of adaptation in the fruits from other sections of our country has been the general experience. And the experiments thus far would seem to indicate that a like fate awaits the later importations from Northern Europe.

The apples will be the stepping stones for the development of a hardier type, by cross-fertilization, for the northern half of the State. And the same will no doubt prove true of the Russian pears. While it is true that they are more hardy than any of our American sorts, there are none of the pears that are worthy of general cultivation. In hardiness they stand in the order named: Gakov-

ska, Kurskaya, Bessemianka, and another still more hardy—name unknown, and of no value except for experimental work. Kurskaya is probably the most valuable of all for northern Iowa. So large a part of the whole Russian importation is in such confusion that no one knows that the fruit that he has under a given name is the same as another has of the same number or name. So that the process of determining their identity and value is exceedingly difficult and perplexing. R. P. Spear, of Cedar Falls, who has had the best opportunities for judging of the value of the Russian plums and pears, (having been State experimenter at our Agricultural College, at Ames) recently informed the writer that he had given up all hope from these two kinds of fruit. But I have no doubt that the hardiness of the pears named will result in great benefit to the northern part of this State, and to the colder sections of a large part of our country.

#### CHERRIES.

Mr. Spear and Professor Budd concur in the opinion that several of the Russian cherries are decidedly valuable. But two years hence their comparative merits can be better stated.

#### PLUMS.

Our native plums are of such promise that we have little cause to look elsewhere. The best in quality are probably Rockford, Wyant, De Soto and Cheeny, in the order named, now so regarded, I believe, by Professor Budd.

The Hawkeye, originated by H. A. Ferry, of Crescent City, is larger than the Lombard. The Letta, a new plum, found in Buchanan County, is as large as the Hawkeye, and has a good deal of promise as a market plum for culinary use. It is being introduced by J. Wragg & Son of Waukeg.

H. W. Lathrop, of Iowa City, refers me to a seedling apple of that county named the Brady, that he regards as an acquisition. Also, one from Traer, exhibited by D. A. Porterfield. Both being winter apples of excellent quality, he regards them as acquisitions.

The Patten's Greening, originated by the writer in 1870, judged by its hardiness, good and uniform size and quality, general appearance and bearing, stands at the head of the list of new apples for late fall and early winter.

Melinda, a seedling from Vermont, tested for sixteen years in the northern counties of the State, is the most hardy all-winter apple ever tried. Size, medium; form, round conical, similar to Black Gilliflower, though more enlarged toward the stem; green, with dark red in the sun; mild acid, almost sweet from February through April; a perfect keeper, valuable for the north.

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### Kansas.

Reported by G. C. Brackett, Lawrence, Chairman of the State Fruit Committee.

In this report, no attempt will be made to add to what has been published heretofore, but it will be confined to circular questions Nos. 3, 7 and 8, and in the order given.

Question No. 3. "New Native Varieties." There are quite a number of new varieties which have originated in the State, especially of the blackberry and raspberry, which give promise of rivaling any yet introduced, in size, color and quality, and some of the pear, peach, grape and strawberry, but which are not sufficiently tested outside of their locality to justify any recommendation.

Question No. 7. "Obstacles to successful Fruit Culture." Our climate and soil, generally, are all that can be desired. Exceptions are not more than occur in the most favorable states. An occasional wet season is the main climatic hindrance in which the "Scab" quite seriously damages crops of fruit, more especially the apple, but some years the pear and peaches suffer from rotting.

It is believed by some of our horticulturists, who have given attention and had some experience, that such destructive agencies may be controlled largely by the use of fungicides recommended by some of the Agricultural Experiment Stations, and which by way of experimentation on a small scale *have proven* successful with us.

Insects have been very damaging to the products of the apple, peach, pear and plum. But within the past three years the free use of London Purple and Paris Green by methods of spraying have largely reduced the number each year, until in well sprayed orchards it is quite difficult to find a specimen larvæ of the Codling Moth in the apples

or pear, or of a Plum Curculio in its chosen fruits.

The apple crop has been brought up from 25 per cent. of a full crop of sound fruit to that of 75 per cent. by application of insecticides in only two seasons.

It has become a settled conviction that a spraying machine is about as important an implement as a plow, harrow, cultivator, etc., on a fruit-farm.

London Purple has been used in the proportion of one pound to 120 gallons of water, and by three applications, first as soon as the blossom leaves fall, and thereafter at intervals of one to two weeks, as condition of weather would permit.

Paris Green, one pound to 300 gallons of water; the first application just before the buds break open, and second and third at intervals of a week or ten days after the bloom has fallen. This was used only upon pear, plum and peach trees. But the solution was found to be too strong for the pear foliage, or the burning may have resulted from insufficient agitation while being used.

Statistics: The area has not so generally increased during the last two years. But in a few localities large plantations have been made. Apple orchards of 160 acres are becoming common. The largest in the State is that of the Fairmount Company, of Leavenworth County. The present bearing portion contains 438 acres to which during the last three years have been added 640 acres, and in 1892 an additional 160 acres will be planted.

The product of the bearing portion for 1890 was nearly 80,000 bushels, and sold for some \$59,000; net proceeds of the crop about \$45,000.

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### Louisiana.

Reported by E. M. Hudson, New Orleans, Chairman State Fruit Committee.

*Mr. C. L. Watrons, Chairman:* Ill health has prevented me from traveling over the State, as I had wished, to ascertain in person what had been accomplished in the two years past, and there being no Horticultural or Pomological Society in the State, I am unable to procure the requisite data. I have not been able to secure a working State Fruit Committee this time, and any other I did not want.

From the best information I have been able to collect, I am satisfied that a generally greater interest in fruit culture has obtained in the past two years. A noted interest in the cultivation of the Japanese plums, Kelsey, Botan, Ogon and Satsuma, is broadly apparent, and a great number of persons have planted these, or some of these varieties, both for home and commercial purposes, for they are all promising and, where tried, have been eminently satisfactory. Also a number of persons have planted the past spring Idaho pear trees, notwithstanding their high price, in numbers ranging from 50 to 250 pear trees, of which the best results seem to be hoped and expected in this climate. The failure, in great part, of the fruit crops in 1890 and 1891 from spring frosts has rendered the visible production of Louisiana fruits of almost all kinds very meagre; but, notwithstanding the cultivation and planting of most kinds of fruits suitable to the State, is continually increasing. The effects of the undertaking of testing all fruits at our two Experimental Stations has added to the interest in the subject generally; but these experiments, commenced only eighteen months since, are as yet too recent to afford any tangible results, although much is expected therefrom in the next two or three years.

That the cultivation of the best fruits is extending generally and to a considerable extent yearly in Louisiana admits, I feel warranted in saying, of no doubt whatever.

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#### Maine.

Reported by Samuel L. Boardman, of Augusta, Chairman of the State Fruit Committee.

Maine is especially adapted to the growing of the hardy varieties of the apple in great excellence, and the revised list of the Society gives the relative degree of excellence and profitableness of the varieties cultivated. Our greatest success is with the hardy winter varieties which are esteemed for shipment. During the past six or eight years a great export trade has grown up for our fine winter varieties which are shipped direct to London and Liverpool. The pear is not grown to the extent it was a few years ago, and the varieties are more or less injured by the blight. Plums and cherries

are raised only in limited quantities for the local markets. Peaches are not grown; and the culture of the grape has no importance in our pomological or horticultural work, being only grown in a small way in garden culture as an amateur crop. The culture of the berries is rapidly extending and our fruit growers are finding them very profitable.

Considerable attention has been given in recent years to the origin and dissemination of new varieties of apples of promise, some of the most important of which are the following:

Apples: *Boardman*.—Originated by E. H. Purington, Farmington, described and figured in Report of Department of Agriculture for 1886, page 272. An esteemed variety, in season, December to spring; sub acid. *Dudley's Winter*.—Originated by J. W. Dudley, Castle Hill. Large; mild, acid; perfectly hardy; a valued sort for the cold north as it succeeds well in Aroostook County at a point as far north as Quebec; keeps all winter. *Rolfe*.—Originated in Abbott. Beautifully colored; fine grained, sub acid; excellent quality, a decided acquisition to the fruits of Maine. Is recommended by the State Pomological Society. *Russell*.—Originated by William Russell, of Farmington. Large; bright yellow; fine grained; sub-acid; quality best; September: hardy and a regular bearer.

The greatest obstacles to the growing of choice apples are the prevalence of the Apple Maggot throughout the State, and the alarming increase of the Apple "Scab." The Apple Maggot, (*Trypeta pomonella*), which about six or seven years ago made its appearance in a few varieties of early apples, has extended its terrible ravages till it is now found in all our fall sorts, and even the winter varieties, are not free from it. It is making terrible inroads upon our apples and causing almost untold injury to the crop. The Apple Scab, (*Fusicladium dendriticum*), is causing great injury to many varieties, especially the Fameuse. Under the direction of Professors Harvey and Munson, of the State College Experiment Station, experiments are being carried out on orchards in different parts of the State with the use of insecticides and fungicides. Our soil and climate are especially well adapted to orchard culture.

High manuring; giving the trees plenty of room in the orchard; mulching in summer, and pruning and sleeping the trees when young, with constant care and attention to the trees.

Statistics for the year 1890 gave a total of 287,000 barrels of apples as the crop marketed. The leading fruit growing county is Kennebec, yielding for market 60,000 barrels, the larger part of which are shipped to England. The amount received for apples sold in 1890, was carefully computed to be \$645,750.

### Massachusetts.

Reported by Robert Manning, Boston, Chairman of the State Fruit Committee.

I submit for my report the following notes on new and newly introduced fruits.

The "Bay State" cherry was found twelve years ago in a garden in Bay Street, Springfield, which partly accounts for its name. The fruit was sent to the largest growers in Geneva, Rochester and Newburyport, to ascertain its true name, but no description of it in the books could be found, neither could any grower give it a name. Its many good qualities which at first appeared have been maintained and those who know it, accord to it as many or more good points than belong to many other varieties.

*Bay State*.—Fruit of the largest size; deep red; juicy, sweet and of excellent flavor. It ripens with the May Duke. Very productive. The trees are healthy, because their leaves are not eaten and curled as soon as they commence growing, by the little brown Aphis, which preys upon other sweet cherry trees.

*Mann Apple* bears young; tree hardy and fruit keeps longer than the Baldwin. It resembles the Greening, and is worthy of dissemination on account of its late keeping qualities.

*Park Apple* is somewhat like the Baldwin or more productive. A better keeper and promises to be a first rate market apple.

*The Walter Pease Apple*.—We do not remember of ever seeing trees in bearing. So conspicuous for their bright colors as these—and when harvested it has been sent to the New York market and sold at full prices, when the supply of other fruit

was superabundant. Fruit extra large; bright red; mild acid and excellent quality. Ripe in September and may be kept until mid-winter. The most promising new apple of its season, being in many respects superior to the Gravenstein, which is the standard among fall apples in Massachusetts.

*Chenango*.—This is a long, large, showy, bright red apple, somewhat of the William's Favorite class. It ripens in the unfortunate fruit selling month of September, and, though not as good an apple in quality as its rival, the Porter, it is, on account of its color, more saleable.

A letter to a leading fruit grower saying, "there has been no new and improved variety of apples introduced for New England in thirty years," drew from him this reply. "The 'Yellow Transparent' is an improvement upon any summer apple which we now have, being earlier than Early Harvest, larger and more productive." This we find to be true in part, but it is a full month later in ripening and stands but little chance of ever displacing the Astrachan. It is not disposed to rot but its juices seem to evaporate like a puff ball if left on the tree too long and it becomes as light and useless as an apple of cork.

[NOTE.—I have not raised the Chenango (Strawberry) apple, but as I have seen it, it is altogether too delicate to bear transportation, and therefore of no value as a market fruit. It is of fine quality and I should think would be desirable in a private garden.—R. M.]

*Springfield Quince*.—This new variety was brought from Europe a dozen years ago, and the original tree has borne several crops of the finest quality, color and size. Other Quinces may be as good, none better, but its chief merit is its thick, healthy foliage and growth. Its leaves go through the hot summer months without dropping off. The trees make as much growth as the best apple when budded. Fruit extra large, round, smooth and golden. Very tender when cooked. Keeps sound until February.

*Abundance Plum* is quite new and promising, of fair quality, not large. It appears to be too productive except for skilled workmen who understand the value of thinning.

The "North Star" Currant has some points of superiority. The plants are very rapid growers and become larger bushes than any other variety. The fruit is not quite the size of the Cherry currant,

although it appears to average as large in field culture and brings the same price in market. It is very much more productive and of better flavor; indeed the best of the red currants, and it may be left on the bushes several weeks after it becomes fit for use.

The *Early Amber Grape*, after a score of years' trial of the hundred and one varieties of grapes, has been selected as the one best extra early grape for family use only, and to that extent worthy of dissemination.

Note on the *Tolman Sweet Apple*.—My attention has been called to the origin of the Tolman or Tolman's Sweet apple, and also to the proper orthography of the name. Mr. George Tolman, formerly editor of the *New England Farmer*, informed me that the family tradition is that it originated in Dorchester, where the family settled in 1635, though there are various statements as to the precise spot, as we find to be the case when we come to inquire into the history of other fruits. Mr. Tolman, who has studied the geneology of the family, says that the proper spelling is Tolman, and not Talman, as in Downing's *Fruit Trees* and the *Catalogue of the American Pomological Society*. The family is of Norman origin and the name was originally Le Toller. Toulmin is an Irish form of the name, but it is never spelt with an *a*. The name of *Tallman* is that of a German family and is entirely distinct from Tolman.

#### Minnesota.

Reported by S. D. Hillman, Minneapolis, Chairman of the State Fruit Committee.

Although possessed of a soil of unsurpassed fertility, Minnesota cannot boast of an exceptionally favorable climate for fruit production, at least without winter protection. It is situated in latitude 43:30° and 49:30° north, and longitude 89:39° and 97:5° west; extending 380 miles from north to south, varying in breadth from 180 to 337 miles. It may be said to be situated on the northernmost limit of successful fruit culture. Indeed, the difference in climate is so great between the extreme northern and the southern counties that it becomes highly important to carefully discriminate in selection of varieties of fruit which may be found adapted by acclimation to the different sections.

For more than a quarter of a century apple growers have been seeking for varieties of fruit trees hardy enough to withstand the vicissitudes of our variable temperature in the more favorable locations, and the success thus far achieved though not as marked as many enthusiastic growers could desire, has been measurably proportionate to labor and expense involved. And yet large sums of money have been expended on worthless nursery stock, worse than wasted on semi-hardy varieties.

Notwithstanding the discouraging features alluded to, the fruit industry of the State is making not rapid, but steady advancement. This is specially so with regard to the culture of small fruits, nearly all of which succeed remarkably well. The percentage of increase for a number of years past is estimated by careful and conservative growers at from fifteen to twenty five per cent., there being a marked advance in the growth of grapes, raspberries and blackberries.

The crop of apples produced in the season of 1890 was exceptionally good, being, perhaps, the largest ever raised in the State. This was the more marked when short crops were reported in most of the apple growing sections of the country. The exhibits made at the State and other fairs were unusually fine, especially of newer Russian varieties.

About 75 per cent. of an average yield of small fruit was reported, including strawberries, raspberries, blackberries, and grapes; plums nearly a failure. Early frosts and the dry weather late in the season were the principal causes of shortage.

This year the apple crop is not so good, but is a fair average one, especially in the southern portion of the State. New Russian trees while hardy and vigorous do not seem to be bearing heavily this season. There is little change to report as to varieties in public favor from those mentioned in former reports. Many new orchards have been planted this year and so brisk has been the call for trees, especially Russian sorts, that nurserymen have experienced difficulty in supplying the demand.

An unusually large crop of small fruits of all kinds is reported this season, and prices thus far have been well maintained. The crop of native or American plums is the best for five years.

Interest in the culture of grapes is on the increase. The crop this year is excellent. Varieties most largely grown are Delaware, Concord, Moore's Early, Worden, Brighton and Lady. The latter for a white grape succeeds better than Niagara, and though tender bears well. There has been some rot reported on Concord and Rogers. Downy mildew has been rather troublesome on the Delaware but is held in check by the carbonate solution. This variety grows very large here and seems almost a new variety, the fruit being so much larger than that shipped from eastern vineyards. It is improved in color and flavor also, said to be due to our favorable climate and soil.

In strawberries the Crescent is more extensively grown than any other kind. Warfield, Haverland and Bubach are gaining in favor. All need polenizers, and a better variety for that purpose than either the Wilson, Captain Jack, or Jessie.

Of raspberries the Cuthbert, Marlboro and Turner take the lead among the red; Gregg, Souhegan, Ohio and Doolittle, among the black.

Our Experiment Stations are now well equipped and are testing many new varieties of fruits, cereals and plants, and propagating from seeds of our native fruits with a view to ascertaining their value and susceptibility to improvement under cultivation.

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### Mississippi.

Reported by J. J. Colmant, Columbus, Chairman of the State Fruit Committee.

In 1889 we had the most abundant fruit crop the State ever produced. Many young pear orchards bore during that year their first crops. The seasons were favorable and prices were good. During the following winter many orchards were planted along the lines of our railroads, the winter being an unprecedentedly mild one, Le Conte and other pear trees of that type did not shed their leaves and commenced blossoming and set fruit in February, 1890. Peaches and plums were in full bloom and the buds of apple trees were expanding during February; also Strawberries were in bloom and had set fruit up to ripening. Then came the freeze of March 1, 1890. The thermometer fell to 26° and down to 20° respectively as to location and all blossoms and fruits were killed. Many peach

trees of the Amsden variety were killed, while other trees did not put forth new leaves until June. Strawberries made a good late crop; but too late for obtaining good prices in northern markets. Le Conte pear trees, which were the most forward, had their bark, cambium and outer layers of wood discolored and much blight was the result. Le Conte and Kieffer especially, and also some other pear trees blossomed again from adventitious buds three weeks after the freeze and produced some fruit, about one-twentieth of a crop.

In the year 1891 we had a similar spell of weather, but the freezes came on the 4th, 5th and 6th of April, when again all blossoms and fruits were killed with the exception of apples of which there is an abundant crop. Grapes bore profusely during 1889, 1890, 1891. We had again to depend on the development of adventitious buds of pear trees for a small crop. To-day, September 2, Le Conte pears are not yet ripe while in former years they ripened in July and early in August. In the northern part of the State, where vegetation was less forward, the fruit crops of 1890 and 1891 were much better. The southern part of the State also had a small crop. Much blight has been reported after the freezes of 1890 and 1891. Mr. J. Burgin, of Mayhew, lost fifty per cent. of his pear trees from blight last year and this. He only lost three trees in all the previous years. Notwithstanding the failures of the last two years, the planting of orchards, especially pears, continue.

I refer to the reports of Mr. W. H. Cassell of former years and my report of 1889 in connection with this report.

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### Michigan.

Reported by L. R. Taft.

No section of our country is more favorably located for fruit-growing than is the State of Michigan, and for a number of years its record in this line has given it high rank among fruit-producing States.

The "fruit belt," as it is called, extends along the entire west side of the State for a number of miles in width. At the south we find thousands of acres of small fruits grown for the Chicago market, while the peach crop proves so profitable that in some townships the greater portion of the land is

devoted to that fruit. In Oceana County the plum shares the honors with the peach, and failures are almost unknown, while the extensive apple orchards of the Grand Traverse region has given that section a national reputation.

In addition to this peculiarly favored belt, where the winds are tempered by Lake Michigan, the entire southern and eastern portions of the State are well adapted to fruit-growing.

In favorable seasons the apple crop ranges at from 6,000,000 to 10,000,000 bushels, and crops of half a million bushels of peaches and three million pounds of grapes are not uncommon.

In April, 1891, the prospect for a full crop of fruit of all kinds was seldom better, but frosts in many sections thinned it much.

The crop of winter apples will not exceed 50 per cent. of a full one and pears and sweet cherries were even more injured.

The successful orchardists are the ones who give their trees good care; they have found that frequent cultivation, judicious pruning and the supply of plant food in proper kind and amount are indispensable to the best results. The varieties most commonly grown as market sorts are Northern Spy, Baldwin and Red Canada.

#### SMALL FRUITS.

Perhaps the greatest gain has been made in small fruits. The acreage has fully doubled, and (especially in the strawberry) a correspondingly large gain has been made in the varieties themselves.

Instead of the Crescent, Chas. Downing and Captain Jack, we now have the Haverland, Bubach and Eureka, while Warfield, Jessie and Parker Earle have generally proven valuable. Of the promising new early sorts, Lovett and Van Deman may be mentioned. A new seedling (Crescent-Glendale) from Bradford, Vt., bids fair to stand high as a shipping variety.

As standard varieties of raspberries, none excel Cuthbert as red, and Gregg and Ohio of the black-caps. Of the new sorts, Lovett and Crowell are perhaps slight improvements over the Souhegan. The Gregg does not prove hardy in all sections of the State, and there the Nemaha and Ohio are planted. The latter variety is largely grown for evaporating purposes.

Except in the southern portion of the State, the better sorts of blackberries cannot be grown with success, but the Snyder and Taylor seldom fail. Wallace, Agawan, Freed and Knox have also proven valuable.

The Michigan orchardist is alive to the danger from the attacks of insects and fungi. He has found that London Purple or Paris Green used at the rate of one pound to 250 gallons of water sprayed over the trees and vines will destroy nearly every insect that *eats* either leaf or fruit, and that kerosene emulsion will destroy the sucking insects. Jarring is however considered surest against plum curculio. The use of fungicides is also increasing, and for the various mildews and rots of the grape, for scab on the apple, for leaf-blight of the pear, and for nearly all other fungous diseases whose workings are superficial, the Bordeaux mixture, *eau celeste* and copper carbonate are found effectual.

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#### Nebraska.

Reported by J. H. Masters, Nebraska City, Chairman of the State Fruit Committee.

The varieties of apples which succeed best in all parts of the State are the following: Winesap, Ben Davis, Minkler, Iowa Blush, Oldenburg, Red Astrachan, Jonathan.

The following varieties of pears are the most successfully grown: Bloodgood, Sheldon, Sickel Bonssock, Kingsessing, Rostiezer. The trees of all are more or less attacked with blight.

Peaches are not reliable for fruit. In the south-east portion of the State a crop is borne about once in three or four years.

Plums of the native sorts succeed throughout the State, such as the Wild Goose, Miner, Wolf and De Soto.

Cherries, Early Richmond, English Morello, Wragg and Ostheim.

Apricots: The Russian varieties are the greatest humbugs that have been offered to our planters. The varieties of small fruits successfully grown: Blackberry, Snyder; raspberry, in all parts of the State, Shaffer, Souhegan and Gregg; Strawberry, Crescent, Bubach No. 5, and Jessie are the most popular. Crops of all classes of fruit were abundant the present year.

### North Carolina.

Reported by J. Van Lindly, Pomona, Chairman of the State Fruit Committee.

The years 1890 and 1891 have been the most unsuccessful ones in my recollection of the State. We have passed through two extremely warm winters which caused all the early blooming classes to open their fruit buds in February, which was followed by a cold, frosty season in March, killing all the fruit.

The only peaches I found in 1890 in the State were grown on the high, sandy lands in Morse County, where I learn they never fail to fruit. The present year we have one-fourth a crop and one-half a crop of Wild Goose plums.

The Blue Ridge range of mountains, which in Virginia begins to diverge from the Alleghanies, in North Carolina makes a wide divergence, embracing thirteen counties with an area of 3,243,959 acres. The river valleys of this plateau are elevated 1,500 to 3,000 feet above the sea. At 2,500 feet the climate both as to heat and moisture at each season of the year is almost identical with that of Geneva, Switzerland. The abundance, variety and vigor of vegetation is remarkable, the mountains being clothed with verdure to their tops. This region was, during his life time, a favorite resort of the late Professor Asa Gray. The great differences in elevation and exposure causing great diversity in the flora which especially interest the botanist. Add to this the fact that the soil is composed of decomposed granitic rocks abounding in potash, and it will at once be seen that it offers the best conditions for the cultivation of fruits of the temperate zone.

Berries and grapes grow in abundance and of unusually good quality in a wild state. The wild crab abounds. Seeds of cultivated apples falling by the way and in hedges make a remarkably successful struggle for existence. There are apple trees in orchards planted by the first settlers a century ago still living and with trunks from eight to ten feet in circumference. The largest apple at that time on record was sent from this—Haywood—County to the Centennial at Philadelphia in 1876, weighing thirty-two ounces.

General fruit culture is still in its infancy, as this region was opened up to full development

only within the past few years by the advent of railroads.

Following is a list of a few of the varieties of the several classes of fruits that have proven successful:

*Apples*.—Yellow Transparent, Red Astrachan, Carolina June, Early Harvest, Early Joe, American Summer, Sweet Bough, Horse, Fall Pippin, Buckingham, Grimes' Golden, Bonum, Ben Davis, York Imperial, Winesap, Camack Sweet, Smith's Cider, Green and Yellow Newtown Pippin.

*Pears*.—Bartlett, Bosc, Lucrative, Angonleme, Seekel, Howell, Keiffer, Flemish Beauty.

*Grapes*.—Delaware, Catawba, Concord, Worden, Jefferson, Niagara, Maxatawny, Salem, Lady, Moore's Early, Massasoit.

*Raspberries*.—Red, Cuthbert is preferable and all the blackcap varieties tried succeed.

*Strawberries*.—Crescent, Chas. Downing, Minor, Kentucky. The Sharpless and Jessie do well whenever they escape injury by late spring frosts, to which they are liable.

*Currants*.—Only the Red Dutch has been found in cultivation and succeeds even when neglected.

*Gooseberries*.—Only the Downing is found succeeding in favorable locations. The Industry succeeds in specially favorable places.

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### New Hampshire.

Reported by James M. Hayes, Chairman of the State Fruit Committee.

The apple is our leading market fruit, and owing to the failure of the Baldwin for two seasons business in the fruit line is much depressed.

There has not been so many fruit trees set of recent years as formerly. Pears which were formerly much cultivated do not receive as much attention. Grapes are about the same. In small fruits there is an increased attention to strawberries, more being set each year. Most of the older varieties have been discarded with the exception of Crescent which is still much cultivated, more of this variety being planted than of all others. The newer varieties, Bubach's No. 5, Haverland and perhaps Jessie are growing more and more in favor, Haverland promising to be a popular and leading berry. Insects are about the same as in former

years. Spraying to destroy the Canker Worm and the Codling Moth has been quite successful. In regard to statistics I have no means of ascertaining the production at the present time.

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#### New Jersey.

Reported by E. Williams, Mont Clair, Chairman of the State Fruit Committee.

The fruit interest in New Jersey seems to be on the increase, and I think it may with truth be said to be above par in production and as far below in consumption and profits.

Though the fruit crop of the State, as far as reported, is but slightly above the average, our markets are glutted to an extent hitherto unknown, and in many instances the receipts do not meet the expenses incurred in even disposing of the crop.

This condition of things has been foreseen for years, but visionary theorists and interested parties have ridiculed the idea of over-production whenever it has been mentioned. The ravages of insects and fungi have, for the past few years, proved very detrimental to the fruit growing interests and tended to reduce the yield to a minimum. But experience with insecticides and fungicides have demonstrated their usefulness, and that their hindrances can be in a measure controlled. The present season however has seemed less favorable for the development of these scourges than usual. Trees not treated for insect depredations have borne fruit quite as fair as treated ones, so that the effectiveness of the treatment has not been quite as apparent as heretofore, which is probably due to some peculiarity of the season. The beneficial effect of fungicides on the grape crop has however been visible this season as heretofore. It has now become practically demonstrated that by the timely use of copper sulphate solutions and paper bags we can secure perfect immunity for this crop from Mildew and Black Rot, the most dreaded and destructive fungi this fruit has to contend with, and the use of both methods is on the increase.

A new insect enemy of the pear has recently appeared in this state, that has been pronounced the Pear Midge, an importation from Europe. It attacks the young fruit, causing a deformed, uneven growth, and destroys such as are attacked. The

young larva after devouring the inside of the pear, cause it to drop and leaving it, enter the ground to await for another season. The period of injury is of short duration. The insect, wherever noticed, has seemed to show a preference for the Lawrence, but is not confined to that variety. No practical method of eradication has as yet been devised as far as I know.

A new fungus has also appeared on our pears within the past year or so, in the form of a brown rust that chiefly attacks the base or blossom end, sometimes irregularly but often very regular and even, extending for about one and a half inches from the calyx. The effect is not only a blemish but prevents a full development of that portion of the fruit. It is not confined to any one variety or locality, and has not yet been studied by our fungologists as far as I know.

The Keiffer pear has, on extended trial, proved profitable since its true place and value has been found. The tree has proved to be a strong, healthy and vigorous grower, an early and abundant bearer, well adapted to the light and warm soils of the central and southern portions of the State. Its chief merits seem to be in the keeping and canning qualities, and can be shipped around the world if necessary to reach a market.

The Le Conte will, it is also thought by some, prove a profitable pear in the southern part of the State if properly handled.

The Fay currant has proved a valuable addition to the class of the small fruit family and is fast superseding the older varieties.

The Downing gooseberry has, for years, been our best large gooseberry not subject to mildew, but the Triumph is larger and equally healthy and productive. There is room for improvement in quality, or rather for varieties of improved quality in many of our fruits. But the Raspberry, especially among the small fruits, affords as fine a field for the experimenter as any.

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#### New York.

Reported by Charles A. Green, Rochester, Chairman of the State Fruit Committee.

The depression in agriculture and the low price for all agricultural products has stimulated the

planting of fruits, it having been found beyond doubt that while fruit growing does not promise fabulous wealth it will certainly yield double the profit of ordinary farming.

The great bugbear of fruit growers has been the expected glut in the market. Fruit growers generally have anticipated that a glut would occur, owing to the extensive planting of vineyards, orchards and berry fields. Even those best informed have been pleasantly disappointed by the absence of any such glut.

The fact seems to be that as varieties of good quality are offered in the markets at prices at which the consumer can afford to buy, the demand is largely increased every year.

Failures are often met with in fruit growing here, as in every other enterprise; insects and diseases seem to be more numerous each season, but as they appear new remedies are introduced and the intelligent and progressive fruit grower is rather aided than injured, while the careless and improvident are driven to the wall.

Our apple crops are not as reliable as in former years. The plum, cherry and pear seem to be more reliable than the apple, which was not the case in past years.

The small fruits perhaps yield more profit than the large fruits, and when we consider how soon they come into bearing it may be concluded that they are the safest to recommend, especially to those who have little means.

We are making progress in new fruits rapidly, if we consider the thousands of years it has taken to bring our fruits to the present state of perfection; slowly, if we consider only the few years that we can look back upon. The older varieties of strawberries are giving way to the newer varieties, which are larger, better flavored and more productive. The same may be said of raspberries and blackberries, progress having been made in hardness of varieties as well as other respects; in new grapes progress has been made.

A few days ago I visited the grounds of John Charlton, of Rochester, N. Y., who is a careful cultivator and who also makes crosses of the best fruits hoping to secure improved varieties. He had a large number of new and rare gooseberries in bearing; the bushes were of large size, the branches

being three to five feet in length and all actually borne down to the ground with loads of fruit.

One of his new gooseberries was discovered growing in the crotch of a large elm tree. It is called the Golden Prolific; it is a remarkable gooseberry as seen on his grounds; the most beautiful golden color, of large size, very productive and at the same time the best quality of any gooseberry I have eaten. If one's eyes were closed he might think he was eating a very ripe apricot when eating one of those gooseberries.

The fact is that gooseberries can be grown almost as cheaply as potatoes.

I give below a few county statistics as reported by the County Committees of our Western New York Horticultural Society. Chautauqua County, the famous grape district, reports the following shipment of grapes for 1890:

Brocton.....	541	car loads.
Portland.....	292	"
Westfield.....	359	"
Fredonia.....	279	"
Ripley.....	187	"
Dunkirk.....	62	"
Silver Creek.....	45	"
State Line.....	23	"
Prospect Station.....	11	"
Laona.....	8	"
Smith's Mills.....	4	"
Forestville.....	1	"
Fractions of carloads omitted above		
aggregate.....	5	"
Used for wine (estimated).....	20	"
Sold from wagons (estimated)....	20	"

Total for entire County.....1,857 " of 13 tons—or 24,141 tons; or 48,282,000 pounds, which, at average price of 2¼ cents per pound, amounts to \$1,086,345.

The variety chiefly grown is Concord, but Niagara, Worden, Moore's Early and Pocklington are grown to a considerable extent, with a few Delewares, Brighton, Catawba, Rogers' Hybrids, Champion, etc. The crop was a very heavy one, many large vineyards of Concords averaging five or more tons per acre, and some Niagara vineyards of over five acres, yielding seven tons per acre, while one plot of less than two-thirds of an acre of

Niagaras produced over six tons, which netted the owner nearly \$1,000, a large part of the fruit being sold to the Pullman Palace Car Company at 10 cents per pound.

Genesee County reports one Dwarf Duchess pear orchard, the aggregating sales from which the past six years, were \$3,402.92. The product for 1890 was \$1,054.80. No cultivation is given the above orchard, simply mulching each year with manure. Hon. Eli Taylor sold \$1,000 worth of Duchess pears from 2½ acres in 1890.

Yates County reports 11,000 tons of grapes for 1890.

My rough estimate of the average annual value of the fruit crop of New York State is \$10,000,000, of which the grape crop of one County alone was \$1,086,345.

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### Ohio.

[SOUTHERN PORTION.]

Reported by M. Crawford, Cuyahoga Falls, Chairman of the State Fruit Committee, assisted by N. Cox, E. H. Cusman, and N. H. Albaugh.

In southern Ohio we grow successfully the apple, peach, pear, cherry, plum and grape.

Of apples, the Rome Beauty, being a native of this county, (Lawrence), is our most profitable apple, doing its best on our hills in what we call white oak land composed of the different clay soils in color, of moderate fertility. The Ben Davis is our second apple, doing finely on thin clay soil with a great many small stones in it, land that will not produce over twenty bushels of corn per acre with good cultivation. The Smith Cider, R. Genet, Crawford's Keeper, Tulpehocken and Lansingburg do reasonably well. In pears the Bartlett is first, Angouleme, Buffum, Clarigeau, and Seekel do reasonably well. Of the peach we grow all the standard varieties when the frosts don't interfere. Cherries—The May is the only one grown to any extent and does well. Plums are only grown on a small scale, the old Damson taking the lead.

Obstacles to successful fruit culture are: Late frosts and cold northeast winds, to contend with which is very disastrous some springs. Insects prey upon the apples, and we fight them by spraying with London Purple. Black scab injures the apple very bad some years. The pear blight

some seasons nearly destroys our orchards of several years growth. It appeared the past summer but not so bad as formerly.

Culture and pruning: On our hill land in setting an apple orchard, dig holes one spade deep and some two feet across and in planting, fill up with the top soil only, or use ashes, old rotten leaves, and mulch the tree with leaves, course manure, or old half-rotten hay, corn stalks or anything that is suitable. Cultivate the land in corn one or two years which will give the trees the needed shade through the hot, dry summer months. Clover the land one or two years then plow again for a crop and at the age of 6 or 7 years put the land down in clover and orchard grass. The pruning should begin with the first year to form the heads of the trees and they will not need so much afterwards. Low heads are decidedly the best on hill land.

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### Pennsylvania.

Reported by H. M. Engle, Marietta, Chairman of the State Fruit Committee, assisted by F. Jackel, of Blair County.

All the species of fruits common to the Middle States are successfully grown in this State where a proper soil and location are chosen and judicious after-management is followed.

Peach culture has extended rapidly in the central portion since 1889. Early in the season the peach crop for Juniata County as estimated would be 400,000 crates. The surrounding counties have also largely increased their acreage in this fruit. This industry has been largely and successfully carried on in the southern portion of the State on the mountain slopes. Several seedlings have originated among the peach growers. One by Daniel ———, of Lancaster, as large as Crawford's Late, nearly as early in season as ———; color, yellow; quality unsurpassed by any other yellow sort; fairly productive. Another by Miss Albright, of New York City, and for her named the "Albright," which is of the Mixon type in quality, fully as large and ripening with the Smock.

The most serious obstacles to fruit culture, in addition to injudicious management, are insects and fungoid diseases. It is gratifying, however, that quite an interest is being manifested in the

counteracting of insects, and I will predict that apparatus for their destruction will be in demand by and by, and similar efforts for the counteracting of fungoid diseases will necessarily follow.

In 1890 the fruit crop in this State was the smallest for many years, while this season it is probably the largest ever grown, especially peaches.

Reported by F. Jackel, Hollidaysburg, Blair County.

In this part of the State, apples, cherries, pears, plums and grapes are successfully grown. The peach and grape will not thrive in unprotected locations where the altitude exceeds 1,300 feet. The apple is by far the most valuable class, and in the order named follow the cherry, pear, plum and grape. Lately blight has reduced the number of bearing pear trees quite largely.

#### VARIETIES OF FRUIT SUCCESSFULLY GROWN.

*Apples.*—Baldwin, Grimes' Golden, Wealthy, Gravenstein, Fameuse, King of Tompkins County, Maidens' Blush, Oldenburg, Rambo, Blenheim Pippin, Rhode Island Greening, Red Astrachan, Smokehouse.

*Pears.*—Bartlett, Seckel, Clapp's Favorite, Louise Bon de Jersey, Souvenir du Congress, Angoulême, Anjou, Clairgeau, Superfine, Bose, Vicar, Kieffer. Idaho seems promising. Le Conte not fit for this part of the country.

*Plums.*—Damson, German Prune, Blue and Yellow Egg, Green Gage. Wild Goose is of little or no value, so are many other highly recommended sorts.

*Cherries.*—Morello's Montmorency Ordinaire, Napoleon Bigarreau, Ohio Beauty, Black Tartarian.

*Peaches.*—Crawford's Early and Late. Wherever peaches succeed and the trees are attended to properly there is little or no difference in the value of the different varieties.

*Grapes.*—Concord first, Elvira, Delaware, Moore's Early, Pocklington, Salem, Riesling and its varieties, Hartford, Prentiss, Lady. August Giant, Cottage, White Herrman, Agawam, Brighton and Lady Washington are liable to mildew.

*Berries.*—Strawberries are generally fine and pay good prices. Raspberries do well. Black-

berries, generally ripening in August, are of less value. Currants and quinces are not extensively raised here but succeed finely.

*Culture and pruning:* Apples should be pruned when small, head and branches formed, so that ever afterwards only summer shoots may be removed and that at any time when the knife is sharp. After the second year of planting, no crop whatever should be raised in an orchard, but if possible the orchard should be kept clean. It also should receive a fair top dressing of manure annually. Stable manure is always preferable, but if that cannot be had, hard wood ashes will do just as well, and crushed bone and lime may answer. During fall and winter it is very beneficial to the trees to receive a liberal supply of liquid manure from the barn yard. Never apply liquid manure during the growing season. At least once each year, spring time preferable, all grass should be cleaned from around the trees, borers removed and root suckers cut away. Cherries and pears worked on "wildlings" are not troubled with borers.

The ground should be loosened each year near the body of the tree, and dressed with manure. They require little or no pruning except to remove dead branches. Plum and pear trees thrive best on a sandy clay loam, made rich with manure, and given clean cultivation. Dwarf pear trees must be judiciously pruned, and the peach a thorough pruning.

*Statistics:* I cannot give any exact figures, only know that the extent and progress of fruit culture in this part of the country has been very great, and we may easily say without fear of contradiction that on an average every family in this state consumes \$50 worth of fruit, either raised by themselves or purchased—per annum—which would give to every individual about \$10 worth of fruit per year.

#### Rhode Island.

Reported by James H. Bourn, Providence, Chairman of the State Fruit Committee.

The present year is one of the few which promise a plentiful fruit harvest; apples are the exception, but will yield moderately on trees which were not defoliated by caterpillars last year. Healthy trees

which bear inferior fruit are profitably grafted with good varieties, And those which have been neglected, if not too old, are made profitably fruitful by removing the soil from off one half of the roots in autumn of one year, and the other half the next, carefully lifting the roots and relaying them near the surface, replenishing the exhausted soil with a fresh compost containing wood ashes, soot and bonedust—an excellent stimulant.

Long-keeping varieties should be picked late in autumn, as they will improve in color and maturation.

The Palmer is one of the best early winter varieties; Fameuse and Jonathan are favorite table sorts, Garfield, Bowen, and Shepardson are local, and their planting is extending. Pear trees are healthy and promise an abundant crop. The most profitable pear trees are those under high cultivation planted in the midst of a vegetable garden. Varieties most profitable are: Bartlett, Sheldon. Anjou, Bosc, Louisa Bonne de Jersey, Winter Nelis, Dana's Hovey.

The main hindrance to peach culture is our climate. Standard market sorts are Alexander, Stump the World, Old Mixon Free, Yellow Rareripe, Crawford's Early, Large Early York.

*Grapes.*—The Niagara has grown in favor, being hardy and easy to ripen. Empire State, Ulster, Goethe, Hayes and Herbert, uncertain.

Cherries thrive the best; blackberries, currants and raspberries yield generously.

*Plums.*—The crop has been cut short by late spring frosts the last two seasons. The Bradshaw, McLaughlin, Lombard, Smith's Orleans, Imperial Gage, are good market sorts.

*Strawberries.*—The brown rust on the leaves makes their culture unsatisfactory, only such varieties as possess the strongest resistant qualities of this fungus can be safely used, and the acreage I think is diminishing.

Young plantations invariably yield the finest product. A very promising seedling originated by Jeremiah Briggs four years ago at Providence, and named the Briggs. It has many characteristics of the Charles Downing but is an improvement of that sort.

Healthy, vigorous orchards of long standing are rare in the State.

The extermination of insect pests is of primary importance. The use of arsenical compounds should be practiced under the strictest regulations, for injury is liable to occur to the blossoms and foliage.

### Vermont.

Reported by T. H. Hoskins, Newport, Chairman of the State Fruit Committee.

In the report of the Society for 1883 I made a completely detailed statement regarding the pomology of this State, and since that time there has developed very little to be added, excepting as regards the progress of "Ironclad" fruit culture in the northwestern and most elevated portion, which has been rapid in the planting of orchards of Russian and native ironclad sorts of apples, so that the counties of Orleans, Essex and Orleans, Caledonia, will cease to import and will soon become exporting centers of orchard products. Several car-loads (mostly of Wealthy and Scott's Winter) were shipped from this station last fall to Massachusetts; but this was later nearly balanced by importations of Ben Davis from Kansas—an unprecedented occurrence.

All the Russian apples do finely here. The varieties most planted have been Oldenburgh, Alexander and Tetofsky, but the list is being rapidly increased by the addition of longer-keeping sorts—Switzer, Longfield, Anis, Bogdanoff, Antonovka, Babuschkino, Autumn Streaked, Golden White (White Russet), several kinds of the "Cross" apples, etc. Newer fall sorts—Prolific Sweeting, Zolotoreff, Titus, etc.—do well and are meeting with favor.

Among American and Canadian ironclads, Bethel, Winter St. Lawrence and Canadian Baldwin are in considerable favor.

The Russian and other tree fruits of northeastern Europe other than apples have been under trial, and quite a number of the plums and cherries have fruited. They seem, so far, to be well adapted to the localities where they have been tried. None of the old standard sorts are of much value here. Russian pears show themselves much hardier than the old sorts and grow vigorously. Some trees of the Bessemianka—the first variety received—

are bearing this season. Within the next four or five years we shall probably have nearly all of them in fruit and be able to report more fully.

Of new native varieties of this locality, the only noteworthy recent addition is the "Newport Winter Sweet," which is a good substitute for the Tolman Sweet when that variety fails from lack of hardiness. It is of about the same size, superior for eating fresh, but not quite so good for baking. The tree

is a free grower and very productive. The western native plums, especially the De Soto, prove very acceptable. For this part of the State the Wealthy and Scott's Winter should have two stars, also Yellow Transparent, Prolific Sweeting. Shiawassee Beauty, which seems quite ironclad and does not spot, is likely to supplant the popular Fameuse, which is very tender and very subject to spot. The Canada Baldwin, an excellent variety for clay soil, is likely to bark blight on light soil.

## DISCUSSION ON CATALOGUE OF FRUITS.

Mr. Garfield was invited to read from the catalogue taking first the list of apples.

*Allerson's Early.*

MR. BRACKETT: It is only known in Iowa.

MR. WATROUS moved that it be stricken off, and there being no objection this was done.

*Aromatic Carolina.*

On motion of Mr. Watrous it was stricken from the catalogue.

*Bonum.*

MR. LIPPINCOTT: That apple grows in our section in New Jersey. It is not largely cultivated, but about every other year it seems to do remarkably well. It grows finely, is a very saleable apple, has many good qualities, and I certainly should object, so far as our section is concerned, to having it stricken from the list.

*Bonum.*

MR. BLACKWELL: I think that Bonum should be stricken off, so far as New Jersey is concerned, at any rate.

MR. SAUL: It is one of the best apples we have in the District of Columbia.

MR. VAN LENDLEY: I will move that it be given two stars for North Carolina.

*Buncomb.*

THE PRESIDENT: It is strange that apple is not rated. It is one of the best early fall apples all throughout the Middle States and the South.

MR. GARFIELD: It is identical with Red Winter Pearmain. That is why it appears here without a rating.

*Clayton.*

MR. BRACKETT: The Clayton is an excellent apple. We cannot strike that off. It is one of the best.

*Dominie.*

MR. LYMAN: Dominie should be advanced one star for Virginia.

MR. MANNING: Dominie ought to have one star for Massachusetts. I see them on exhibition, and they look well.

*Early Margaret.*

THE PRESIDENT: It is by all means one of the best of summer apples.

*Edward's Winter.*

MR. VAN LENDLEY: Edward's winter is a fine winter apple in North Carolina; one of the best keepers in the middle of North Carolina.

*Gano.*

MR. GARFIELD: That is an apple that has come to the front in Missouri.

MR. LYONS: It is a comparatively new apple.

MR. RAGAN: Personally I am not acquainted with this apple by having grown it, but I know it is a very popular apple and is grown largely in Western Missouri. I think it is a seedling of the Ben Davis—of that type. It is said to be better in quality and to have other characteristics that recommend it in that region. It is not thoroughly tried in our section.

*Granite Beauty.*

MR. MANNING: That should have two stars for New Hampshire and deserves one for Massachusetts.

MR. BRACKETT: It is a famous apple in the State of Maine where it originated.

*Hewes Crab.*

MR. GOFF: I would like to ask if that is the Virginia Crab of the Northwest?

MR. BRACKETT: It is not the same at all.

MR. LYONS: Is there any good reason for retaining the word Crab? It is not a crab in ordinary sense, and we have so many crabs now to which that name is properly attached, that it strikes me it would be well to leave it off in all such cases as this.

I move that the word "Crab" be eliminated from the name of this fruit; it not being one of the class usually recognized as crabs.

MR. GARFIELD: I heartily support the motion. And on ballot the motion prevailed.

*Hoover.*

MR. VAN LENDLEY: In Western North Carolina that is a fine apple and does well.

MR. GARFIELD: The Iowa Blush is not even described.

MR. WATROUS: It is a good winter apple in parts of Iowa. It should not be stricken off. It is a very hardy tree.

*Kentucky.*

MR. BRACKETT: It is starred in only one State. I move it be stricken out, and was so ordered.

*Key's Fall.*

MR. GARFIELD: It is starred only for Tennessee. I move it be stricken off, and was so ordered.

*Klaprath.*

On motion of Mr. Engle, it was stricken off.

*Longfield.*

MR. HARRIS: The Longfield is coming into favor up in Wisconsin and in portions of Minnesota. I should think it was worthy of one star for Southern Minnesota, and probably two for Wisconsin.

MR. GOFF: I would give it one star for Wisconsin.

MR. HARRIS: It is a profuse bearer and a very fair fruit.

*Lawver.*

THE PRESIDENT: Is it not the same as Delaware Winter?

MR. BRACKETT: That was settled four years ago, but it did not stay settled.

MR. LOVETT: I think it should be added as a synonym of Lawver.

MR. RAGAN: Did I understand there is any doubt as to the origin of this variety—the Lawver of Southern Illinois? It is a seedling, as I understand, of McAfee, a western apple which is very popular. Later it appeared in Delaware under a different name. Are we to pass from the original and give a subsequent name to the apple in a section far remote from its origin?

MR. STRONG: I move that the question be referred to the Standing Committee.

MR. BLACKWELL: I think the two apples are the same, and not of any value in New Jersey at all.

MR. GARFIELD: The next is Neverfail.

MR. LYONS: I strongly suspect that is Rawle's Genet. I ask to have that question determined if someone can do it.

MR. BRACKETT: It is a synonym, and I move it be stricken off.

MR. GARFIELD: The next is Red June. Is that Red June or Carolina Red June?

MR. LYONS: That is a question that ought to be decided here now. Mr. Brackett, I know, is sure that it is Carolina June, and upon the strength of his assurance I ventured in revising to strike out Carolina June and leave this. If that meets the approval of the meeting, well and good.

MR. HENDRICKS: I would like to ask for two stars for Summer Pippin on the Hudson River.

MR. LYONS: Champlain and Nyack are the synonyms.

MR. LOVETT: It is known as the Nyack Pippin in New Jersey. It is called by that name more than by the name Summer Pippin. It is one of our best apples.

MR. LYONS: Cannot some of our Northwest people tell us whether Wolfe River is distinct from Alexander?

MR. WATROUS: It is a very different tree; the fruit is very much the same but the tree is hardier.

#### CRAB APPLES.

##### *Early Strawberry.*

MR. LYONS: I wish to bring up a point in regard to Early Strawberry and one or two others. It seems to be supposed that because it is a crab, we can assume the same name with the apple of the other class. It is almost certain to create more or less confusion. Cannot we in some way escape that danger, and can't we venture to change these names of crabs where they are identical with others?

MR. BRACKETT: I move to strike out early and leave it simply "Strawberry."

The motion prevailed.

##### *Glover's Early.*

MR. GARFIELD: I move that the word Early be stricken out.

It was so ordered.

THE PRESIDENT: This ends the list of apples. Now any new apples that you desire to bring before the Society are in order.

MR. STRONG: I now mention the Murphy apple described by the elder Manning as originated near Salem, having been known in Massachusetts a great many years, but not having come into general

cultivation. It is the most beautiful large winter apple on the catalogue.

MR. BABCOCK: I would like to add the Fourth of July. We have nothing superior in the State of Virginia. It is absolutely perfect. In growth of tree, perfection of fruit, table and market qualities, we have nothing better. It is an apple long neglected. Charles Downing sent it into the South seven years ago. I have fruited it constantly. It is good when young, and better when old, if you can understand such descriptive language.

## APRICOTS.

MR. GARFIELD: Apricots are the next fruits to be considered.

MR. LYONS: May I interrupt the speaker to request that inasmuch as it has fallen to me to do something in the way of revising this catalogue, there are a few rules which I laid down for myself in that revision, and a good deal of the work that will be done here to-night even may depend upon the same principles. I would ask the privilege of reading a few lines, prescribed rules that I have carried out in that revision, in the hope that we will both be working in the same direction. The revision itself is too great a matter to ask this Society to consider in full in meeting, but I will read what I had proposed to add to the plan of the catalogue, and ask this meeting to consider and determine whether it shall be changed or not. You are all acquainted with the catalogue and know what the plan is as it has been heretofore prescribed, and I will read only the addition I would propose to it. That addition is as follows:

Prefixes, suffixes, apostrophic termination and secondary words, together with words whose significations are expressed in the descriptive columns of the catalogue, are eliminated from the names of fruits, save in a few cases in which they may be needful to insure the identity of a variety, and in a few time-honored names.

The anglicizing of foreign names is resorted to only in the interest of brevity or pronounciability.

In questionable cases subsidiary words are retained in parentheses.

THE PRESIDENT: I have no doubt these suggestions will meet with the approbation of the Society, as they are the result of a great deal of thought on

the revision of the catalogue which has been in the hands of Mr. Lyons for so many years past. If any objections are to be offered now is the time; if not, they will so stand, and we will proceed with the reading of the catalogue.

MR. GARFIELD read the list of apricots, but no changes were made.

## BLACKBERRIES

*Agawam.*

MR. MANNING: Very fruitful in Connecticut.

*Ancient.*

MR. WATROUS: Good in the Northwest.

*Brunton's Early.*

On motion of Mr. Lyon it was stricken off.

*Dorchester.*

MR. MANNING: It could be retained in Massachusetts. It is double starred there now.

MR. LYONS: The Dorchester was one of the very first introduced. It was at one time considered very desirable, but there are so many so much better that I more than suspect that even at its original home it is not valued now as compared with others.

*Early Harvest.*

MR. UBER: A very fine berry in Virginia.

MR. WRIGHT: One of the best berries we plant in Delaware for market, and we make more money out of it than any other berry in Delaware. It is far superior to any other in the market.

*Erie.*

MR. LYONS: The Erie is assuming quite a prominent and valued position, so that it should remain upon the list.

MR. HALE: In Connecticut it is extremely hardy and quite productive. The berries are very large and handsome and showy.

*Lucretia Dewberry.*

MR. LOVETT: I would recommend a star for it for New Jersey. Grown to stakes it is not bad to pick.

*Minnewaska.*

MR. HALE: The Minnewaska is not as strong a grower as the Erie, it is more branchy, but is a profuse bearer and enormous cropper, of almost as large size as the Erie and much the same form. It is bright in color, a clear glossy black, and of

considerable better quality than the Erie, and is a valuable berry either as a market or family berry, and so far in the past four years seems hardy. It is a valuable berry with us most certainly.

MR. HENDRICKS: It is not very hardy on the Hudson River, but very productive and of good quality.

MR. GARFIELD: I suppose when anybody speaks of a blackberry being hardy, he means productive in the North.

MR. LYONS: I do not know of a hardy blackberry hardly anywhere. Perhaps I should qualify that by saying the blackberry may be hardy in a large portion of the country in its particular locality, that is as an undergrowth; but in an open exposure anywhere, in my long acquaintance, the most hardy ones, sometimes so called, are injured by the winter.

THE PRESIDENT: I will have to say something about the blackberry culture of the South. In Georgia, Tennessee, Alabama, and South Carolina, where blackberries are cultivated to a large extent, they are cultivated in open fields, and the only objection and trouble met with is that they will sometimes get attacked by rust, that is the only drawback to successful blackberry culture, and the Kittatinny is perhaps one that takes the rust easier than any other. But so far as hardiness is concerned, we have no trouble.

MR. LYONS: I do not mean there is danger of losing the plants, but we all know that the habit of the plants is such that if the tips of the twigs are injured by winter, the crop is lost.

*Stone's Hardy.*

MR. GOFF: It is successful in Wisconsin. I would give it one star for that state.

MR. LYONS: Its chief fault is it is too small.

*Wilson Junior.*

MR. HENDRICKS: I move that the "Junior" be stricken off the list, and it was so ordered.

#### CHERRIES.

*Butner's Yellow.*

On motion of Mr. Lyon it was stricken off the list.

*Governor Wood.*

MR. WRIGHT: Give that a star for Delaware.

MR. LINES: Two stars for Connecticut.

*Knight's Early.*

MR. BABCOCK: In Norfolk it is an acquisition; I would recommend it to every farmer.

#### CURRANTS.

*Victoria.*

MR. HALE: The Victoria currant with us in Connecticut, and I think through New England, is one of the most valuable and reliable of the older currants. It is a strong, vigorous grower, and an abundant bearer of good long bunches of moderate sized berries, which have a happy faculty of remaining on the vines a long time after they are ripe, and keeping in perfect condition. The ladies can leave their jelly making for a week, and cannot with others. It is valuable as a market and family berry. It will hold its foliage and fruit.

MR. LYONS: This is the only variety we have that is really exempt from the borer. It also holds its foliage unusually well.

MR. SMITH: It continues a month or six weeks after the others in Massachusetts.

MR. HARRIS: It is one of our most valuable currants in Minnesota.

MR. WATROUS: It is one of the best in Iowa, if not the best.

MR. GOFF: It is one of the best in Wisconsin.

MR. FARNSWORTH: One of the most profitable in Ohio.

#### GRAPES.

*Madeira.*

MR. CAMPBELL: I move it be stricken from the list, and it was so ordered.

*Moore's Early.*

MR. BABCOCK: I would give it two stars for Virginia.

*Prentiss.*

MR. CAMPBELL: Some years ago I had a Prentiss vine growing on the side of the wall, and it ripens well so; but on the open trellis I can do nothing with it. I do not think it is fitted for general culture at all, but only for special localities.

A motion to strike it off was lost.

*Woodruff Red.*

MR. BRACKETT: Why not strike off the "Red."

On motion of Mr. Van Deman, the word "Red" was stricken from the name of this grape.

MR. GARFIELD: How about the word "Red" in the name of the next one—Wyoming Red?

On motion the word "Red" was stricken from the name.

MR. CAMPBELL: I would move that the grape Brilliant, originated by Munson, of Texas, be put upon the list as very promising and of great value.

MR. VAN DEMAN seconded the motion, which was agreed to.

MR. HALE: I would move that the Green Mountain grape be added to the list.

THE PRESIDENT: I would ask is not the Green Mountain grape held under restriction as to its sale? By resolution passed at Philadelphia, it was ordered that no fruit under restriction can be catalogued.

MR. WATROUS: It is said that the name Green Mountain is copyrighted, and although you may buy vines and pay your money, you may not propagate them and sell them and attach to your vines the name Green Mountain.

MR. CAMPBELL: There is another difficulty in regard to this grape, which is that it is claimed positively by Ellwanger and Barry that they have been selling the same grape for years, under the name Winchell, and they are identical. We might, therefore, pass the grape by and not have it put on.

MR. GARFIELD: I move that the matter be referred to the Committee on Catalogue.

#### PEACHES.

The names of the varieties which were stricken from the catalogue are here given, without recording the discussion for lack of space:

Albert, Alexander Cling, Amsden, Ashby's Early, Beatrice, Bordeaux, Briggs, May, Conner's Cling, Counts, Crawford's Yellow, Crocket's Late, Haine's Early, Indian Blood, Indian Cling, Jacques, La Grange, Large White Cling, Lemon Cling, Malta, Masicot, Morris White, Nugent's June, Prince of Wales, Troths Early, Waterloo, Yellow St. John.

#### DISCUSSION RESUMED.

##### *Elberta.*

THE PRESIDENT: In our catalogue, Elberta has no description, and there are more Elbertas planted to-day everywhere, even by Hale and others, than perhaps all the other varieties of peaches together.

MR. VAN DEMAN: I have just been down to the Olden Fruit Farm in Southern Missouri, next to Arkansas, and there it is the finest thing they have.

MR. CAMPBELL: From all accounts it seems to be the most valuable market peach planted.

MR. CARY: I move that the committee be instructed to describe this peach, and have it appear in the catalogue, and recommended as good generally. I do not believe locality has anything to do with it. During the past year they attained extraordinary size; I think the largest I ever saw. They were on exhibiton at our State Horticultural meeting. Some weighed twenty ounces. Being Fish Commissioner, they say I am good at fish stories, but that is true.

#### PEARS.

A few varieties were stricken from the list but no other changes of importance were made.

#### PLUMS.

##### *Shropshire Damson.*

THE PRESIDENT: I should like to hear something about that. Who fruits it?

MR. LYMAN: It does well with us, but our old Virginia Damson beats it because it sells so well.

MR. BRACKETT: I move that the Rockford be added to the list. It is a plum lately introduced in our State, and it is admitted by every one there now that it stands at the head of the list in quality among our native plums.

THE PRESIDENT: It belongs to the Chickasaw type, does it not?

MR. BRACKETT: Yes, sir.

There is another one that comes from your part of the State, I believe—Pottawatomie.

MR. BRACKETT: I move that Pottawatomie be added. Also the Hawkeye.

MR. LYMAN: We are growing Pottawatomie very successfully.

THE PRESIDENT: It is a wonderful plum.

MR. WATROUS: Hawkeye certainly should be added. It is very valuable in Iowa.

THE PRESIDENT: There is another of the same type, known for 26 or 27 years in our section—the South Cumberland. It is a golden-yellow plum, quality very good, and just as heavy a cropper as Pottawatomie.

MR. RAGAN: A plum exceedingly popular in our State that is not on the list, I think, is well enough known to be placed there. It belongs to this Chickasaw type—the Robiison. It originated in my native county from seed brought from North Carolina. It is enormously productive, and good in quality.

THE PRESIDENT: It is not as good as Pottawatomie side by side.

## REPORTS OF COMMITTEES.

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### On Scale of Points for Judging Citrus Fruits.

*To the President and Members of the American Pomological Society:*

GENTLEMEN: Speaking for your committee, we beg to say: A correspondence has been carried on between California and Florida (aggregating some 15,000 words) and the positions of these States on the subject are now clearly defined before the committee, and an approximate basis for agreement has been reached. A final decision, however, involves considerable further discussion. Before transmitting their conclusions the members of your committee desire to submit the same for approval to the Horticultural Societies of their respective States. Therefore, your Committee reports progress and asks further time.

Your Committee would suggest, as it is important to have an established National Scale for the Columbian Exposition competitions, which will occur before the next meeting of the Society, that a commission be appointed to receive and act upon the report of this Committee when ready for submittal.

(Signed) A. H. MANVILLE.

For the Committee.

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### On Review of Scale for Judging Citrus Fruits.

*Mr. President and Members American Pomological Society:*

Such a "Scale" must be one of practical values. This word "*practical*" must be taken in a very broad sense, covering, in the first part, whatever possible element can give pleasure to vision or scent or taste, and, in the second, the shipping and keeping qualities that commerce requires. The member of this Committee from the State of Florida, in an article recently published by him in the *Florida Agriculturist*, asks: "Who has the courage to propose a commercial standard for judging citrus fruits at future competitive exhibits? A standard that will place durability first in

the list of desirable characteristics, giving equal importance to size, appearance and weight?" To this signal admission that the official scale of the Florida Horticultural Society is not a "commercial standard," California now offers the considered and tangible answer of a new one, with rules formulated with market requirements steadily in view; and she asks your favorable judgment upon it as the only one covering all points and presenting them with approximation to just balance.

With such I offer Mr. Manville's request for further time, but do not feel at liberty to concur with it, owing to the readiness of my State for present judgment, and to the large increase of demand for time and money that such delay must entail, for California is a round trip of 6,000 miles from Washington. I had hope to the last for Mr. Manville's attendance, and for the agreement which a very pleasant correspondence with him had led me to believe possible upon a personal interview; so pleasant, indeed, that I am exceedingly pained that a sense of duty prevents compliance with his desire.

With his request, and with the scale here offered, I also join a transcript, verbatim, from a paper of Mr. Manville's, of the Florida Scale, that your honorable Society may be enabled to consider the subject advisedly.

Permit me now to offer certain arguments which may throw light upon the *California idea*.

In classification with regard to season, a wide range is necessary. Florida is perhaps two months earlier in maturing her fruit than is California, and Jamaica is doubtless in advance of Florida. Hence the need of much latitude for inter-state and world competitions. Further, it is obvious that varieties which differ in size must, in certain structural characteristics, be judged by different standards.

Through all the literature of the subject runs the desire of our Florida friends for an "Analytical Scale." In this I concur with them, but premise that where analysis is, there clear cut division of

elements and exact nomenclature is needed. Florida makes the component parts of her scale as follows, to wit: "Size, appearance, juciness, thickness of peel, absence of seed, absence of tissue, acidity, sweetness, bouquet." California covers the ground with this analysis, as follows: "Size, form, color, weight, peel, fiber, grain, seed, taste," and under these general heads groups related elements, so that "color" includes the consideration, by distinct valuation of "bloom," "color of peel," and "Color of Flesh." Also "Peel" is subdivided into "finish," and "protective quality," while "taste" covers "sweetness," "citrous quality," and "aroma." Florida regards "appearance" as a whole, while California sees "form, bloom, color of peel and finish," all of them points which are best seperately considered.

In the literature of the subject our Florida friends invariably make the two general divisions "physical characteristics" and "juice characteristics." As a substitute for the first of these I submit the term "*structural characteristics*," inasmuch as even "juice characteristics" are "physical."

The two states agree upon the number 100 as a maximum summary of points, but vary in assignment of division values. Florida makes all these equal, (ten points) except two of (fifteen each). California holds that nature does not adjust her parts that way. There is no good reason why "absence of tissue" should count equal with "appearance." "Appearance" sells the fruit, for beauty will have her way. Florida grants her but a tenth of the scale, while California lays double that tribute upon her shrine, in form 5 and color 15, and holds that it should be still increased rather than diminished.

Certain remarkable differences of the two scales exist which are best treated in order.

The California scale allows to "weight" (juciness) a certain amount of buoyancy in the water test, for, if the orange is to sink in water, then the *commercial* (shipping and keeping) quality is to be sacrificed. Oranges fresh from the tree do not sink in water, and few ever reach that stage, even after undue "curing." The thin peel of such is not sufficient for marketing purposes. Surely that is not a fit standard of excellence which involves the destruction of the shipping quality.

In the consideration of "peel" Florida, in further contravention of "commercial standards" makes thinness her desideratum (3.32 inch only allowable), while California regards the subject chiefly from the standpoint of "protective quality." What is the peel for anyhow? It is of the writer's personal observation that, given, two specimens of like variety, and of equal texture and maturity, the one with the thicker peel will keep the longer time. No market objects to 1.8 to 3.16 inch, and the keeping values demand that such should be allowed without discount. It must be here observed that in certain seasons and conditions no thickness of peel will avail for good shipping.

For "fiber" I have allowed but eight points, and for "grain" but four. I do not feel certain that the first of these, possibly also the second, might not be still somewhat further reduced in favor of the more important elements of "color" and "taste."

The question of "rudiments" in "seed" I treat from the view that, whenever any growth is found in such, they then are equally nuisances with fully developed seed.

Finally in the all-important subject "taste" the term "citrous quality" is used in preference to acidity, as being more expressive of the thing desired. Men eat the orange for this quality. They can get sweetness more cheaply from other sources, but it is citric acid that makes the orange, and the sugars, grape and cane, are there simply to temper this element.

In the preparation of my work I have been very much indebted to the many experienced and intelligent orange farmers, who have responded to the drafts I have made upon them for their ideas, and whose approval, without dissent, enables me to offer this "scale," as embodying the judgment of my state. I especially desire to acknowledge the assistance of Mr. G. W. Gareelon, of Riverside, for his most valuable aid in the preparation of the "lemon scale." I do not deem it necessary to review the latter, and am glad that it is so, for it provides for lemonade without sugar which I do not like!

In leaving this delicious subject, I cannot refrain from telling you all how glad I am that I am a fruit farmer, and not something else—an entomol-

ogist perhaps, searching the south seas for the bug that will eat the bug that eats the trees, that grow in the groves in—well—Mexico!

Most respectfully,

(Signed) J. E. CUTTER,

Member of Committee on "Scale for Judging Citrus Fruits."

### Scale for Judging Citrus Fruits.

Submitted by J. E. Cutter, Riverside, California, Member of committee for formulating "scale."

#### ORANGES.

Preliminary Classification (dual).

Season:	{	Early — December to April 1st.
		Middle — February " July 1st.
		Late — June " December 1st.
Size:	{	Large.
		Medium.
		Small.

Managing Committee from each competing state or section to nominate varieties to any or all of above classes, with months and, when practicable, dates for tests of its own fruit in the same.

Fruit to be judged only by standards of its class.

So far as practicable no committee to judge fruit of more than one size (as per above classification).

#### Scale.

Divisions—Size, Form, Color, Weight, Peel, Fiber, Grain, Seed, Taste—to be considered in order named.

Counts (credits—points) to be by units and tenths thereof, expressed decimally. Possible total of same to equal 100.

1. Size—0 to 10, (Counts).

Standards:	{	Large, "126's"— $3\frac{1}{8}$ ins. diameter.
		Medium, "176's"— $2\frac{3}{4}$ " "
		Small, "226's"— $2\frac{3}{8}$ " "
		Mandarins and Tangerines $2\frac{1}{8}$ ins. dia.

Three eighths inch excess of standards allowed (without discount) to "medium" and "small" fruit;  $\frac{1}{2}$  inch ditto to "large."

One unit discount for each  $\frac{1}{8}$  inch deficiency in any size,

2. Form—0 to 5.

Standards:	{	Round.
		Oval.
		Ovate.
		Pyriiform.

Discounts for lack of symmetry and for form blemishes. Navel marks not to be discounted except when of abnormal size or of bad form.

3. Color—0 to 15:	{	Bloom, 0 to 2.
		Of Peel, 0 to 10.
		Of Flesh, 0 to 3.

Standards. Bloom to be perceptible and to be discounted according to degree of deficiency, or of injury thereto,

Peel to be of rich, deep orange color, in natural condition, and to be discounted according to degree of deviation therefrom—one or more points. Rust, scale and smut to be discounted five to ten points, and fruit that gives visible evidence of having been cleaned of the same to be subject to equal penalty. Also peel that has been rubbed or "polished," giving a gloss at expense of breaking or pressing the oil cells, to suffer same discount.

Flesh to be rich, clear and uniform in any of the shades common to fine fruit.

(Omit consideration of "flesh color" until after concluding division 5,—"peel.")

4. Weight—0 to 10.

Standard: Specific Gravity 1, (equal to that of water) with buoyancy of  $\frac{3}{4}$  oz., allowed to "large" fruit;  $\frac{1}{2}$  oz. ditto to "medium"; and  $\frac{1}{4}$  oz. ditto to "small,"—all without discount.

One point to be discounted for first  $\frac{1}{2}$  oz. of buoyancy in excess of allowance, and thereafter two points for each additional  $\frac{1}{2}$  oz.

(NOTE.—Buoyancy may be easily determined by clasping apothecaries' weights to fruit with light rubber elastics and then placing in water.)

5. Peel—0 to 10:	{	Finish, 0 to 3.
		Protective Quality, 0 to 7.

Standards: Of finish, smoothness and uniformity of surface and pleasant touch.

Of protective quality, firm and elastic texture, abundant, compact and unbroken oil cells, and  $\frac{1}{8}$  to 3-16 inch thickness.

Discount one point for first 1-32 inch above maximum or below minimum, and two points for second ditto,—provided that to long-picked and fully "cured" oranges the minimum shall be lowered to 3-32 inch; and that to "large" fresh-picked and to "large" slightly "cured" fruit the maximum shall be raised to  $\frac{1}{4}$  inch.



Rudiments to be considered as seed if any growth has been developed; otherwise allowed without discount.

9. Taste—0 to 40: { Acidity, 0 to 20.  
Aroma, 0 to 10.  
Absence of bitterness, 0 to 10.

In inter-state competitions the standard of acidity shall be the highest per cent. of strength of acid found in any fruit, determined by chemical test. In other competitions such tests may be applied as committees or competitors may require.

Aroma shall be full and of clear quality.

Bitterness to be determined by slicing the fruit (including peel) thin, covering with hot water, and cooling slowly; to stand 24 hours when practicable. (No sugar to be used.) Should a *trace* of bitterness appear to the taste, discount one point; should the bitterness be *fairly defined*, discount two points; if *pronounced*, discount five points; and if *strong*, ten points.

### On Semi-Tropical Fruits.

BY A. H. MANVILLE, CHAIRMAN.

[A complete classification of, and report upon, the fruits of the Gulf Coast Division of the Semi-tropical region of the United States was prepared for the biennial session of the society by A. H. Manville, Chairman of the Semi-tropical Committee, with the assistance of Dr. G. Devron and E. L. St. Ceran, of Louisiana, also of the committee; and Geo. L. Taber, R. D. Hoyt, E. N. Reasoner, E. H. Hart, E. S. Hubbard, Jas. H. White, John B. Beach and W. S. Hart, of Florida, and Gilbert Onderdonk, of Texas. An outline of this comprehensive report is given in the following condensation. It is to be regretted that the spare limits of this volume precludes its publication entire.]

This report, like the one submitted at the last session, includes that portion of the country which lies within one hundred and fifty miles of the Gulf of Mexico and embraces Florida, the southern portions of Georgia, Alabama, Mississippi and Louisiana and coastwise and Southern Texas.

At the Ocala meeting (session of 1889) the Semi-tropical Committee made its first report, a full report, and, accompanied as it was by a series of articles on the several fruits grown, prepared under

its auspices by competent persons, treated fruit culture in the Gulf District with considerable thoroughness. In the revision of the Society's catalogue for the present session the fruits of Florida and the Gulf region have received careful attention. The matter submitted below is based upon the Ocala report and is merely supplemental thereto and in amplification of the catalogue lists for this territory.

For convenience the fruits of this region have been grouped under three heads, namely: "Hardy," "Citrus," and "Tropical." Tropical fruits are confined to the Florida Keys and a narrow strip along the coast from Merritt's Island on the east to Pinellas Peninsula on the west, including some favorably located spots in the interior. By artificial protection some of these fruits (pine apples for instance) are grown well up in the orange district. Citrus fruits are grown in Central Florida (the upper half of the peninsula), near the mouth of the Mississippi and to some extent in extreme Southern Texas. Most of the fruits classed as "hardy" are grown throughout the South and many of them farther north, but the varieties which succeed in the upper part of the Coast Belt, and to some extent are to be found well down in the Citrus region, are entirely distinct and peculiar.

#### I. HARDY FRUITS.

Peaches, pears, plums, kaki, grapes, strawberries, pecans, olives, figs, loquats, pomegranates, mulberries, quinces, dewberries, blackberries, chestnuts, apricots and apples comprise the list of "hardy" fruits, named, as nearly as possible in the order of their importance. The first six are of commercial importance; they are largely grown for shipment to outside markets, and the area planted, already extensive, is being rapidly increased.

*Peaches.*—The comparatively recent impetus given peach culture is the direct result of the discovery and dissemination of valuable varieties perfectly and peculiarly adapted to this region. Compared with other parts of the country the climatic conditions of this southern south are unique, even differing radically from that of contiguous territory in the south. Almost without exception varieties of peaches which thrive farther north are worthless here. A few years ago, as the result of experi-

ments with varieties of Persian (Northern) type, peaches were pronounced a failure. Now a very large and rapidly extending area is in cultivation and the Gulf Coast region promises in the near future to become one of the heaviest peach producing districts in the country.

The varieties grown are grouped into classes or types as follows: "Peen to," "Honey," "Spanish," "Northern Chinese" and "Oriental Bloods." The Peen-to and Honey groups, each comprising the parent from which the type takes its name and numerous seedlings and crosses, and the Oriental Bloods, which promise a new line of varieties, with a few exceptions of the Honey class, all belong exclusively to the Gulf region. The Chinese Cling and its decedents (Northern Chinese type) have a more northern range, but some varieties succeed in the upper Gulf region.

The adaptedness of the Peen-to to semi-tropic conditions awakened a new interest in peach culture, and led, after the introduction, to experiments in entirely new lines. Attention was turned to natives. It was found that a distinct race of peaches exist in the extreme South from Florida to Mexico, including a wide range of varieties which time immemorial, had propagated themselves from the seed, and which in quality equaled those grown farther north. Indeed many were so like well-known kinds as to suggest their being prototypes or anti-types of their Persian cousins.

Florida and the Gulf region has the first month of the peach market at the North to itself and for another month is able to compete with the peaches of Georgia and the South. In addition to these is a good local market throughout the season, which a succession of varieties extends from May until October.

*Pears, Plums and Kaki.*—The introduction of the so-called Oriental pears was another era-marking event in Gulf horticulture. The cultivation of the Le Conte for shipping, drying and canning, as well as for home market and consumption, has already become a large industry, and is rapidly increasing. While a poor fruit by comparrison it is the first in market and yields a good profit. How far south it will succeed, and consequently how early it can be ripened, remains to be seen. It promises well throughout the orange

belt. The Keiffer, a large, handsome fruit, superior to the California Bartlett and a really good desert pear, is being extensively planted. It is probable that from the foregoing and other varieties of the same class new varieties of superior excellence will be developed.

Native plums, including some Chickasaw varieties, thrive and afford an abundance of fairly good fruit for home consumption. Here again the "Orientals" come in—mostly from Japan and of recent introduction. They are at home here, some everywhere, others in particular locations. No great quantity of fruit has yet been produced, but there is every reason to believe they will enable us to place superior plums beside our peaches and pears in market.

The Kaki (to which the name Japan persimmon still clings) is no longer an experiment. This fruit succeeds without reservation or qualification throughout the Semi tropical and Semi temperate sections of this region.

*Grapes and Strawberries.*—Many varieties of grapes are now successfully grown and the list is increasing. Great interest is taken in viticulture, especially in Florida. We hear a good deal about the "grape boom" that has struck the state, and hundreds of acres are being planted in vineyards annually. The first grapes in market, black, red and white, are from Florida, and the quantity will increase enormously within the next ten years. Ives, Delaware and Niagara are the leading sorts in each color. The latter seems especially adapted to the country and has been largely planted. Viniferas of the Chassellas class thrive, bear well and are profitable for early shipment.

The above refers to table grapes. Wine grapes are not receiving as much attention but do as well. Connoisseurs declare Florida clarets, hocks, sauternes and wines of this class to be unequaled by any native (American) production.

The strawberry industry increases from year to year as the facilities for transportation (in refrigeration) are improved and extended.

## II. CITRUS FRUITS.

At the Ocala meeting the varieties and culture of citrus fruits was discussed at length, carefully prepared papers being read by such eminent special-

ists in this field as Messrs. Hart, Moore, Bielby and Kedney. But little can be added under this head to the report of that session.

At that time the citrus groves of Florida had just recovered from the effects of the big freeze of 1886, the most severe up to that time in the history of orange growing in this state, which reaches back to 1835. The year after the Ocala meeting (1890) a "bigger freeze" visited the state; it came in March, the damage resulting being due to the lateness of the season rather than the degree of cold. The oaks, hickories and other forest trees suffered in common with the orange trees, all being in lush growth. The injury to the trees was everywhere felt and some young groves and groves still suffering from the cold of '86 succumbed entirely. No diminution in the annual production was felt, however, the crop of the state having increased steadily and in unchanging ratio for the past six years.

The planting of lemons has greatly increased in the southern portion of the orange region during the past two years, and pomelos, (or grape fruit) are being extensively set out, some going as far as to rebud bearing orange groves with this fruit. The demand at good prices for lemons is practically unlimited and pomelos are most sought, the supply being insufficient.

It will be noted that a number of species and varieties have been added to the catalogue.

### III. TROPICAL FRUITS.

The tropical fruit interest has been steadily expanding, an occasional cold snap cutting off a tender growth, or materially shortening a crop, has proved a blessing in disguise, discouraging wild speculation, and helping to keep the industry upon a fine economic basis.

All along the lower Indian river and two hundred miles of Reef Keys, which border the southern coast of this peninsula, the pineapple is a permanently profitable crop. At the present time several of the largest growers own and run their own sail vessels to New York, but this method of transportation is not to be recommended as delays, which are sometimes unavoidable, often result in loss of entire cargoes. The inland transportation is improving every year and before half

the available land can be brought into cultivation, fancy ripe fruit can be laid down in the eastern market in from forty-two to sixty hours.

*The Pineapple.*—The development of the pineapple industry in the last few years has been phenomenal, is but a feeble expression as compared with the facts. On Indian River alone there are (1891) about 500 acres planted, one-half of which in partial fruitage has produced this year not less than one million "pines." The crop from a single plantation (that of Captain Thomas E. Richards at Eden, comprising forty acres) *selling on the plants* for \$18,000.

The limit of successful cultivation on the main land of the east coast is about the 28th parallel of north latitude, and on Merritt's Island it extends about half a degree further north. Within this limit the acreage is being extended with great rapidity, in some places it has more than quadrupled the past year. In fact the only limit has been the supply of plants.

About 500 acres have been prepared for planting this year along the east coast, but owing to scarcity of slips not over two-thirds of this area will be set this season. Schooners are kept cruising through the Bahamas picking up slips but find it difficult to obtain cargoes even there.

*The Cocoanut.*—Second in importance only to the pineapple, the cocoanut is taking a prominent place, and on the coast from Lake Worth to Charlotte Harbor its lofty plume-blue crown may be seen in an almost unbroken line, growing and fruiting abundantly even down to the sifting sands of the seashore. Its profitableness as a market fruit has yet to be determined. The crop is too bulky to be handled cheaply, and at the present price of labor and transportation, new methods of handling and getting it to market must be devised if it is to be sold at a profit.

*The Guava and Mango.*—Guavas are planted to a considerable extent, and the establishment of factories to work up the product into jellies, marmalades, etc., is doing much to stimulate the industry.

The Mango, next to the Guava, is of most importance of tropical fruits. Unlike the latter it can be safely shipped a long distance. Mr. White, of Indian River, says: "From our 'island home'

we shipped Mangoes this season to New York, where they sold for \$3.50 per (vegetable) crate. These were the first shipped to a distant market from this part of the state."

### On New Fruits.

*To the President and Members of the American Pomological Society.*

Your Committee on New Fruits report on the new fruits exhibited during this session as follows:

#### APPLES.

*Palouse.*—Large and very handsome; roundish, oblate, and deeply ribbed or scalloped; color, bright yellow with broad red stripes, or blush; stalk, long and slender; cavity very deep; calyx closed, set in a deep basin; seed capsules very large; flesh, tender, mildly sub acid. It appears to be a good keeper, and the tree is reported as a most prolific bearer. Specimens received from George Ruedy, Whitman County, Washington, grown from mixed seed sent from Illinois.

*Globe.*—Exhibited by Rev. Joseph A. Buck, Rock Creek, D. C. Size, good medium; roundish, slightly conical; color, dull red, striped darker, yellowish towards the calyx; quality, good; season, winter.

*Dudley's Winter.*—Exhibited by J. W. Dudley, Castle Hill, Me. Large; roundish; color, light yellow with reddish cheek; quality, good; hardy in the North. Three other seedling apples shown by the same exhibitor.

*Lehigh Valley Greening.*—Exhibited by W. B. K. Johnson, Allentown, Pennsylvania. Resembles the Rhode Island Greening, but is rather more oblong, and has less blush. A promising winter variety.

*Paragon, Kinnard, Cove, Gilbert.*—Exhibited by W. L. Moores, Cyruston, Tenn. All seedlings of Winesap, improved in size.

#### PEARS.

*Lincoln.*—Exhibited by W. E. Jones, Lincoln, Illinois. Size, medium; form, pyriform, obtuse; color, yellow, slight blush; quality, good; use, family and market; season, late summer. Free, strong grower, prolific, perfectly hardy in Illinois.

#### QUINCES.

*Unnamed Seedling.*—Exhibited by W. B. K. Johnson, Allentown, Pa. Resembles the orange; claimed to be more prolific.

#### PEACHES.

*Albright.*—Exhibited by H. M. Engle, Marietta, Pa. White, splashed and shaded with carmine; very large, nearly round, with distinct sutures; flesh, white, very juicy, rich and vinous; melting red at stone which is large and deeply corrugated; perfectly free; very promising.

*Seedling (unnamed).*—Exhibited by Miss Robena Taylor, Washington, D. C. A peach of the Smock type, large, globular with faint suture and depressed apex. Dull yellow, with deep carmine next the sun; flesh, yellow, firm, quite dry, but fairly good quality, bright red at stone. Stone, large pointed and deeply corrugated, very free, worthy of further trial.

*Excelsior (now named Crosby).*—Exhibited by J. H. Hale, South Glastonbury, Conn. Medium size; generally of a globular form with indistinct suture; color, brilliant orange, largely overspread with carmine deepening into a dark crimson; flesh, yellow, firm, sweet, rich and pleasant, deep red at stone which is small; parts from stone free and dry; quality, good. Notes accompanying the exhibit state that it is an annual, heavy bearer; owing to hardness of trees and blossoms it is very promising.

*Seedling.*—Exhibited by F. Chain & Co., Baltimore, Md. Very late; cling; worthy of further trial.

*Taylor.*—Exhibited by H. James Kintz, Alexandria, Va. Originated from seed in the yard of Mrs. Kate U. Taylor. It is reported as a hardy grower and prolific bearer; has a deep red flush color; free stone; never splits at the pit; good flavor, and very much represents the Early Crawford; ripens about the 12th of September; hangs well on the tree, and has its full color two weeks before ripening; grows of a uniform size fully as large as a Crawford.

#### GRAPES

*Brilliant.*—Exhibited by E. Williams, Montclair, N. J., and G. W. Campbell, Delaware, Ohio. A cross between Lindley and Delaware raised by T.

V. Munson, Texas. Berry, medium, large, round; long bunch, compact; color, reddish purple with bloom; quality, very good; season, medium, following Concord.

*Colerain*.—Exhibited by the Colerain Grape Co., Colerain, Ohio. Size, above medium; bunch, medium, loose; color, green to yellow; translucent when ripe; quality, very good; season, early.

*Unnamed Seedling*. Exhibited by Geo. W. Campbell, Delaware, Ohio. Size, medium; shape, slightly oblong; bunch, short, medium; color, black; quality, crisp, best; season, medium.

## SMALL FRUITS.

*Harrison (Black Cap)*.—Exhibited by R. G. Chase & Co., Geneva, N. Y. Size, medium to large; rather dry, firm; black, with less bloom than Gregg; good, promising for market.

## NEW FRUITS REPORTED SINCE THE LAST SESSION.

President P. J. Berckmans, Augusta, Georgia, reports:

## APPLES.

*Queen of Haywood*.—4 by  $2\frac{3}{4}$  inches; oblate; skin, pale yellow, nearly covered with light crimson and a darker carmine cheek, darker stripes and large grey dots; calyx closed in a very shallow basin; stalk in a deep narrow cavity; flesh, white, brittle, sub acid; quality, good; tree, very healthy and vigorous; seedling of Hoover—originated by H. Inman, Haywood Co., N. C. A very showy, valuable market apple. Maturity, October to November.

*Hargrove*.— $3\frac{3}{4}$  by  $3\frac{1}{4}$  inches; nearly round; skin, golden yellow, often with a bright crimson cheek, a few faint stripes at base, and some russet; skin, very smooth; calyx protuberant and open, surrounded with corrugations; stalk, short, in a shallow cavity; flesh, crisp, brittle, white, Pearmain flavor, sub-acid; best maturity, November to January; a very showy fruit; origin, in orchard of W. Campbell, on head waters of Jonathan Creek, Haywood Co., North Carolina.; introduced by W. H. Hargrove.

*Pine Stump*.— $3\frac{3}{4}$  by  $3\frac{1}{4}$ ; slightly conical; deep orange with a dark brown crimson cheek on the sunny side and a little lighter in the shade, streaked, with numerous white dots; calyx open

and in a shallow corrugated basin; stalk, short, in a narrow cavity; flesh, yellow, crisp, sugary and of a moderate flavor; quality, good; maturity, middle of September; a very showy fruit and excellent market apple; origin, Granville County, N. C.; tree spreading, thrifty and very productive.

## PEACHES.

*Sueed*.—Origin, Centerville, Miss., large (9 inches), globular; skin, creamy white with carmine penciling like the Chinese flesh melting, very juicy, sprightly, subacid; quality, best; free stone. Matures ten to twelve days before Alexander, an extra fine early fruit.

J. H. Hale, South Glastonbury, Conn., reports: Fewer new fruits have been brought out within the past two years than in any like period for the last twenty years.

## BLACKBERRIES.

*Erie and Minnewaska*.—Neither of them have been introduced during the past two years, still, it is only within that time that they have been tested thoroughly enough to speak of their merits. Erie is a strong, stocky growing plant with us here and does not branch very freely; so far it has proved perfectly hardy; extremely productive of very large berries, and more globular than any other blackberry I know of. Our crop this season has been about two hundred and fifty bushels to the acre, and the berries have averaged an inch and a quarter, largest diameter, by an inch, cross diameter. They are a jet, glossy black, with very little hard core in the center; a very productive and profitable market berry but not of first-class quality for table use. Minnewaska has a well-branching habit of growth, somewhat similar to the old Wilson's Early, although rather more branching and with not so stout canes. This is also very productive, and the fruit very round, similar to the Erie; although not quite so large it is of better quality, and while fully as valuable for market purposes, I think will give more satisfaction in the family garden; the plant appears to be perfectly hardy.

## STRAWBERRIES.

*Gandy*, while very large, fine, and late to ripen, is rather unproductive and I doubt if it will long hold its place among the standard sorts.

*Middlefield*, on light lands is a failure, but, on a deep, moist soil, it is a wonderfully productive variety of large, high colored berries of fairly good flavor.

*Yale* is vigorous in plant, productive, of large size, very dark, dull colored berries, somewhat similar to the old Seth Boyden, only without its green tip; the quality is very fine, and, as it ripens extremely late, will prove a valuable sort, at least, for the family garden.

*Bubach and Haverland* are "rough and ready" berries, somewhat of the Crescent style of growth and productiveness, and being of large size and very productive, they are profitable market sorts, but neither of them good enough for the family garden.

*Michael's Early* is a tremendous grower and an early, perfect bloomer, making it valuable as a pollenizer to the early pistillate varieties; it also matures its fruit among the very earliest, is of fair size and quality, and, all in all, is the most valuable perfect flowering strawberry I know of, especially for light lands.

*Parker Earl* is vigorous in plant but sets more fruit than it is usually possible to bring to perfection; otherwise, it is a valuable sort.

*Beeder Wood* is a very strong, growing plant and productive, of large size, fine colored and fine flavored berries; one of the best of the new sorts.

*General Putnam* is somewhat after the Cumberland in plant growth and in the form and color of the berry; just about perfect in form, like the small end of a hen's egg; each berry looks as if it might have been run through a mould; the average size is rather above that of the Cumberland, and, while the fruit is somewhat soft, it is of a fine flavor and gives promise of being one of the very best family varieties.

*Swindle* is another new variety; in plant growth and appearance of the berry very similar to the Gandy but is fully four times as productive as that variety, and of better quality; it ripens extremely late and has a pistillate blossom, as has also the General Putnam.

## PEACHES.

*The Excelsior (now named Crosby)*, which originated in Northern Worcester County, Mass., promises to be one of the very best sorts for a

cold climate, as the fruit buds are so extremely hardy as not to cause a failure in that section and in Southern New Hampshire for ten years past, where there were only two moderate crops of the other standard varieties. The fruit is somewhat similar to the Late Crawford, except not quite so dark colored and has a somewhat smaller pit.

## CURRANTS.

*The North Star* I have seen in Minnesota where it promises well; plants put out there last spring are making even stronger growth than the Victoria, which in the past has been our most vigorous variety.

T. H. Hoskins, Newport, Vt., reports: Regarding the new fruits, I have a large number of the Budd-Gibb Russian apples, pears, plums, and cherries growing finely in my orchards. They all seem to be sufficiently hardy for this climate, and the fruit so far as we have got any, is encouraging in its appearance, size and quality.

*The Bessemianka Pear* is bearing this year for the first time. I have had just a few specimens of plums and cherries, the trees of which winter well and grow thriftily. Among the apples are some long keepers of good size, color, and quality; but regarding all these experiences teaches me that it is much better to take time before expressing decided judgment in points. We have but little fruit of any kind this year, having had our trees overladen last year. If I am spared, I hope to be able to furnish notes upon a good many varieties which will be a better showing than before what their true value may be. With regard to older sorts, I may say that among apples Yellow Transparent, Prolific Sweeting, Oldenburgh, Wealthy, and Scott's Winter are best adapted for commercial planting in Northeastern Vermont.

Chas. A. Green, Rochester, N. Y., reports: The new fruits worthy of note are:

*Strawberries*.—Parker, Earle, Farnsworth, and Lovett's Early.

*Pears*.—Idaho, Wilder, Early, and Vermont Beauty.

*Peaches*.—Elberta.

*Plums*.—Botan and Saratoga.

*Grapes*.—Major, Eaton, and Diamond.

*Currants*.—Moore's New Seedling (not named).

*Raspberries*.—Gladstone, New Seedling by F. W. Loudon, Janesville, Wis. (not named).

J. S. Harris, La Crescent, Minn., reports: None of the varieties of the domestic plums are sufficiently hardy to withstand the severity of the climate of the Northwest; we must, therefore, turn our attention to the native species to find substitutes. The De Soto, a variety found on the Mississippi river in Illinois, nearly opposite Lansing, Iowa, was about the first variety brought to notice, and has been more extensively propagated and disseminated than any of the kinds which have been introduced from time to time. The newer candidates for favor are the Rolling Stone, which was found at Minnesota City, Minn., and the Cheney, found in Vernon County, Wis.

*The Cheney* is a large, round, red plum, beginning to ripen about August 15th, and ranks among the very best for canning and cooking.

*The Rolling Stone* is a round plum from medium to large; nearly free stone; pulp, meaty and sweet; color, red and purple; quality, dessert and eating from the hand the very best.

Newer varieties not yet disseminated are:

*Kniedsen's Peach*.—Large, red, round; skin, thin; pulp, meaty; free stone; flavor sweet and rich.

*Piper's Peach*.—Large, round; color, light red.

*Ocheeda*.—Large, yellow, blotched, with deep red on sun side; flesh, orange yellow, meaty; sweet apricot flavor; pit, small, oval, thick, nearly free stone.

*Gaylord*.—Large, yellow clouded pinkish red; very good.

In addition to these there are a few seedlings at New Ulm, Minn., of very large size and fine appearance.

The most promising varieties of apples that have originated in the Northwest and recently come into notice are the Peerless, Okobena, and Patten's Greening, also Catharine. The Peerless is believed to be a seedling of the Oldenburgh and originated with Geo. Miller, of Rice County, Minn., about twenty-four years since. It is a red striped apple of Medium size, sub-acid flavor, good quality; season, January to March. Okobena originated in Nolles County, Minn., original tree is about eighteen years old; fruit, medium; size, form and

color much like the Duchess; flavor sub-acid, good; season, October to December. Patten's Greening is a seedling of the Oldenburgh; about twenty years old; originated in Floyd County, Iowa; size, medium to large; color, greenish yellow with blush cheek; flavor, pleasant acid; season, early winter.

*Catherine*—Originated in Houston County, Minn., from a seed brought from Canada and planted in 1857; fruit, medium to large, very fair; color, greenish yellow, and brownish red on sun side; flavor, sub-acid; good; season, late autumn.

Wm. Watson, Brenham, Texas, reports: I have no new fruits of any special merit to report except the Japan plums. All the sorts we have tried are very promising and will be valuable here; I will name Kelsey, Ogon, Botan, Burbank, Satsuma, Hattankio, Chabot, and Batankio. We have fruited them long enough to recommend them. We have a number of new peaches and grapes but our lists are long enough now and unless we find some extra fine, I would not recommend them.

It is gratifying to note an increasing tendency among nurserymen, as well as fruit growers, to discourage the naming and introduction of new fruits which do not possess points of decided superiority, not already found in older varieties.

All of which is respectfully submitted.

F. M. HEXAMER,

Chairman, Committee on Native Fruits.

#### On Fruits Exhibited.

*To the President and members of the American Pomological Society:*

Your Committee on Fruits Exhibited report the following awards:

WILDER MEDALS—SILVER.

Virginia State Board of Agriculture, represented by Henry L. Lyman, Charlottesville, Va., for 335 plates of apples, 27 plates of pears, 78 varieties of grapes, 5 plates of plums.

P. J. Berekmans, Augusta, Ga., for 8 varieties of Japanese persimmons, 1 plate *Limonium trifoliatum*, 2 plates of Kieffer pears, 1 plate of Hawaii pears, 1 plate *Juglans praeparturiens*, 4 varieties *Pyrus Japonica*, 3 varieties of figs.

Rev. Lyman Phelps, Sanford, Fla., for 8 varieties of lemons, 5 varieties of limes, 4 varieties of

Japanese persimmons, 1 plate pomelos, and a highly instructive collection of citrus hybrids and crosses.

Ellwanger & Barry, Rochester, N. Y., for 112 varieties of pears.

## BRONZE MEDALS.

Chas. H. Hedges, Charlottesville, Va., for 78 plates of grapes.

Luther Burbank, Santa Rosa, Cal., for a collection of seedling quinces.

J. S. Harris, La Crescent, Minn., for 28 varieties of apples.

Wisconsin Horticultural Society, Madison, Wis., for 39 varieties of apples.

Jewell Nursery Company, Lake City, Minn., for a collection of 26 seedling apples.

P. S. Dinsmore, Riverside, Cal., for 29 plates of apples.

J. W. Porter, Piedmont, Va., for 52 varieties of apples.

J. L. Babcock, ———, Va., for 130 plates of apples.

## SPECIAL MENTION.

H. S. Williams, Rock Ledge, Fla., for exhibit of pineapples from Indian River.

S. A. Birch, Coveseville, Va., for 4 plates of superior market apples.

A. M. Lybrook, Stuartburg, Va., for 8 varieties of notable excellence.

T. V. Munson, Dennison, Texas, for 17 plates of apples, and 1 plate of Keiffer pears.

R. A. Wickersham, Clearbrook, Va., exhibit of notably well-grown peaches, comprising Heath, Garey, and Smock.

## OTHER FRUITS EXHIBITED.

I. J. Blackwell, Titusville, N. J., 8 plates seedling apples, 1 plate peaches.

A. N. Brown, Wyoming Del., 7 plates apples.

Prof. J. L. Budd, Ames, Iowa., 2 specimens Japanese pear, 2 specimens Chinese Snow pear.

A. J. Curtis, Bennings, D. C., 2 plates apples, 1 plate Kieffer pear.

P. S. Dinsmore, Riverside, Cal., 2 plates oranges.

H. M. Engle & Son, Marietta, Pa., 2 plates paragon chestnuts, 2 plates peaches.

W. W. Farnsworth, Waterville, Ohio., 2 plates apples, 2 plates pears.

Fitzwater Pear Co., Himrods, N. Y., 1 plate Fitzwater pears, 1 plate Lawrence pears.

G. W. Garcelon, Riverside, Cal., 2 plates Lisbon lemons.

A. L. Hatch, Ithaca, Wis., 1 large plate of McMahan's white apples; 4 varieties pears.

W. R. Lippincott, Fellowship, N. J., 1 plate apples.

J. T. Lovett, Little Silver, N. J., 1 plate Fuller quinces.

H. E. McKay, ———, Miss., 3 plates apples.

Seth Lewellyn, Milwaukee, Oregon, 1 plate Coe's Golden Drop plums.

W. M. Munson, Orono, Me., 8 varieties apples.

G. T. Raub, Four Mile Run, Ga., 2 varieties pears, 10 varieties apples.

Chas. H. Tunnel, Georgetown, D. C., 1 plate Pyrus Japonica.

C. A. Uber, Falls Church, Va., Wild Vine Muscadine grape.

Chas. Wright, Seaford, Del., 11 varieties apples.

E. Williams, Montclair, N. J., Munson's new grape Brilliant, a plate of Lindley, Niagara, and Brighton; also two plates of apples and one of pears.

Respectfully submitted,

F. M. HEXAMER,

W. C. STRONG,

D. W. ADAMS,

W. A. TAYLOR.

## On Credentials.

MR. STRONG: Mr. President, the Committee on Credentials report that there are 104 delegates who have presented their credentials. The number of States, we regret to say, and the boards from which these delegates have come, have not been presented to the committee. Perhaps it was the fault of the chairman of the committee that we did not require the certificates. We can only report that there are six delegates from Florida, two from New Jersey, and eight from Massachusetts, and that the report as to the other States is incomplete.

## On Resolutions.

BY CHARLES WRIGHT, OF DELAWARE:

*Resolved*, By the American Pomological Society in twenty-third biennial session assembled, that our thanks, and an expression of our appreciation are due

to Hon. Robert P. Porter, Superintendent of the Census, for the recognition he has given to Horticulture, and especially to provide in the Eleventh Census, through the division in charge of one of our members, Mortimer Whitehead, of New Jersey, for an enumeration of our orchards and vineyards and their products. The facts and figures already made public are of inestimable value, forming as they do the basis of our first national census of the interests represented by this Society.

*Resolved*, That it is the sense of this Society that the work so well begun under Mr. Whitehead's direction and so efficiently aided by special agents, J. H. Hale, H. Gardner and A. N. Brown, in the investigations covering Viticulture, Nurseries, Florists, Seed and Truck Farms, Tropic and Semi-Tropic Fruits and Nuts, and Peaches, and also the unfinished work upon the apple, pear plum, cherry and other orchard fruits and small fruit crops, be carried on to completion, and that the results be printed and published in a regular census volume of Horticulture, as already announced by the Superintendent, to the end that the large amount of work already prepared shall be of the greatest practical value to an industry that represents an investment of capital in our country of over one thousand millions of dollars.

DEPARTMENT OF AGRICULTURE.

WHEREAS, The United States Department of Agriculture, which is doing so much to advance the general condition of the industry it has under its care, and especially through its efficient Division of Pomology to foster the fruit-growing interests of our country, now of such national importance, has through its honored head, the Secretary of Agriculture, invited this Society to hold its twenty-third biennial session in the city of Washington; and

WHEREAS, In accepting this invitation, this Society has received the kind attentions of the Department of Agriculture from the Honorable Secretary, from the Assistant Secretary and from the various Divisions; therefore,

*Resolved*, That the thanks of the American Pomological Society in the closing hours of its twenty-third biennial session are gratefully due and are hereby tendered to the Hon. J. M. Rusk, Secretary of Agriculture, to Hon. Edwin Willits, Assistant Secretary, to Prof. H. E. VanDeman and his able assistants of the Division of Pomology, to Prof. J. T. Galloway, Erwin F. Smith and C. V. Riley, for their provisions for our comfort and convenience in the use of rooms for meetings and the exhibition of fruits, for their words of welcome, their valuable papers and untiring efforts to add to the pleasures and profits of our gathering and to all other attaches of the Department for their kindly assistance.

*Resolved*, That we hereby record our appreciation of the great work now being wrought by the Department of Agriculture in all its various divisions, our confidence in its management and to pledge our individual and

united support and to express our sentiments in favor of more liberal appropriations by Congress, in order that the Department may still move forward and extend its grand and useful work.

*Resolved*, That we will carry to our homes only the most pleasant memories of our sessions in the capital city of our country.

*Resolved*, That a copy of these resolutions be delivered to the Honorable Secretary of Agriculture.

BY ERWIN F. SMITH:

WHEREAS, The pomological statistics of the Tenth Census remained unpublished, and after collection and tabulation found their way into the waste basket on account of lack of funds; and

WHEREAS, The work on the pomological statistics of the Eleventh Census has been suspended for the same reason,

*Resolved*, That as fruit growers representing every section of the United States, we earnestly protest against this unjust treatment and request that consideration be given to a business involving millions of invested capital and representing thousands of votes; and

*Resolved*, That copies of this resolution be presented to the Chairman of the Ways and Means Committee of each House of Congress, and also to the Chairman of Census Committee of each House, with the request that the next Congress make suitable appropriations for the completion and publication of these statistics, and we hereby pledge ourselves as members of this Society to use our best endeavors with members of Congress to secure this end.

BY CHAS. W. GARFIELD:

*Resolved*, As the sense of this meeting, that the most entertaining and instructive feature of our biennial conventions is the free discussion of pomological topics of the day, in which members from all parts of the country give their observations and express their opinions concisely and freely.

*Resolved*, That, while we appreciate the desirability of publication in our transactions of valuable treatises upon pomological topics, we wish to emphasize the idea that it is a great compliment to be invited to present a carefully prepared essay for the transactions, which is in no wise diminished if it is simply furnished for publication and not read before the convention.

*Resolved*, That the officers of the Society be and hereby are urged in future programmes to give prominence to methods of securing sharp, lively discussions for the sessions and well prepared papers for publication.

BY T. T. LYON:

WHEREAS, It has become a somewhat frequent practice on the part of originators or introducers of new fruits to put forth such novelties under their own names with numbers appended; and,

WHEREAS, Such practice has already grown to be a

source of great inconvenience as well as of error and consequent confusion; therefore,

*Resolved*, That this Society will require, as a condition precedent to the discussion of such fruits, that they receive names in accordance with its rules in such case provided.

*Resolved*, That upon the request of the Chairman of the Committee on Revision of Catalogue, it shall be the duty of the chairman of each State Fruit Committee to supply such information respecting the varieties of fruits recommended or to be recommended for his State as shall be found needful for the perfecting of such revision so far as such State may be concerned.

### Invitations for Next Meeting.

Mr. Samuels, who had been present during the entire session read the following telegram:

"CHICAGO, ILLINOIS, September 22, 1891.

"*J. M. Samuels*,

Chief Department of Horticulture,  
Ebbitt House, Washington, D. C.

"Please extend invitation of World's Fair Management to American Pomological Society to meet in Chicago in 1893."

"GEORGE R. DAVIS,

"Director General."

MR. SAMUELS: It certainly affords me a great deal of pleasure to extend this invitation to one of the oldest and most influential horticultural societies in our country, and it is especially gratifying at this time, as I will need your advice and aid until the close of the World's Columbian Exposition. In all matters pertaining to pomology you will be consulted, and I will take it as a great favor if you will express your opinions freely in regard to the needs of the Horticultural Department. We may not always agree in our views, but we will try to work harmoniously and come as near together as we can. I would suggest that this Society appoint a committee such as they may wish to select to confer with the Horticultural Department of the World's Fair.

MR. WATROUS: There are a great many here who would be glad to see the great pomological show at Chicago, but who feel some degree of anxiety to know who shall be the Chief of the Bureau of Pomology there, and would be glad to know what is the feeling of the management of the fair, so far as known to Mr. Samuels, in regard

to filling that place. Of course it goes without saying that the head of that department would be the one that the members of this Society would have especially to do with, and therefore they have a right to feel a particular and personal interest in that office that they would not feel in any other one.

MR. SAMUELS: I will state that I have consulted the Director General and the Board of Local Directors before coming here, and they were all in favor of this Society indicating the man that will be Chief of the Bureau of Pomology.

MR. ADAMS: When Mr. Samuels was on the floor he gave this Society the first real recognition it has ever had. He has invited us to appoint a committee to act in conjunction with him and his department of the World's Fair for the promotion of the objects of our Society, and I would move that we accept his invitation and have a committee of suitable number appointed for that purpose.

The motion was carried.

MR. SAMUELS: I will further state that it will be necessary for this committee to come to Chicago on several occasions. The management has been liberal in the past, and I would state that the expenses and compensation of this committee will be provided for.

After due consideration the following persons were appointed on said committee: C. L. Watrous, of Iowa; Charles W. Garfield, of Michigan; D. W. Adams, of Florida; Frank Kimball, of California. William C. Barry, of New York.

On motion of Mr. Hexamer, the President of the Society was added to the committee and made its chairman.

MR. GARFIELD: Do I understand that this whole matter of deciding upon the place of our next meeting is referred to this committee?

MR. WATROUS: That was the order yesterday.

MR. GARFIELD: In order that this committee may have something more to do than has been referred to already, I wish, as representing the Michigan State Agricultural Society, believing that possibly there may be a contingency arise in which it may be desirable to meet somewhere not far from Chicago, to extend an invitation from the State of Michigan for the Society to hold its meet-

ing in 1893 within our State, and move that the invitation be referred to this committee.

The motion was carried.

CLOSING REMARKS OF THE PRESIDENT.

It has been my pleasure and privilege to have been a member of this Society for nearly forty years. Never have I seen a more enthusiastic meeting, where scientific problems were better understood and explained than we have had at this meeting. And further, the attendance has been

such—you have been so interested—that instead of the house thinning out at about 4 o'clock, as has been usual, you have all stayed here until the time of adjournment. For that, gentlemen, I am more than obliged to you. And now, in my own behalf, I thank you most heartily for the condescension with which you have borne my shortcomings. If my parliamentary knowledge is deficient, my will to do good for this Society you know is yours.

I now pronounce this Society adjourned until the call of the Executive Committee.

CATALOGUE OF FRUITS.



# LETTER OF SUBMITTAL.

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SOUTH HAVEN, MICH., December 23, 1891.

*To the President of the American Pomological Society:*

SIR.—In submitting the following report, the Chairman of the Committee on Revision takes occasion to remark that, having, at your suggestion, completed and submitted the usual revision of the Society Catalogue (excepting that on Semi-Tropical Fruits) in advance of the meeting of the Society in September last, the action taken at that meeting rendered such revision almost wholly nugatory, necessitating an entire re-revision.

The revision of the Tropical, Semi-Tropical and Sub-Tropical lists had been committed to Mr. A. H. Manville, of Florida, Chairman of the Committee on Semi-Tropical Fruits, who, obviously with great care and labor, very kindly supplied a mass of highly valuable information in aid of the revisory work. This material was received after the first revision had been submitted.

In the present revision, therefore, this material (which, in form, proved to be but partially adapted to the form of catalogue adopted by the Society) has been extensively interwoven into the appropriate sections, together with various items of value derived from other sources.

In the course of these revisions, the following, among other particulars, have impressed themselves upon the consideration of the revisor:

1. That the lists probably contain varieties as well as starrings which may fairly be supposed no longer to properly represent present preferences, but for the changing or retiring of which we have no adequate provision.
2. That the eliminating and adding of varieties in open session is liable to be too unwisely and hastily done, and therefore not to fully or properly express the matured convictions of those whose wishes may be supposed to be represented.
3. That a more trustworthy result may, perhaps, be secured by means of reports from local societies or from capable committees so far in advance of meetings of the Society that revisions may be prepared in advance, submitted to the criticism or approval of the Society at such meeting prior to acceptance.
4. That the customary review of the Catalogue in open session, with the liability to change upon the instance of transient and possibly even illy-informed attendants, may, and probably should be omitted, and matters developed during the sessions bearing upon its revision or modification be treated as being referred to the revisory committee, to be used at their discretion, subject, of course, to the final action of the Society in its acceptance or adoption of such committee's report.
5. That it is desirable to provide against hasty change of the Catalogue, resulting from a possibly preponderating local attendance from a single locality.

All of which is respectfully submitted.

T. T. LYON,

Chairman of Committee on Revision of Catalogue.



## PLAN OF CATALOGUE.

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The arrangement of the names of varieties in the Catalogue is alphabetical and according to the nomenclature adopted by the Society. The synonyms given are appended to the adopted names in italics.

The columns are arranged thus: In the first column the names of varieties, in the next seven columns the description, and in the remaining columns the States or Districts.

The State or District columns are not placed in alphabetical order, as in the octavo editions, but are grouped in *Divisions* somewhat similar in climate, and other characters affecting fruit culture. Thus: 1.—Northern Division—between 42° and 49°. 2.—Central Division—between 35° and 42°. 3.—Southern Division—between 28° and 35°.

The State or District in which a fruit is recommended for cultivation is designated by a star (\*) and if the variety is of great superiority and value, two stars (\*\*); if new or recently introduced and promising, by a dagger (†). A minus sign (—) shows that the variety has been tried and found, undesirable in the State or District indicated.

Prefixes, suffixes, apostrophe terminations and secondary words, together with words whose significations are expressed in the descriptive columns of the catalogue, are eliminated from the names of fruits, save in a few cases in which they may be needful to insure the identity of a variety, and in a few time honored names.

The Anglicising of foreign names is resorted to only in the interest of brevity or pronounceability. In questionable cases, subsidiary words are retained in parentheses.

# CATALOGUE

## Section I.—Anonas.

### Abbreviations for this Section.

COLOR.		FORM.		ORIGIN.
b-brown, g-green, p-pink,	r-red, w-white, y-yellow.	c-conical, k-kidney shape, o-ovate or oval,	ob-oblong, p-pear shape, r-round.	Usual abbreviations for countries, etc.

NUMBER.	NAME.	DESCRIPTION.						
		COLOR.	FORM.	ORIGIN.	SEASON.	SIZE.	QUALITY.	USE.
1	Beriba. ( <i>A. Beriba</i> ).....			S. Am.				
2	Cherimoya. ( <i>A. Cherimolia</i> ).....			S. Am.				
3	Custard Apple. ( <i>A. reticulata</i> ).....	g.	c.	W. I.	s.	l.	g.	d. m.
4	Pond Apple. ( <i>A. glabra</i> ).....			W. I.				
5	Sour Sap. ( <i>A. muricata</i> ).....	g. g.	c.	W. I.	s.	l.	g. g.	d. m.
6	Sugar Apple. ( <i>A. squamosa</i> ).....	g. g.	c.	.....	s. f.	m.	g. g.	d. m.

## Section II.—Apples (*Pyrus malus*).

### Abbreviations.

SIZE.	FORM.	COLOR.
l-large, m-medium, s-small.	r. c-roundish conical, r. ob-roundish oblate, r-roundish.	y. r-yellow and red, r. s-red striped, g. y-greenish yellow, rus-russeted, y. rus-yellow and russet.

# OF FRUITS.

## Section I.—Anonas.

### Abbreviations for this Section.

SEASON.	SIZE.	QUALITY.	USE.
s-summer, f-fall.	l-large, s-small, m-medium, v-very.	b-best, g-good, v-very.	m-near market, c-cooking, s-shipping, d-dessert.

NUMBER.	STATES.								
	Florida.	Georgia.	Alabama.	Mississippi.	Louisiana.	Texas.	New Mexico.	Arizona.	California.
1	**					*			*
2	*					†			*
3	*					†			*
4	*								
5	*								†
6	*					†			

## Section II.—Apples (*Pyrus malus*).

### Abbreviations.

QUALITY.	USE.	SEASON.	ORIGIN.
g-good, v. g-very good, b-best.	F-family use, K, M-kitchen and market. F, M-family and market.	S-summer, E, A-early autumn, L, A-late autumn, W-winter.	Usual abbreviations for names of countries.

NUMBER.	NAMES.	DESCRIPTION.						I.—N. Div.							
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts.	Rhode Island.
1	Alexander.....	l.	r. c.	r. s.	v. gg.	K. M.	E. A.	Rus.	*	*	*	*	*	*	*
2	American Beauty.....	l.	r. ob.	y. r.	v. gg.	F. M.	W.	Am.	*	*	*	*	*	*	*
3	American Golden. <i>American Golden Pippin</i> .....	l.	r. ob.	gg. y.	v. gg.	F. M.	W.	Am.	*	*	*	*	*	*	*
4	Anisovka.....							Rus.							
5	Arnold Beauty.....	m.	fl.	y. r.	v. gg.	F.	W.	Am.							
6	Aromatic Carolina.....	l.	fl.	y. r.	v. gg.	F.	A.	Am.							
7	Autumn Bough.....	m.	r. c.	gg. y.	v. gg.	F.	E. A.	Am.						*	
8	Autumn Swaar.....	m.	r. ob.	gg. y.	v. gg.	F.	L. A.	Am.							
9	Babbit.....														
10	Bailey Sweet.....	l.	r. c.	r. s.	v. gg.	F. M.	L. A.	Am.				*	*	*	*
11	Baker.....	l.	r. ob.	y. r.	v. gg.	K. M.	W.	Am.							
12	Baldwin.....	l.	r. c.	r. g.	v. gg.	F. M.	W.	Am.	**	*	*	*	*	*	*
13	Baltimore. <i>Cable's Gilliflower. Mahaska</i> .....	m.	r. c.	r. y.	v. gg.	F. M.	W.	Am.							
14	Baltzby.....	l.	r. ob.	y.	v. gg.	F. M.	A.	Am.							
15	Beauty of Kent.....	l.	r. c.	r. s.	v. gg.	K. M.	L. A.	Eng.		*	*	*	*	*	*
16	Beldn Sweet.....	m.	r. c.	y.	v. gg.	F.	W.	Am.							
17	Belmont.....	l.	r. c.	y. r.	v. gg.	F. M.	W.	Am.				*	*	*	*
18	Ben Davis. <i>New York Pippin</i> .....	l.	r. c.	y. r.	v. gg.	K. M.	W.	Am.	*			*	*	*	*
19	Benoni.....	m.	r. ob.	y. r.	v. gg.	F. M.	S.	Am.		+	*	*	*	*	*
20	Bentley Sweet.....	m.	r. ob.	gg. y.	v. gg.	F. M.	W.	Am.				*	*	*	*
21	Berkshire (Spy).....	m.	r. c.	r. s.	v. gg.	F.	E. W.	Am.				*	*	*	*
22	Bethlemite.....	l.	r. ob.	y. r.	v. gg.	F. M.	W.	Am.				*	*	*	*
23	Bevan. <i>Bevan's Favorite</i> .....	m.	fl. c.	y. r.	v. gg.	F.	S.	Am.				*	*	*	*
24	Black (Jersey).....	m.	fl.	d. r.	v. gg.	F.	W.	Am.				*	*	*	*
25	Blenheim (Pippin).....	l.	r. ob.	y. r.	v. gg.	F. M.	W.	Eng.	**	*	*	*	*	*	*
26	Blue Pearmain.....	l.	r. c.	r.	v. gg.	M.	W.	Am.	*	*	*	*	*	*	*
27	Bonum.....	l.	r. ob.	y. r.	v. gg.	M.	L. A.	Am.				*	*	*	*
28	Borovitzky.....							Rus.							
29	Bourassa.....	m.	r. c.	y. r.	v. gg.	M.	L. A.	Ger.				*	*	*	*
30	Bowen (Favorite).....	m.	r. ob.	r.	v. gg.	M.	A.	Am.				*	*	*	*
31	Bower Nonpareil.....	l.	fl.	y. r.	v. gg.	F. M.	W.	Am.				*	*	*	*
32	Bowling Sweet.....	m.	r.	y. r.	v. gg.	M.	L. A.	Am.				*	*	*	*
33	Broadwell.....	m.	r. c.	gg. y.	v. gg.	F. M.	L. A.	Am.	*	*	*	*	*	*	*
34	Broadwell Sweet.....											*	*	*	*
35	Brittle Sweet.....	m.	r. c.	r. s.	v. gg.	F.	E. A.	Am.				*	*	*	*
36	Brown. <i>Nottingham Brown</i> .....	l.	fl.	r. s.	v. gg.	F. M.	L. A.	Am.				*	*	*	*
37	Bruce (Summer).....	l.					S.	Am.				*	*	*	*
38	Buckingham. <i>Fall Queen of Kentucky. Bachelor, Equinately</i> .....	l.	r. ob.	y. r.	v. gg.	F. M.	E. W.	Am.				*	*	*	*
39	Buff.....	l.	r. ob.	y. r.	v. gg.	F.	W.	Am.				*	*	*	*
40	Buffington.....	m.	fl.	y.	v. gg.	F.	S.	Am.				*	*	*	*
41	Bullock (Pippin). <i>American Golden Russett</i> .....	s.	r. c.	y. rus.	b.	F. M.	W.	Am.				*	*	*	*
42	Buncombe.....	m.	r. ob.	y. r.	v. gg.	F. M.	W.	Am.				*	*	*	*
43	Burlington. <i>Burlington Pippin</i> .....	m.	fl. c.	y. r.	v. gg.	F. M.	W.	Am.				*	*	*	*
44	Cadwallader. <i>Cadwallader's Golden</i> .....	m.	r. ob.	y.	v. gg.	K. M.	W.	Am.				*	*	*	*
45	Calef Sweet.....	l.	r. ob.	y.	v. gg.		W.	Am.				*	*	*	*
46	Calkin. <i>Calkin's Pippin</i> .....	l.	r. c.	y. r.	v. gg.	F. M.	W.	N. S.	*	*	*	*	*	*	*
47	Camack Sweet.....	m.	r. ob.	y.	v. gg.	F. M.	W.	Am.				*	*	*	*
48	Campfield.....	m.	r. ob.	gg. r.	v. gg.	M. K.	W.	Am.				*	*	*	*
49	Canada Baldwin.....	m.	ob.	r.	v. gg.		W.	Can.	*	*	*	*	*	*	*
50	Canada Reinette.....	l.	r. c.	gg. y.	v. gg.	F. M.	W.	F.	*	*	*	*	*	*	*
51	Cannon Pearmain.....	m.	r. c.	r. s.	v. gg.	F.	W.	A.				*	*	*	*
52	Carolina Watson.....	m.	fl. c.	gg. y. r.	v. gg.	M.	S.	Am.				*	*	*	*
53	Carter Blue.....	l.	r. ob.	gg. r.	v. gg.	F. M.	E. A.	Am.				*	*	*	*
54	Cane Creek Sweet.....	m.	r.	y.	v. gg.	F.	S.	Am.				*	*	*	*
55	Chattahoochee.....	m.	fl.	y.	v. gg.	M.	W.	Am.				*	*	*	*
56	Chenango (Strawberry). <i>Sherwood Favorite</i> .....	m.	ob. c.	gg. r.	v. gg.	F. M.	E. A.	Am.	*	*	*	*	*	*	*
57	Clark Pearmain.....	m.	r. ob.	y.	v. gg.	M.	W.	Am.				*	*	*	*
58	Clayton.....	l.	c.	y. r.	v. gg.	F. M.	W.	Am.				*	*	*	*
59	Clyde (Beauty).....	l.	r. c.	gg. r.	v. gg.	F. M.	W.	Am.	*	*	*	*	*	*	*
60	Cooper.....	l.	r. ob.	gg. y.	v. gg.	M.	L. A.	Am.				*	*	*	*
61	Cooper Market.....	m.	r. c.	y. r.	v. gg.	M.	W.	Am.				*	*	*	*
62	Cooper Early.....	m.	r.	y.	v. gg.	M.	A.	Am.				*	*	*	*
63	Cogswell.....	m.	r. ob.	y. r.	b.	F. M.	W.	Am.				*	*	*	*

1. Moderate bearer; showy; hardy.

12. In Vermont adapted only to the Southern and Western part of the State south of Burlington.



NUMBER.	NAMES.	DESCRIPTION.							I.—N. Div.						
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick.	Maine.	New Hampshire.	Vermont.	Massachusetts.	Rhode Island.
64	Cole Quince.....	l.	r. ob.	g. y.	v. g.	F. M.	W.	Am.							
65	Colvert.....	l.	r. ob.	y. r.	v. g.	F. M.	L. A.	Am.	*						
66	Cornell.....	m.	ob.	y. r.	v. g.	F. M.	L. A.	Am.	*						
67	Cox Orange, (Pippin).....	m.	ob.	y. r.	v. g.	F.	E. A.	Eng.	*						
68	Cracking.....	l.	r. ob.	y.	v. g.	K.	L. A.	Am.							
69	Creek.....	m.	fl. c.	y. r.	v. g.	F. M.	W.	Am.							
70	Cross.....	l.	r. ob.	r. s.	v. g.	F. M.	S.	Am.							
71	Cullasaga.....	m.	r. c.	y. g.	v. g.	M.	W.	Am.							
72	Curtis Sweet.....	l.	r. c.	y. r.	v. g.	K.	L. A.	Am.							
73	Danvers Sweet. <i>Danvers Winter Sweet</i> .....	m.	r. ob.	g. y.	v. g.	F. M.	W.	Am.			*	*	*	*	*
74	Detroit Red.....	m.	r. ob.	r.	v. g.	F. M.	E. W.	Am.							
75	Disharoon.....	m.	r. c.	g.	v. g.	F. M.	A.	Am.							
76	Dominie.....	m.	r. ob.	g. r.	v. g.	F. M.	W.	Am.							
77	Drap d'Or.....	l.	r. ob.	y.	v. g.	F.	S.	Ger.	*						
78	Dutch Mignonne.....	m.	r. ob.	r. s.	v. g.	M.	S.	Ger.							
79	Dyer. <i>Pomme Royal</i> .....	m.	r.	g. y.	v. g.	F.	E. A.	F.			*	*	*	*	*
80	Early Harvest.....	m.	r. ob.	g. y.	v. g.	F. M.	S.	Am.	*	*	*	*	*	*	*
81	Early Margaret. <i>Early Red Margaret</i> .....	m.	r.	r. s.	v. g.	F. M.	S.	Ger.			*	*	*	*	*
82	Early Joe.....	s.	fl.	y. r.	b.	F.	S.	Am.			*	*	*	*	*
83	Early Pennock.....	l.	r. c.	g.	v. g.	M.	S.	Am.			*	*	*	*	*
84	Early Strawberry. <i>Red Juneating</i> .....	s.	r.	r. s.	v. g.	F.	S.	Am.			*	*	*	*	*
85	Early Ripe.....	m.	r. ob.	y.	v. g.	F.	S.	Am.			*	*	*	*	*
86	Edgar Red Streak. <i>Walbridge</i> .....	l.	r. ob.	r. s.	v. g.	F.	W.	Am.							
87	Edward Early.....						S.	Am.							
88	Edward Winter.....														
89	English Russett. <i>Poughkeepsie Russett</i> .....	m.	r. c.	y. rus.	v. g.	F. M.	W.	Eng.			*	*	*	*	*
90	Esopus Spitzenburg.....	l.	ob.	y. r.	b.	F. M.	W.	Am.	*		+	*	*	*	*
91	Etowah. <i>Cooper's Red</i> .....	m.	ob. c.	y. r.	v. g.		W.	Am.							
92	Eustis.....	m.	r. ob.	r. s.	v. g.	F.	E. W.	Am.						*	
93	Entaw.....						A.	Am.							
94	Evening Party.....	m.	fl.	r.	v. g.	F. M.	W.	Am.							
95	Ewalt.....	l.	r.	y. r.	v. g.	M.	W.	Am.							
96	Excel.....	l.	ob. c.	y. r.	v. g.	F. M.	W.	Am.							
97	Fallowater. <i>Fornwalder, Tulpehocken</i> .....	l.	r. c.	g. y.	v. g.	M.	W.	Am.	+						
98	Fall Harvey.....	l.	r. ob.	g. y.	v. g.	M.	L. A.	Am.	+		*			*	
99	Fall Jenneiting.....	l.	fl.	g. y.	v. g.	M.	E. A.	Am.	*		+				
100	Fall Orange.....	l.	r.	y. r.	v. g.	K. M.	L. A.	Am.				*	*	*	*
101	Fall Pippin. <i>Holland Pippin, (erroneously)</i>	l.	r. ob.	g. y.	v. g.	F. M.	L. A.	Am.	*		+	*	*	*	*
102	Fall Queen. <i>Haus, Gross Pommier</i> .....	m.	ob. c.	y. r.	v. g.	F. M.	A.	Am.			*	*	*	*	*
103	Fall Wine.....	m.	r. ob.	r. y.	b.	F.	L. A.	Am.	*		*	*	*	*	*
104	Fameuse. <i>Pomme de Neige, Snow Apple</i> .....	m.	r. ob.	r. s.	v. g.	F. M.	W.	F.	*	*	*	*	*	*	*
105	Family.....	m.	fl. c.	y. r.	v. g.	M.	S.	Am.							
106	Fanny.....	m.	fl.	r. s.	v. g.	F. M.	S.	Am.							
107	Faust (Winter).....	m.	r.	y. r.	v. g.		W.	Am.							
108	Ferdinand.....	l.	fl.	o. y.	v. g.		W.	Am.							
109	Ferris.....	m.	r. fl.	y. r.	v. g.	F. M.	W.	Am.							
110	Fink.....	m.	fl.	y. r.	v. g.	M.	L. W.	Am.							
111	Fourth of July.....	m.	r. ob.	r. s.	v. g.	M.	S.	Ger.	+						
112	Foundling.....	m.	r. ob.	y. r.	v. g.	F.	A.	Am.			+	*	*	*	+
113	Fulton.....	m.	fl.	g. y.	v. g.	M.	W.	Am.							
114	Gabriel.....	m.	r. ob.	r. y.	v. g.	M.	L. A.	Am.							
115	Gano.....														
116	Garden Royal.....	m.	r. ob.	y. r.	b.	F.	S.	Am.			*	*	*	*	*
117	Garrettson.....	m.	r. c.	y.	v. g.	K.	A.	Am.							
118	Gideon.....														
119	Gilpin. <i>Carthouse, Little Romanite</i> .....	s.	r. c.	y. r.	v. g.	M.	W.	Am.				*	*	*	*
120	Golden Ball.....	l.	r.	y.	v. g.	F.	E. A.	Am.							*
121	Golden Russett of Western New York.....	m.	r. ob.	y. rus.	v. g.	F. M.	W.	Am.	*			*	*	*	*
122	Golden Sweet.....	l.	r.	g. y.	v. g.	F. M.	S.	Am.	*			*	*	*	*
123	Granite (Beauty).....	l.	r. ob.	y. r.	v. g.	F. M.	W.	Am.			+	*	*	*	*
124	Gravenstein.....	l.	r. ob.	y. r.	v. g.	F. M.	L. A.	Ger.	*		*	*	*	*	*
125	Green Cheese.....	m.	fl.	g. y.	v. g.	F. M.	W.	Am.							
126	Green Sweet.....	m.	r. ob.	g. y.	v. g.	K. M.	W.	Am.					*	*	*
127	Grimes Golden.....	m.	r. ob.	g. y.	v. g.	F.	W.	Am.	*				*	*	*

76. Productive and hardy.  
 79. Valued for dessert.  
 80. Succeeds best on strong soils.

82. A delicious table sort; tree of small growth.  
 83. Popular market sort.  
 84. Continues a long time after ripening.



NUMBER.	NAMES.	DESCRIPTION.						I.—N. Div.							
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick.	Maine.	New Hampshire.	Vermont.	Massachusetts.	Rhode Island.
128	Hall.....	s.	fl.	y. r.	v. g. g.	F.	W.	Am.							
129	Hamilton.....	l.	r.	y. r.	v. g. g.	F. M.	A.	Am.							
130	Haskell Sweet.....	m.	fl.	g. y.	v. g. g.	F.	E. A.	Am.							
131	Hawthornden.....	m.	r. ob.	g. y.	v. g. g.	K. M.	E. A.	F.							
132	Hartford Sweet.....	l.	r. ob.	r. s.	v. g. g.	M.	W.	Am.							
133	Hewes Crab. <i>Hewes' Virginia Crab</i> .....	s.	r.	y. r.	v. g. g.	Cider.	L. A.	Am.							
134	Higby Sweet.....	m.	r. c.	y. r.	v. g. g.	F.	L. A.	Am.							
135	High Top Sweet. <i>Sweet June</i> .....	s.	r.	g. y.	v. g. g.	F. M.	S.	Am.							
136	Hockett Sweet.....	m.	r. ob.	y. r.	v. g. g.	K.	W.	Am.							
137	Holland Pippin.....	l.	r.	g. y.	v. g. g.	K. M.	L. A.	F.							
138	Hoover. <i>Black Coal</i> .....	m.	r.	y. r.	v. g. g.	F. M.	W.	Am.							
139	Horn.....	m.	fl.	g. r.	v. g. g.	F. M.	L. W.	Am.							
140	Horse. <i>Haas</i> .....	l.	r.	y. r.	v. g. g.	K. M.	S.	Am.							
141	Hubbardston. <i>Hubbardston's Nonsuch</i> .....	l.	r. c.	y. r.	v. g. g.	F. M.	W.	Am.	**	**	**	**	**	**	**
142	Hunt Russet.....	m.	r. ob.	y. rus.	v. g. g.	F. M.	W.	Am.							
143	Huntsman. <i>Huntsman's Favorite</i> .....	l.	ob.	y.	v. g. g.	F. M.	W.	Am.							
144	Hurlbut.....	m.	r. ob.	y. r.	v. g. g.	F. M.	L. A.	Am.	+	+	*	*	*	*	*
145	Iowa Blush.....														
146	Irish Pippin.....	m.	r.	r. s.	v. g. g.	F. M.	E. W.	Am.							
147	Jefferson County.....	m.	r. ob.	y. r.	v. g. g.	F. M.	W.	Am.							
148	Jeffers.....	m.	r. ob.	y. r.	v. g. g.	F. M.	E. A.	Am.		+	*	*	*	*	*
149	Jersey Sweet.....	m.	r.	y. r.	v. g. g.	F. M.	E. A.	Am.							
150	Jewett Red. <i>Jewett's Fine Red</i> .....	m.	r. ob.	r.	v. g. g.	F. M.	W.	Am.	*	**	**	**	**	**	**
151	Jonathan.....	m.	r. c.	y. r.	v. g. g.	F. M.	W.	Am.							
152	Julian.....	m.	fl. c.	w. r.	v. g. g.	K.	S.	Am.							
153	Junaluskee.....	m.	r. ob.	g.	v. g. g.	F. M.	W.	Am.							
154	Kentucky Red. <i>Kentucky Red Streak. Bradford's Best</i> .....	m.	r. c.	g. y. dr.	v. g. g.	F. M.	A.	Am.							
155	Keswick.....	m.	r. c.	g. y.	v. g. g.	K. M.	E. A.	Eng.	*						
156	Kinnaird. <i>Kinnaird's Choice</i> .....	m.	fl.	y. r.	v. g. g.	F. M.	W.	Am.							
157	Kirkbridge. <i>Kirkbridge White</i> .....	m.	ob.	g. y.	v. g. g.	K. M.	E. A.								
158	Lady.....	s.	fl.	y. r.	v. g. g.	F. M.	W.	F.							
159	Lady Sweet.....	l.	r.	y. r.	v. g. g.	F. M.	W.	Am.							
160	Lansingburg.....	m.	r. fl.	y. r.	v. g. g.	M.	W.	Am.							
161	Late Strawberry. <i>Autumn Strawberry</i> .....	m.	r.	y. r.	v. g. g.	F. M.	L. A.	Am.							+
162	Lawver.....	l.	r. ob.	y. r.	v. g. g.	F. M.	W.	Am.							
163	Limber Twig.....	m.	r. ob.	y. r.	v. g. g.	M.	W.	Am.							
164	Little.....							Rus.							
165	Longfield. <i>Langerfeldske</i> .....	m.	r. ob.	y. r.	v. g. g.	K. M.	L. A.	Rus.							
166	Long Island Russet.....	m.	r.	rus.	v. g. g.	K.	W.	Am.							
167	Lorne. <i>Marquis of Lorne</i> .....	l.	r. fl.	g. r.	v. g. g.	F. M.	W.	N. S.	*						
168	Lowdon.....	l.	fl.	y. r.	v. g. g.	M.	W.	Am.							
169	Lowell. <i>Orange, Tallow Pippin, Queen Anne</i> .....	l.	r. c.	g. y.	v. g. g.	F. M.	E. A.	Am.	*	*	*	*	*	*	*
170	Lyscom.....	l.	r.	g. y.	v. g. g.	F. M.	E. A.	Am.	*	*	*	*	*	*	*
171	Maiden Blush.....	m.	r.	g. y.	v. g. g.	K. M.	E. A.	Am.	+		*	*	*	*	*
172	Major.....	l.	r. fl.	g. r.	v. g. g.	F. M.	W.	Am.							
173	Mangum. <i>Gully</i> .....	m.	r. ob.	y. r.	v. g. g.	F. M.	W.	Am.							
174	Mann.....	m.	r. ob.	y. r.	v. g. g.	F. M.	W.	Am.							+
175	Manomet.....	m.	r. ob.	y. r.	v. g. g.	F. M.	E. A.	Am.							*
176	Mary Womac.....	l.	r. fl.	y. r.	v. g. g.	F. M.	W.	Am.							
177	Mason Orange.....	v. l.	ob.	y.	v. g. g.	F. M.	W.	Am.							
178	Mason Stranger.....	m.	fl.	y. r.	v. g. g.	F. M.	W.	Am.							
179	Mattamuskeet.....	s.	fl.	y. r.	v. g. g.	F. M.	W.	Am.							
180	Maverack Sweet.....	m.	r. ob.	y. r.	v. g. g.	N.	W.	Am.							
181	Maxy.....	m.	r. c.	g. r.	v. g. g.	F. M.	W.	Am.							
182	McAfee. <i>McAfee's Nonsuch, Large Striped Pearmain</i> .....	l.	r. ob.	y. r.	v. g. g.	F. M.	W.	Am.							
183	McIntosh.....	m.	r. ob.	y. r.	v. g. g.	F. M.	W.	Am.							
184	McLellan.....	m.	r. ob.	y. r.	v. g. g.	F. M.	W.	Am.							*
185	McMahon.....	l.	r. ob.	y. w.	v. g. g.	K. M.	A.	Am.							
186	Mellinger.....	m.	r. c.	r. s.	v. g. g.	F. M.	E. W.	Am.							
187	Melon.....	m.	r. ob.	y. s.	v. g. g.	F. M.	W.	Am.							*
188	Mexico.....	m.	r. ob.	r. s.	v. g. g.	F. M.	A.	Am.							+
189	Milam.....	m.	r.	r. s.	v. g. g.	K. M.	W.	Am.							

131. One of the most profitable of market sorts.  
 134. A delicious dessert apple.  
 176. A seedling from Rambo, which it resembles.  
 187. One of the most delicious apples; tree a poor grower.

133. Valued only for cider.  
 171. A profitable market sort.  
 175. A valued sweet apple.



NUMBER.	NAMES.	DESCRIPTION.						I.—N. Div.							
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick.	Maine.	New Hampshire.	Vermont.	Massachusetts.	Rhode Island.
190	Milden or Milding.....	l.	fl.	y. r.	v. gg.	F. M.	E. W.	Am.							
191	Minister.....	l.	ob.	r. s.	gg.	K. M.	L. A.	Am.							
192	Minkler.....														
193	Missouri Pippin. <i>Missouri Keeper</i> .....	l.	r. ob.	y. r.	gg.	M.	W.	Am.							
194	Monmouth. <i>Red Check Pippin</i> .....	l.	fl.	y. r.	v. gg.	F. M.	W.	Am.							
195	Moore Sweet.....	m.	r. ob.	r.	gg.	K.	W.	Am.							
196	Mother.....	m.	r. c.	y. r.	b.	F. M.	W.	Am.							
197	Munson Sweet. <i>Orange Sweet</i> .....	m.	fl.	y. g.	gg.	K. M.	L. A.	Am.							
198	Nansemond. <i>Nansemond Beauty</i> .....	m.	r. ob.	r. s.	v. gg.	F. M.	W.	Am.							
199	Newtown Pippin. <i>Albemarle Pippin, Brooke's Pippin</i> .....	l.	r. ob.	g. y.	v. gg.	F. M.	W.	Am.							
200	Nickajaek.....	l.	r. ob.	r. s.	gg.	F. M.	W.	Am.							
201	Nonpareil Russett.....	m.	r.	y. g.	gg.	F. M.	W.	Eng.							
202	Northern Spy.....	l.	r. e.	y. r.	b.	F. M.	W.	Am.							
203	Northampton.....	m.	fl.	r. s.	v. gg.	F.	E. W.	Am.							
204	Oakland. <i>Oakland County Seek-no-further</i> .....	m.	r. ob.	y. r.	v. gg.	F.	W.	Am.							
205	Oconee Greening.....	m.	ob.	y.	gg.		A.	Am.							
206	Ohio Nonpareil.....	l.	r. ob.	y. r.	v. gg.	F. M.	L. A.	Am.							
207	Ohio Pippin. <i>Shannon</i> .....	l.	r. ob.	y. r.	gg.		W.	Am.							
208	Oldenburg. <i>Duchess of Oldenburg</i> .....	m.	r. ob.	y. r.	gg.	M.	S.	Rus.							
209	Orange Pippin.....	m.	ob.	y.	v. gg.	F. M.	A.	Am.							
210	Orange Winter.....														
211	Ortley. <i>White Bellflower, Woolman's Long</i> .....	m.	ob.	g. y.	v. gg.	F. M.	W.	Am.							
212	Otoe. <i>Otoe Red Streak</i> .....	m.	r. ob.	y. r.	v. gg.	F. M.	W.	Am.							
213	Peach (of Montreal).....	m.	r. e.	y. s.	v. gg.	F. M.	A.	F.							
214	Peach Pond Sweet.....	m.	fl.	r. s.	v. gg.	F.	A.	Am.							
215	Peck Pleasant.....	m.	r.	g. y.	v. gg.	F. M.	W.	Am.							
216	Perry Russet.....	m.	r. c.	rus.	gg.	F. M.	W.	Am.							
217	Pewaukee.....	l.	fl.	r. s.	gg.	F. M.	W.	Am.							
218	Phillips Sweet.....	m.	r. ob.	r. s.	v. gg.	F. M.	W.	Am.							
219	Pickard. <i>Pickard's Reserve</i> .....	m.	r. ob.	r. y.	gg.	F.	W.	Am.							
220	Pilot.....	l.	r. ob.	g. y. r.	v. gg.	F. M.	W.	Am.							
221	Pittsburg. <i>Pittsburg Pippin</i> .....	l.	fl.	g. y.	v. gg.	F. M.	W.	Am.							
222	Pleasant Valley. <i>Pleasant Valley Pippin</i> .....	m.	r. ob.	g. y.	v. gg.	F. M.	W.	Am.							
223	Plumb Cider.....	m.	r. c.	g. y. r.	gg.	K. M.	A.	Am.							
224	Pomme Gris.....	s.	r. ob.	y. rus.	b.	F.	W.	F.							
225	Porter.....	l.	ob.	g. y.	b.	F. M.	A.	Am.							
226	Premium.....	m.	r. c.	y.	v. gg.	F. M.	E. W.	Am.							
227	President.....	l.	r. ob.	y.	gg.	F.	A.	Am.							
228	Primate.....	m.	r. e.	g. y.	b.	F.	E. A.	Am.							
229	Progress.....	m.	r. ob.	y.	gg.	F. M.	W.	Am.							
230	Prother.....	m.	c.	y. r.	gg.	F. M.	L. W.	Am.							
231	Pryor Red.....	l.	r. ob.	y. r.	v. gg.	F. M.	W.								
232	Pumpkin Sweet. <i>Lyman's Pumpkin Sweet, Pound Sweet</i> .....	l.	r. ob.	y.	gg.	K. M.	E. W.	Am.							
233	Pyle Winter. <i>Pyle's Red Winter</i> .....	l.	r. ob.	r. s.	v. gg.	F. M.	W.	Am.							
234	Ramsdell Sweet.....	m.	ob.	y. r.	gg.	K. M.	L. A.	Am.							
235	Rambo.....	m.	fl.	y. r.	v. gg.	F. M.	L. A.	Am.							
236	Ralls Genet. <i>Neverfail</i> .....	l.	r. e.	y. r.	v. gg.	F. M.	W.								
237	Red Astrachan.....	l.	r.	y. r.	gg.	K. M.	S.	F.							
238	Red Canada. <i>Old Nonsuch, Richfield Nonsuch, Steele's Red Winter, of some</i> .....	m.	r. ob.	y. r.	b.	F. M.	W.								
239	Red Cathead.....	l.	r. e.	y. r.	gg.	F. M.	L. A.	Am.							
240	Red Crab.....	s.	r.	r.		Cider.	L. A.	Am.							
241	Red June. <i>Carolina June</i> .....														
242	Red Rance.....	m.	r. ob.	r. s.	v. gg.	F. M.	E. W.	Am.							
243	Red Stripe.....	m.	ob. e.	y. r.	gg.	K. M.	S.	Am.							
244	Rhode Island Greening.....	l.	r. ob.	g. y.	v. gg.	F. M.	W.	Am.							
245	Rhode Orange.....	m.	r. ob.	y. r.	gg.	F.	S.	Am.							
246	Ribston. <i>Ribston Pippin</i> .....	m.	r.	y. r.	v. gg.	F. M.	W.	Eng.							
247	Richard Graft.....	m.	r. ob.	r. s.	v. gg.	F. M.	E. A.	Am.							
248	Ridge Pippin.....	l.	r. e.	y. rus.	gg.	F.	W.	Am.							
249	Robinson. <i>Robinson's Superb</i> .....	l.			gg.	F. M.	A.	Am.							
250	Robertson White.....	m.	r. ob.	g. y.	gg.	F. M.	L. A.	Am.							

196. Esteemed where known.

200. Known in South and West by over forty different names.

233. Valued chiefly for its keeping qualities.

240. Best of all for cider.

241. Esteemed South and West.

248. A long keeper.



NUMBER.	NAMES.	DESCRIPTION.						I.—N. Div.							
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick.	Maine.	New Hampshire.	Vermont.	Massachusetts.	Rhode Island.
251	Rock <i>Rock Pippin, Lemon</i> .....	m.	c.	y.	.....	M.	W.	Am.	..	..	..	..	..	..	..
252	Rockport Sweet.....	m.	r. ob.	g. y.	v. gg.	F.	W.	Am.	..	..	..	..	..	..	..
253	Romanite (of the South).....	s.	r. c.	y. r.	v. gg.	F. M.	W.	Am.	..	..	..	..	..	..	..
254	Roman Stem.....	m.	r.	y. rus.	v. gg.	F. M.	W.	Am.	..	..	..	..	..	..	..
255	Rome Beauty.....	l.	r.	y. r.	gg.	M.	L. A.	Am.	..	..	..	..	..	..	..
256	Roxbury Russet.....	m.	r. ob.	y. rus.	v. gg.	F. M.	W.	Am.	..	..	..	..	..	..	..
257	Saint Lawrence.....	l.	fl.	y. r.	v. gg.	M.	A.	.....	**	*	..	..	..	..	..
258	Sarah.....	l.	fl.	r. s.	v. gg.	F. M.	E. A.	Am.	..	..	*	..	..	..	..
259	Saxton. <i>Full Stripe</i> .....	m.	r. ob.	y. r.	gg.	F.	A.	Am.	..	..	..	..	..	..	..
260	Sheppard Sweet.....	m.	r. c.	r. s.	gg.	F.	L. A.	Am.	..	..	..	..	..	..	..
261	Sheriff.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
262	Shiawassee (Beauty).....	m.	fl.	r. y.	v. gg.	F. M.	W.	Am.	..	..	..	..	..	..	..
263	Shockley.....	s.	r. c.	y. r.	gg.	F. M.	W.	Am.	..	..	..	..	..	..	..
264	Simmons Red <i>Red Everlasting</i> .....	m.	ob.	y. r.	v. gg.	.....	S.	Am.	..	..	..	..	..	..	..
265	Smith Cider.....	l.	r. ob.	y. r.	gg.	F. M.	W.	Am.	..	..	..	..	..	..	..
266	Smokehouse.....	l.	r. ob.	y. r.	gg.	K. M.	W.	Am.	..	..	..	..	..	..	..
267	Somerset (of Maine).....	m.	fl.	r. s.	v. gg.	F.	S.	Am.	..	..	*	..	..	..	..
268	Somerset (of New York).....	s.	r. c.	y. rus.	v. gg.	F.	E. A.	Am.	..	..	..	..	..	..	..
269	Sops of Wine. <i>Hominy</i> .....	m.	r.	y. r.	gg.	K. M.	E. A.	Eng.	..	..	**	*	..	..	**
270	Spice Russet.....	s.	fl. c.	y. rus.	v. gg.	F.	W.	Am.	..	..	..	..	..	..	..
271	Spitzenburg. <i>Newtown Spitzenburg, Vandere of New York</i> .....	m.	r. ob.	y. r.	b.	F. M.	W.	Am.	†	..	..	..	..	..	..
272	Stansill.....	m.	r. ob.	g. y.	gg.	F.	W.	Am.	..	..	..	..	..	..	..
273	Stark.....	l.	r. c.	y. r.	gg.	F.	W.	Am.	*	..	..	..	..	..	..
274	Striped Anis.....	.....	.....	.....	.....	.....	.....	Rus.	..	..	..	..	..	..	..
275	Stevenson Winter.....	m.	r. ob.	y.	gg.	F.	W.	Am.	..	..	..	..	..	..	..
276	Summer Bellefleur.....	m.	r. c.	y.	gg.	F. M.	A.	Am.	..	..	..	..	..	..	..
277	Summer Hagloe.....	l.	r. ob.	r. s.	v. gg.	K. M.	S.	Am.	..	..	..	..	..	..	..
278	Summer King.....	m.	fl.	y. r.	gg.	F. M.	S.	Am.	..	..	..	..	..	..	..
279	Summer Pearmain. <i>American Summer</i> .....	m.	ob.	y. r.	b.	F.	S.	Am.	..	..	*	..	..	..	..
280	Summer Pound Royal.....	l.	r. c.	y. rus.	gg.	M.	E. A.	Am.	..	..	..	..	..	..	..
281	Summer Pippin. <i>Champlain Nyack</i> .....	m.	ob. c.	y. r.	gg.	K. M.	L. S.	Am.	..	..	..	*	..	..	..
282	Summer Queen.....	l.	r. c.	y. r.	gg.	K. M.	S.	Am.	..	..	..	..	..	..	..
283	Summer Rose.....	s.	r.	y. r.	h.	F.	S.	Am.	..	..	..	..	*	..	..
284	Summer Seek-no-further.....	m.	ob. c.	y.	v. gg.	F. M.	S.	Am.	..	..	..	..	..	..	..
285	Summer Paradise.....	l.	r.	g. y.	v. gg.	F.	E. A.	Am.	..	..	†	..	..	..	..
286	Susan Spice.....	m.	fl.	y. r.	gg.	F.	A.	Am.	..	..	..	..	..	..	..
287	Sutton. <i>Sutton Beauty</i> .....	m.	r. ob.	r. s.	v. gg.	F. M.	E. W.	Am.	..	..	..	..	..	*	†
288	Striped (Pippin).....	l.	r. ob.	r. s.	v. gg.	F. M.	E. W.	Am.	..	..	..	..	..	..	..
289	Swaar.....	l.	r. ob.	g. y.	h.	F. M.	W.	Am.	..	..	†	..	..	..	..
290	Sweet Belle et Bonne.....	m.	r. ob.	y. rus.	v. gg.	F.	E. W.	Am.	..	..	..	..	..	..	..
291	Sweet Bough. <i>Large Yellow Bough</i> .....	l.	ob.	g. y.	v. gg.	F. M.	S.	Am.	**	..	**	..	**	..	*
292	Sweet Pear.....	m.	r. c.	y.	v. gg.	F.	A.	Am.	..	..	..	..	..	..	..
293	Sweet Winesap.....	m.	fl.	r. s.	v. gg.	M.	W.	Am.	..	..	..	..	..	..	..
294	Switzer.....	.....	.....	.....	.....	.....	.....	Rus.	..	..	..	..	..	..	..
295	Taunton.....	l.	r. c.	y. r.	g.	F. M.	A.	Am.	..	..	..	..	..	..	..
296	Tetofsky.....	m.	fl. c.	y. r.	g.	K.	S.	Rus.	..	..	**	..	..	..	..
297	Tinmouth.....	m.	fl.	y. r.	v. gg.	F.	W.	Am.	..	..	..	..	..	..	..
298	Talman Sweet.....	m.	r.	g. y.	v. gg.	K. M.	W.	Am.	*	**	**	**	**	**	**
299	Tompkins King. <i>King of Tompkins County</i> .....	l.	r.	y. r.	v. gg.	F. M.	W.	Am.	**	..	*	*	*	*	*
300	Townsend. <i>Hocking</i> .....	m.	r. ob.	r. s.	gg.	M.	S.	Am.	..	..	..	..	..	..	..
301	Trenton Early.....	m.	r.	y.	g.	F.	S.	Am.	..	..	..	..	..	..	..
302	Twenty Ounce. <i>Cayuga Red Streak</i> .....	l.	r.	r. s.	v. gg.	F. M.	L. A.	Am.	*	..	†	*	†	*	*
303	Utter.....	m.	r. ob.	r. s.	gg.	F. K.	A.	Am.	..	..	..	..	..	..	..
304	Vandevere.....	m.	fl.	y. r.	g.	M.	W.	Am.	..	..	..	..	..	..	..
305	Victuals and Drink.....	l.	ob.	y. rus.	gg.	F.	W.	.....	..	..	..	..	..	..	..
306	Virginia Greening.....	l.	fl.	g. y.	gg.	M.	W.	Am.	..	..	..	..	..	..	..
307	Wagener.....	m.	r. ob.	y. r.	h.	F.	W.	Am.	*	..	*	*	*	*	*
308	Warfield.....	l.	fl.	y.	g.	F. M.	A.	Am.	..	..	..	..	..	..	..
309	Washington (Strawberry).....	l.	r. c.	y. r.	v. gg.	F. M.	E. A.	Am.	..	..	*	..	**	..	*
310	Washington Royal.....	m.	r. ob.	g. y.	g.	M.	W.	Am.	..	..	..	..	..	..	*
311	Water.....	m.	r. c.	y. r.	v. gg.	F.	E. W.	Am.	..	..	..	..	..	..	..
312	Waugh Crab.....	s.	r. c.	r. s.	gg.	Cider.	W.	Am.	..	..	..	..	..	..	..
313	Wealthy.....	m.	r. ob.	r.	v. g.	F. M.	W.	Am.	**	..	..	**	..	..	..

253. Entirely distinct from Gilpin or Shockley.

279. Slender grower but healthy.



NUMBER.	NAMES.	DESCRIPTION.						I.—N. Div.							
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Novr Scotia.	New Brunswick.	Maine.	New Hampshire.	Vermont.	Massachusetts.	Rhode Island.
314	Webb.....	m.	r.	y.	g. g.	F.	W.	Am.							
315	Wellford (Yellow).....	s.	r. ob.	g. y.	v. g. g.	M.	W.	Am.							
316	Western Beauty. <i>Grosh, Summer, Rambo, Etc</i> .....	l.	r. ob.	r. s.	v. g. g.	K. M.	S.	Am.							
317	Westfield (Seek-no-further).....	l.	r. c.	y. r.	b. g.	F. M.	W.	Am.	*			*	*	*	
318	White Doctor.....	l.	r. ob.	g. y.	g. g.	K. M.	E. A.	Am.							
319	White Juneating. <i>May, Early May, Etc....</i>	s.	r.	g. y.	g. g.	F. M.	S.	F.							
320	White Paradise. <i>Lady Finger.....</i>	m.	r. fl.	y. r.	g. g.	M.	W.	Am.							
321	White Pippin.....	l.	r. ob.	g. y.	v. g. g.	F. M.	W.	Am.							
322	White Winter Pearmain.....	m.	r. c.	y. r.	v. g. g.	F. M.	W.	Am.							
323	White Rambo.....	m.	r. ob.	g. y.	g. g.	M.	L. A.	Am.							
324	Williams (Favorite).....	m.	r. c.	y. r.	g. g.	M.	S.	Am.	*	*	*	*	*	*	*
325	Willis Sweet.....	l.	r.	y. r.	v. g. g.	K. M.	S.	Am.							
326	Willow Twig. <i>James River.....</i>	m.	r. c.	y. r.	g. g.	K. M.	W.	Am.							
327	Wine. <i>Hay's Wine, Pennsylvania Red Streak</i> .....	l.	r.	y. r.	v. g. g.	F. M.	W.	Am.							*
328	Winesap.....	m.	r.	y. r.	v. g. g.	F. M.	W.	Am.						*	
329	Winter Paradise.....	l.	r. ob.	g. y.	v. g. g.	F.	W.	Am.							
330	Wolf River.....	l.	r. ob.	r.	g.	F. M.	W.	Am.							
331	Woodmansee.....														
332	Wythe.....	m.	fl.	r. s.	v. g. g.	F.	W.	Am.							
333	Yates.....	s.	fl.	y. r.	g. g.	F. M.	W.	Am.							
334	Yellow Bellefleur.....	l.	ob.	g. y.	v. g. g.	F. M.	W.	Am.	**	*	*	*	*	*	*
335	Yellow June <i>Nantahalee.....</i>	m.	r. ob.	y.	g. g.	F.	S.	Am.							
336	Yellow Transparent.....	m.	r. ob.	y.	g. g.		E. S.	Rus.					*		
337	York Imperial.....	l.	fl.	y. r.	g. g.	F. M.	W.	Am.							
338	Yopp (Favorite).....	l.	r. c.	y.	g. g.	F.	A.	Am.							
339	Zachary (Pippin).....	l.	fl.	r. s.	v. g. g.	F. M.	E. W.	Am.		*					

326. Valuable for late keeping.



Sub-Section I.—Apples.—Crabs. *Pyrus bacata* (?)

NUMBER.	NAMES.	DESCRIPTION.							I.—N. Div.						
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick.	Maine.	New Hampshire.	Vermont.	Massachusetts.	Rhode Island.
1	Beecher Sweet.....	m.	r.	r.	v. g.	F. M.	E. A.	Am.							
2	Briar Sweet (Wisconsin).....	l.		r. y.	v. g.	F. M.	A.	Am.							
3	Cherry.....	s.	r.	y. r.		K.	A.	F.							
4	Conical.....	m.	c.	r.	v. g.	F. M.	L. A.	Am.							
5	Early Strawberry.....	m.	r.	r. s.	g.	F.	S.	Am.							
6	Glover Early.....							Am.							
7	Hyslop.....	l.	r.	r.	v. g.	F. M.	A.	Am.	*	*	*	*		*	*
8	Lady Elgin.....	l.	r. ob.	y. r.	v. g.	F. M.	L. A.	Am.							*
9	Lake Winter.....	l.	r.	r. y.	v. g.	F.	W.	Am.							
10	Marengo.....	l.	r. fl.	y. r.	v. g.	F. M.	W.	Am.			†				
11	Minnesota.....	v. l.	ob.	y. r.	v. g.	F. M.	L. A.	Am.							
12	Montreal Beauty.....	l.	r. ob.	y. r.	v. g.	F. M.	A.	Am.	*	*	*	*			
13	Orange.....	m.	r.	o.	v. g.	F. K.	L. A.	Am.							
14	Orion.....	l.	ob.	r. s.	v. g.	F. M.	L. A.	Eng.							
15	Red Siberian.....	m.	r.	r.	v. g.	F. M.	A.	F.							*
16	Spitzenburg.....							Am.							
17	Sweet Russett.....	l.	r. c.	y. rus.	b.	F.	E. A.	Am.							
18	Sylvan Sweet.....	l.	r. fl.	y. r.	v. g.	F. M.	A.	Am.							
19	Transcendent.....	l.	r. ob.	y. r.	v. g.	F. M.	A.	Am.	*	*	*	*			*
20	Whitney.....	l.	r. fl.	r.	v. g.	M.	S.	Am.							
21	Yellow Siberian.....	m.	r.	y.	v. g.	F. M.	A.	F.							

Section III.—Apricots. *Armeniaca vulgaris*.

The columns explain as follows: SIZE—l., large; m., medium; s., small. FORM—r., roundish; r. f., roundish flattened; r. o., roundish oval; ob. c., oblong compressed. COLOR—y. o., yellow, shaded to deep orange in the sun; o. r., orange, with a red cheek; o., orange. QUALITY—g., good; v. g., very good; b., best. USE—All apricots being valued for the desert, the letter F. will signify that it is extra for the dessert, and F. M., that it is valued for the dessert and at the same time profitable for market. SEASON—E, early; M., medium; L. late in season of ripening. ORIGIN—F., foreign; Am., American.

NUMBER.	NAMES.	DESCRIPTION.							I.—N. Div.						
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick.	Maine.	New Hampshire.	Vermont.	Massachusetts.	Rhode Island.
1	Breda.....	m.	r.	o.	v. g.	F. M.	E.	F.							
2	Early Golden.....	s.	r. o.	o.	v. g.	F. M.	E.	F.							
3	Hemskirke (Downing).....	l.	r. f.	o. r.	b.	F. M.	M.	Am.							
4	Large Early.....	m.	ob. c.	o. r.	b.	F.	E.	F.	*						
5	Large Red.....	l.	r. o.	o. r.	b.	F.	M.	F.							
6	Moorpark.....	l.	r.	y. o.	b.	F. M.	L.	F.							
7	Musch Musch.....	s.	r.	y.	g.	F.	E.	F.							
8	Orange.....	m.	r.	o. r.	g.	F.	M.	F.							
9	Peach.....	l.	r. f.	y. o.	b.	E. M.	L.	F.							
10	Red Masculine.....	s.	r.	y. o.	v. g.	F. M.	M.	F.							
11	Royal.....	l.	r. o.	y. r.	v. g.	F. M.	M.	F.							
12	St. Ambrose.....	l.	r. f.	y. o.	b.	F.	M.	F.							
13	Turkey.....	m.	r.	y. o.	v. g.	F. M.	L.	F.							



Section IV.—Bananas and Plantain, *Musas*.

Abbreviations.

COLOR.		SIZE.	
b-brown, g-green, p-pink,	r-red, w-white, y-yellow.	l-large, m-medium,	s-small, v-very.

NUMBER.	NAME.	DESCRIPTION.			
		COLOR.	SIZE.	QUALITY.	USE.
1	Cavendish. ( <i>M. Cavendishii</i> ).....	y.	m.	b.	d. s.
2	Hart's Choice. ( <i>M. Orientum Bull</i> ).....	y.	s.	h.	d. m.
3	Large Fig.....		m.	g. g.	.....
4	Magnifica. ( <i>M. Magnifica Bull</i> ).....	v.	l.	g. g.	d. s.
5	Orinoco. ( <i>M. Paradisiaca</i> var. <i>sapientum</i> ).....	y.	l.	g. g.	d. c. m.
6	Plantain. ( <i>M. Paradisiaca</i> ).....		l.	v. g. g.	c. m.
7	Red Baracoa.....	v.	l.	v. g. g.	d. s.
8	Tahiti.....		l.	v. g. g.	.....

Section IV.—Bananas and Plantain, *Musas*.

Abbreviations.

QUALITY.	USE.
b-best, g-good, v-very.	c-cooking, d-dessert,      m-market, s-shipping.

NUMBER.	STATES.								
	Florida.	Georgia.	Alabama.	Mississippi.	Louisiana.	Texas.	New Mexico	Arizona.	California.
1	**					*			*
2	**					*			*
3	*					†			†
4	**					†			†
5	**					*			*
6	**					†			†
7	**					†			*
8	**					†			†

Section V.—Blackberries. *Rubus villosus*.

The columns explain as follows: SIZE—l, large; m, medium; s, small. FORM—ob. c., oblong conic; r. c., roundish conical or oval; ob. ov., oblong oval. COLOR—b., black. QUALITY—g., good; v. g., very good; b., best. USE—F. M., family and market; M., market. SEASON—M., medium; E., early; L., late. ORIGIN—Am., American; F., foreign.

NUMBER.	NAMES.	DESCRIPTION.						I.—N. Div.							
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts.	Rhode Island.
1	Agawam.....														
2	Ancient Briton.....	l.	ob. ov.	b.	v. g.	F. M.	M.	Am.							
3	Barnard.....	l.	ob. ov.	b.	v. g.	F. M.	M.	Am.							
4	Brunton. <i>Brunton's Early</i> .....	m.		b.	v. g.	F. M.	V. E.	Am.							
5	Dorchester.....	m.	ob. c.	b.	v. g.	M.	M.	Am.	*		*		*	*	*
6	Early Harvest.....	m.	ob.	b.	v. g.	F. M.	V. E.	Am.							
7	Erie.....	l.	ob. ov.	b.	v. g.	F. M.	M.	Am.							
8	Kittatinny.....	l.	r. c.	b.	v. g.	F. M.	M.	Am.	*		*		*	*	*
9	Lawton. <i>New Rochelle</i> .....	l.	ov.	b.	v. g.	M.	L.	Am.			*		*	*	*
10	Minnewaski.....	l.	ov.	b.	v. g.	M.	M.	Am.					*	*	*
11	Sable Queen.....														
12	Snyder.....	m.	r. ov.	b.	v. g.	F. M.	E.	Am.					*	*	*
13	Stone (Hardy).....	l.	ob.	b.	v. g.	F.		Am.					*	*	*
14	Taylor. <i>Taylor's Prolific</i> .....	l.		b.	v. g.	F. M.		Am.					*	*	*
15	Wachusett.....	m.	ob. ov.	b.	v. g.	F. M.	M.	Am.					*	*	*
16	Western Triumph.....	m.		b.	v. g.	F. M.		Am.					*	*	*
17	Wilson (Early).....	l.	ob. ov.	b.	v. g.	M.	E.	Am.	*		*		*	*	*
18	Wilson Junior.....	l.	ob. ov.	b.	v. g.	M.	E.	Am.					*	*	*

5. Of fine flavor. 8. Rusts badly in many places. 16. Almost thornless, and valued on that account.

Sub-Section III.—Dewberries. *R. Canadensis*.

NUMBER.	NAMES.	DESCRIPTION.						I.—N. Div.							
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts.	Rhode Island.
1	Lucretia.....	l.	ob. ov.	b.	v. g.	F. M.	V. E.	Am.						*	



Section VI.—Cherries: (*Cerasus Avium*) Nicholson.

Sub-Section I. Hearts and Bigarreaus.

The columns explain as follows: SIZE—l., large; m., medium; s., small. FORM—ob. h., obtuse heart shape; r. ob. h., roundish obtuse heart shape; r. h., roundish heart shape; r., roundish or round. COLOR—l. r., lively bright red; d. r., dark red, almost black; a. m., amber mottled with red; y. r., yellow ground shaded and marbled with red. USE—F., family, for dessert; F. M., Family or market; K. M., for cooking or market; M., market. SEASON—E., early; M., medium; L., late. ORIGIN—F., foreign; Am., American.

NUMBER.	NAMES.	DESCRIPTION.					I.—N. Div.							
		SIZE.	FORM.	COLOR.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick.	Maine.	New Hampshire.	Vermont.	Massachusetts.	Rhode Island.
1	Belle d'Orleans.....	m.	r. h.	y. r.	F. M.	E.	F.							
2	Bigarreau. <i>Grafton, Yellow Spanish</i> .....	l.	ob. h.	y. r.	F. M.	M.	F.	**						
3	Black Eagle.....	l.	ob. h.	d. r.	F. M.	M.	F.							
4	Black Heart.....	l.	r. h.	d. r.	F. M.	M.	F.	*						
5	Black Tartarian.....	l.	r. h.	d. r.	F. M.	M.	F.	*						
6	Buttner's Yellow.....	m.	r.	y.	F. M.	L.	F.							
7	Coe's Transparent.....	m.	r.	a. m.	F.	M.	Am.							
8	Downer's Late.....	m.	r. h.	y. r.	F. M.	L.	Am.	*						
9	Early Purple. <i>Early Purple Guigne</i> .....	m.	r. h.	d. r.	F. M.	E.	F.	*						
10	Elton.....	l.	r. h.	y. r.	F. M.	M.	F.		*					
11	Florence.....	l.	h.	y. r.	K. M.	L.	F.							
12	Governor Wood.....	l.	r. h.	y. r.	F. M.	M.	Am.	*						
13	Hovey.....	l.	r. h.	y. r.	F. M.	M.	Am.							
14	Knight's Early. <i>Knight's Early Black</i> .....	l.	ob. h.	d. r.	F. M.	E.	F.							
15	Luelling. <i>Black Republican</i> .....	l.	r. h.	b.	F. M.		Am.							
16	Mezel. <i>Bigarreau of Mezel, Monstreuse Mezel, Bigarreau Gaubalis</i> .....	l.	ob. h.	d. r.	F. M.	M.	F.							
17	Napoleon. <i>Royal Ann</i> (in Cal. and Oregon).....	l.	r. ob. h.	y. r.	F. M.	M.	F.		*					
18	Osceola.....	l.	r. h.	d. r.	F. M.	M.	Am.							
19	Ohio. <i>Ohio Beauty</i> .....	l.	ob. h.	y. r.	F. M.	M.	Am.							
20	Pontiac.....	l.	ob. h.	d. r.	F. M.	M.	Am.							
21	Red Jacket.....	l.	ob. h.	y. r.	F. M.	L.	Am.							
22	Rockport.....	l.	r. ob. h.	a. m.	F. M.	E.	Am.							
23	Teeumseh.....	m.	ob. h.	d. r.	M.	L.	Am.							
24	Windsor.....	l.	r. h.	d. r.	M.	L.	Am.							

4. A fine old variety, but by many supposed to be superseded.



Sub-Section II.—Duke and Morella Cherries. (*C. Caproniana*) Nicholson.

NUMBER.	NAMES.	DESCRIPTION.						I.—N. Div.						
		SIZE.	FORM.	COLOR.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts.	Rhode Island.
1	Arch Duke.....	l.	ob. h.	d. r.	K. M.	L.	F.	..	..	..	..	..	..	..
2	Carnation.....	m.	r.	a. m.	K. M.	L.	F.	..	..	..	..	..	..	..
3	Choisy.....	m.	r.	a. m.	F.	M.	F.	..	..	..	..	..	..	..
4	Donna Maria.....	m.	r.	d. r.	K. M.	L.	F.	..	..	..	..	..	..	..
5	Early Richmond.....	s.	r.	l. r.	K. M.	E.	F.	..	..	..	..	..	..	..
6	Eugenie. <i>Empress Eugenie</i> .....	m.	r.ob.h.	d. r.	F. M.	M.	F.	..	..	..	..	..	..	..
7	Hortense.....	l.	r.	l. r.	F. M.	L.	F.	..	..	..	..	..	..	..
8	Late Duke.....	l.	ob. h.	d. r.	K. M.	L.	F.	..	..	..	..	..	..	..
9	Late Kentish.....	m.	r.	r.	K.	M.	F.	..	..	..	..	..	..	..
10	Louis Phillippe.....	l.	r.	d. r.	K. M.	L.	F.	..	..	..	..	..	..	..
11	Magnifique.....	l.	r. h.	l. r.	K. M.	L.	F.	..	..	..	..	..	..	..
12	May Duke.....	l.	r.ob.h.	d. r.	K. M.	E.	F.	..	..	..	..	..	..	..
13	Montmorency, Large.....	l.	r.	d. r.	K. M.	M.	F.	..	..	..	..	..	..	..
14	Morello, <i>English Morello, Large Morello</i> .....	l.	r. h.	d. r.	K. M.	L.	F.	..	..	..	..	..	..	..
15	Olivet.....	l.	r.	r.	F.	M.	F.	..	..	..	..	..	..	..
16	Plumstone Morello.....	l.	r.	d. r.	K. M.	L.	F.	..	..	..	..	..	..	..
17	Royal Duke.....	l.	r.	d. r.	K. M.	M.	F.	..	..	..	..	..	..	..

- 4. Very hardy and productive.
- 5. Believed by many to be identical with Early May of the west; not fully settled.

Section VII. Currants. *Ribes rubrum* and *nigrum*.

The columns explain: SIZE—l, large; m., medium; s., small. FORM—with reference to form of bunch—l., long; v. l., very long; s., short; m., medium. COLOR—r., red; b., black; w., white. QUALITY—a., acid; m. a., moderate acid; v. a., very acid. USE—K. M., kitchen and market; F. M., family and market; M., market. SEASON—E., early; M., medium; L., late. ORIGIN—Am., American; F., foreign.

NUMBER.	NAMES.	DESCRIPTION.						I.—N. Div.							
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts.	Rhode Island.
1	Angers. <i>Fertile d' Angers</i> .....	l.	l.	r.	m. a.	F. M.	M.	F.	..	..	..	..	..	..	..
2	Black Naples. <i>R. nigrum</i> .....	l.	s.	b.	m. a.	K. M.	M.	F.	..	..	..	..	..	..	..
3	Cherry.....	l.	s.	r.	v. a.	M.	M.	F.	..	..	..	..	..	..	..
4	Common Black. <i>Black English. R. nigrum</i> .....	s.	s.	b.	m. a.	K. M.	M.	F.	..	..	..	..	..	..	..
5	Fay. <i>Fay's Prolific</i> .....	l.	l.	r.	m. a.	F. M.	M.	Am.	..	..	..	..	..	..	..
6	Knight Red. <i>Knight's Large Red</i> .....	l.	m.	r.	m. a.	F. M.	M.	F.	..	..	..	..	..	..	..
7	Lce. <i>Lce's Prolific. R. nigrum</i> .....	l.	l.	b.	m. a.	K. M.	M.	F.	..	..	..	..	..	..	..
8	Palluau. <i>Fertile d' Palluau</i> .....	l.	l.	r.	a.	F. M.	M.	F.	..	..	..	..	..	..	..
9	Prince Albert.....	l.	l.	r.	m. a.	M.	L.	F.	..	..	..	..	..	..	..
10	Red Dutch.....	m.	m.	r.	m. a.	F. M.	E.	F.	..	..	..	..	..	..	..
11	Red Grape.....	m.	m.	r.	m. a.	F. M.	E.	F.	..	..	..	..	..	..	..
12	Versaillaise. <i>La Versaillaise</i> .....	l.	s.	r.	a.	M.	M.	F.	..	..	..	..	..	..	..
13	Victoria. <i>Raby Castle</i> .....	l.	v. l.	r.	a.	F. M.	L.	F.	..	..	..	..	..	..	..
14	White Dutch.....	m.	l.	w.	m. a.	F. M.	E.	F.	..	..	..	..	..	..	..
15	White Grape.....	m.	l.	w.	m. a.	F. M.	E.	F.	..	..	..	..	..	..	..



Section VIII.—Figs. *Ficus carica*.

The columns explain as follows: SIZE—s., small; m., medium; l., large; v. l., very large. COLOR—b., black; br., brown; bl., blue; d. r., deep red; g., green; p. v., pale violet; p., purple; v., violet; w., white; y., yellow. QUALITY—b., best; v. g., very good; g., good. SEASON—E., early; M., medium; L., late.

NUMBER.	NAMES.	DESCRIPTION.				STATES.								
		SIZE.	COLOR.	QUALITY.	SEASON.	Florida.	Georgia.	Alabama.	Mississippi.	Louisiana.	Texas.	New Mexico.	Arizona.	California.
1	Alieante.....	m.	br.	b.	M.	.	.	.	.	.	.	.	.	.
2	Angelique. <i>Jaune Hatve</i> .....	s.	y.	v. g.	E.	*	.	.	.	.	.	.	.	.
3	Black Ischia.....	m.	b.	b.	M.	.	.	.	.	.	.	.	.	.
4	Blue Genoa.....	m.	bl.	b.	E.	*	.	.	.	.	.	.	.	.
5	Brown Smyrna.....	m.	br.	b.	M.	.	.	.	.	.	.	.	.	.
6	Brunswick. <i>Constantinople. Madonna</i> .....	v. l.	v.	b.	E.	*	*	*	*	*	*	*	*	*
7	Celestial.....	s.	p. v.	b.	E.	*	*	*	*	*	*	*	*	*
8	Green Ischia. <i>White Ischia. Green Italian</i> .....	m.	g.	v. g.	E.	*	*	*	*	*	*	*	*	*
9	Lemon.....	m.	y.	b.	E.	.	.	.	.	.	.	.	.	.

Section IX.—Gooseberries. *Ribes*.

The columns explain: SIZE—l., large; m., medium; s., small. FORM—r., round; o., oval; r. o., roundish oval. COLOR—r., reddish, when fully ripe; g., greenish yellow, when fully ripe. QUALITY—g., good; v. g., very good; b., best. USE—K., kitchen. M., Market. SEASON—E., early; M., medium; M. L., medium late. ORIGIN—Am., American; F., foreign.

NUMBER.	NAMES.	DESCRIPTION.							I.—N. Div.						
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick.	Maine.	New Hampshire.	Vermont.	Massachusetts.	Rhode Island.
1	Crown Bob.....	l.	o.	r.	v. g.	K. M.	M.	F.	*	.	.	.	.	.	.
2	Downing.....	m.	r. o.	g.	v. g.	K.	M. L.	Am.	.	.	.	.	.	.	*
3	Houghton.....	s.	r. o.	r.	g.	K. M.	E.	Am.	*	*	*	*	*	*	.
4	Industry.....	l.	r. o.	r.	v. g.	K.	M.	F.	.	.	.	.	.	.	.
5	Orange.....	m.	r.	y.	g.	K. M.	E.	Am.	.	.	.	.	.	.	.
6	Pale Red. <i>Cluster, American Seedling</i> .....	m.	r. o.	r.	v. g.	K. M.	E.	Am.	.	.	.	.	.	.	.
7	Roaring Lion.....	l.	o.	r.	v. g.	K. M.	M.	F.	*	.	.	.	.	.	.
8	Smith. <i>Smith's Improved</i> .....	l.	o.	r.	v. g.	K. M.	M.	Am.	.	*	.	.	.	.	.
9	Whitesmith.....	l.	o.	g.	v.	K. M.	M.	F.	*	.	.	.	.	.	.

2. A little liable to sunburn or blister.
6. An old sort entirely free from mildew—more upright than Houghton.



Section X.—Grapes. *Vitis.*

Sub-Section I. Native Grapes.

The columns explain as follows: SIZE—with reference to the berry, l, large; m, medium; s, small. FORM—with reference to bunch and berry, s. r., short bunch, round berry; l. r., large and round; m. r. o., medium bunch, roundish oval berry; m. r., medium bunch, round berry. COLOR—b., black, or nearly so when fully ripe; r., reddish or coppery-brownish red; g., greenish white or yellowish. QUALITY—g., good; v. g., very good; b., best. USE—T., table; M., market; W., wine. SEASON—E., early; M., medium; L., late. ORIGIN—See next page.

NUMBER.	NAMES.	DESCRIPTION.						I.—N. Div.						
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	NewBrunswick.	Maine.	New Hampshire.	Vermont.	Massachusetts.
1	Agawam, <i>Rogers' No. 15</i> .....	l.	s. r. o.	r.	v. g. g.	T. M.	M.	Hyb.	*	**	*	*	*	*
2	Barry, <i>Rogers' No. 43</i> .....	l.	r.	b.	v. g. g.	T. M.	M.	Hyb.					*	*
3	Berekmans.....	l.	r.	r.	v. g. g.	T. M.	M.	Hyb.					*	*
4	Brighton.....	l.	r.	d. p.	v. g. g.	T.	E.	Hyb.				†	*	*
5	Brilliant.....	m.	r.	r.	v. g. g.	T. M.	M.	Hyb.					*	*
6	Catawba.....	l.	m. r. o.	r.	v. g. g.	T. M. W.	L.	Lab.					*	*
7	Champion. <i>Tallman's Seedling</i> .....	l.	r.	b.	v. g. g.	M.	E.	Lab.	*	*	*	†	*	*
8	Clinton.....	s.	m. r.	b.	v. g. g.	T. W.	L.	Rip.	*	*	*	*	*	*
9	Concord.....	l.	l. r.	b.	v. g. g.	T. M. W.	M.	Lab.	*	*	*	*	*	*
10	Cottage.....	l.	r.	b.	v. g. g.	T. M.	E.	Lab.					*	*
11	Creveling.....	m.	m. r. o.	b.	v. g. g.	T.	E.	Lab.		*	*	*	*	*
12	Cynthiana.....	s.	r.	b.	v. g. g.	W.	M.	Est.	*	*	*	*	*	*
13	Delaware.....	s.	s. r.	r.	v. g. g.	T. M. W.	M.	? x.	*	*	*	*	*	*
14	Diana.....	m.	s. r. o.	r.	v. g. g.	T. M.	L.	Lab.	*	*	*	*	*	*
15	Dracont Amber.....	l.	r.	r.	v. g. g.	M.	V. E.	Lab.						
16	Duchess.....	m.	m. r.	w.	v. g. g.	T.	M.	Hyb.					†	*
17	Early Victor.....	m.	m. r.	b.	v. g. g.	T. M.	V. E.	Lab.						†
18	Elvira.....	s.	r.	w.	v. g. g.	W.	L.	Rip. x.						
19	Empire State.....	s.	r.	w.	v. g. g.	T. M.	M.	Hyb.						
20	Essex, <i>Rogers' No. 41</i> .....	l.	r.	b.	v. g. g.	T. M.	M.	Hyb.						
21	Eumelan.....	m.	r.	b.	v. g. g.	T.	M.	Lab.		†	†	*		†
22	Flowers.....	l.	r.	b.	v. g. g.	T. W.	V. L.							
23	Goethe, <i>Rogers' No. 1</i> .....	l.	l. r. o.	g.	v. g. g.	T. W.	L.	Hyb.						
24	Hartford. <i>Hartford Prolific</i> .....	l.	m. r. o.	b.	v. g. g.	M.	E.	Lab.	*	*	*	*	*	*
25	Hayes.....													
26	Herbmont. <i>Warren, etc (?)</i> .....	s.	m. r.	b.	v. g. g.	T. W.	L.	Est.					*	†
27	Herbert, <i>Rogers' No. 44</i> .....	l.	l. r.	b.	v. g. g.	T. M.	M.	Hyb.					*	†
28	Iona.....	m.	m. r. o.	r.	v. g. g.	T. M. W.	L.	Lab.		†			*	*
29	Isabella.....	l.	m. r. o.	b.	v. g. g.	T. M.	L.	Lab.	*		*		*	*
30	Ives.....	m.	m. r. o.	b.	v. g. g.	M. W.	M.	Lab.		*	*		*	*
31	Janesville.....	m.	r.	b.	v. g. g.	T. M.	V. E.	Lab.					*	*
32	Jefferson.....	m.	m. r.	r.	v. g. g.	T. M.	M.	Hyb.					*	†
33	Lady.....	l.	r.	w.	v. g. g.	T. M.	E.	Lab.			†	*	*	*
34	Lady Washington.....	l.	l. r. o.	w.	v. g. g.	T. M.	M.	Hyb.					*	*
35	Lenoir.....													
36	Lindley, <i>Rogers' No. 9</i> .....	m.	m. r. o.	r.	v. g. g.	T. M.	M.	Hyb.		*	*	*	*	*
37	Massasoit, <i>Rogers' No. 3</i> .....	l.	m. r.	r.	v. g. g.	T. M.	M.	Hyb.					*	*
38	Martha.....	l.	s. r.	g.	v. g. g.	M. W.	M.	Lab.			*	*	*	†
39	Maxatawney.....	m.	m. r. o.	g.	v. g. g.	T.	M.	Lab.					*	*
40	Merrimac, <i>Rogers' No. 19</i> .....	l.	s. r.	b.	v. g. g.	M.	M.	Hyb.	*	*	*	*	*	*
41	Missouri Reisling.....													
42	Moore's Early.....	l.	r.	b.	v. g. g.	T. M.	V. E.	Lab.			†	*	*	*
43	Niagara.....	l.	r.	w.	v. g. g.	T. M.	M.	Lab.					*	†
44	Noah.....	s.	r.	w.	v. g. g.	W.	L.	Rip. x.					*	*
45	Norton's Virginia.....	s.	m. r.	b.	v. g. g.	W.	L.	Est.					*	†
46	Perkins.....	l.	r.	r.	v. g. g.	T. M.	E.	Lab.			*	*	*	*
47	Peter Wylie.....	m.	r.	w.	v. g. g.	T.		Hyb.					*	*
48	Pocklington.....	l.	l. r.	w.	v. g. g.	T. M.	M.	Lab.				†	*	*
49	Prentiss.....	m.	m. r.	w.	v. g. g.	T. M.	M.	Lab.				†	*	*
50	Salem, <i>Rogers' No. 52</i> .....	l.	r.	b.	v. g. g.	M.	M.	Hyb.	*	*	*	*	*	*
51	Scuppernon.....	l.	r.	r.	v. g. g.	W.	M.						*	*
52	Telegraph. <i>Christine</i> .....	l.	m. r. o.	b.	v. g. g.	T. M.	E.	Lab.		*	*	*	*	*
53	Tenderpulp.....													
54	Thomas.....													
55	Triumph.....	v. l.	l. r.	g.	v. g. g.	T.	L.	Hyb.						
56	Ulster.....													
57	Vergennes.....	s.	l. r.	p.	v. g. g.	T. M.	E.	Lab.				†	*	*
58	Walter.....	m.	s. r.	r.	v. g. g.	T. M. W.	M.	Lab.			†	*	*	†
59	Wilder, <i>Rogers' No. 4</i> .....	l.	l. r.	b.	v. g. g.	T. M.	M.	Hyb.	*	*	*	*	*	*
60	Worden.....	l.	r.	b.	v. g. g.	T. M.	E.	Lab.			*	*	*	*
61	Woodruff Red.....												*	*
62	Wyoming Red.....												*	*

6. Suited only to clayey loams and certain localities. 7. Valued for earliness and hardness but of a very poor quality.  
 8. Hardy everywhere. Nos. 22, 51, 53, 54, Rotundifolia type; adapted to the South only.



Sub-Section II.—Grapes, Foreign. *Vitis vinifera.*

As the Foreign Grapes are for cultivation under glass, they are not subject to those variations induced by climate or soil, and therefore they may be regarded as equally adapted to all localities. Very few of the local committees have made any report in reference to these Grapes. The list below contains such as have been already adopted by the Society, with a few others very generally esteemed. In California, Utah and sections of the Southern States, they require no artificial protection or heat; it has, therefore, been thought unnecessary to tabulate the States and Territories relative to them; but taking the old catalogue, and simply adding to it a column relative to variety as adapted to a *cold house*, or its want of fire heat, in our Northern States, the old form is continued.

The columns explain: 1st—The COLOR of the fruit; 2d—FLAVOR; 3d—SEASON of maturity; 4th—Cold for a variety that does well without fire heat; Hot for a variety wanting fire heat. In flavor, the only distinction given is between those that are simply sweet, as the Chasselas or Hamburgs, and those having a distinct musky aroma, as the Muscats.

No.	NAMES.	COLOR.	FLAVOR.	SEASON.	VINERY.
1	Barbarossa. <i>Prince Albert, Brizola</i> .....	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. <i>Calabrian Raisin, Raisin de Calabre</i> .....	White....	Sweet.....	Late.....	Hot.....
11	Canon Hall Muscat.....	White.....	Muscat....	Late.....	Hot.....
12	Chasselas Musque, or Joslin's St. Albans. <i>Muscat blanc hative</i> (?).....	White.....	Muscat....	Early.....	Hot.....

Section XI.—Guavas. *Psidium.*

Abbreviations.

COLOR.	FORM.	ORIGIN.
b-brown, g-green, p-pink,	r-red, w-white, y-yellow.	c-conical, k-kidney shape, o-oval or ovate,
	ob-oblong, p-pear shape, r-round.	Usual abbreviations for names of countries.

NUMBER.	NAMES.	DESCRIPTION.						
		COLOR.	FORM.	ORIGIN.	QUALITY.	SEASON.	SIZE.	USE.
1	Apple, <i>Psidium Guava</i> .....	v. g.	f.	W. I.	g.	S. A.	m.	d.c.m.
2	Chinese or yellow (Mexican) <i>P. Chinensis</i> or <i>P. Lucidum</i> ...	y.	f.	.....	b.	S. A.	s. m.	d.c.m.
3	Common Red or Strawberry, <i>P. Catheyannum</i> .....	r.	f.	S. A.	g.	S. A.	s.	d.c.m.
4	Large White, <i>P. Guava</i> .....	v. g.	o.	W. I.	g.	S.	l.	d.c.m.
5	White Winter, <i>P. Guava</i> .....	g. g.	p.	W. I.	g.	A.	m.	d.c.m.
6	Yellow, <i>P. Guava</i> .....	y.	o.	W. I.	g.	S.	m.	d.c.m.

Sub-Section II.—Grapes, Foreign. *Vitis vinifera.*

No.	NAMES.	COLOR.	FLAVOR.	SEASON.	VINERY.
13	Duke of Magenta.....	Black.....	Sweet.....	Early.....	Hot.....
14	Golden Hamburg. <i>Stockwood G. Hamburg</i> .....	White.....	Sweet.....	Late.....	Hot.....
15	Golden Champion.....	Amber.....	Sweet.....	Medium....	Hot.....
16	Grizzly Frontignan. <i>Red Frontignan, Red Constantia</i> ...	Red & Yel.	Muscat.....	Medium....	Hot.....
17	Gros Colman.....	Purple.....	Sweet.....	Late.....	Cold.....
18	Lady Downes. <i>Lady Downes' Seedling</i> .....	Black.....	Sweet.....	Very late..	Hot.....
19	Muscat of Alexandria.....	White.....	Muscat.....	Late.....	Hot.....
20	Muscat of Hamburg.....	Black.....	Muscat.....	Medium....	Hot.....
21	Mrs. Pince's Muscat. <i>Mrs. Pince's Black Muscat</i> .....	Black.....	Muscat.....	Late.....	Hot.....
22	Queen of Nice.....	White.....	.....	.....	.....
23	Red Chasselas. <i>Rose Chasselas</i> .....	Red.....	Sweet.....	Medium....	Hot.....
24	Red Lombardy.....	Red.....	Sweet.....	Medium....	Hot.....
25	Rio Virgin.....	.....	.....	.....	.....
26	Royal Muscadine.....	White.....	Sweet.....	Early.....	Cold.....
27	Silver Frontignan. <i>Early Silver Frontignan</i> .....	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. <i>Dutch Hamburg, Wilmot's Black Hamburg</i> .....	Black.....	Sweet.....	Medium....	Hot.....
31	White Sweetwater. <i>Dutch Sweetwater, etc</i> .....	White.....	Sweet.....	Early.....	Cold.....
32	White Frontignan. <i>White Constantia, Muscat blanc</i> .....	White.....	Muscat.....	Medium....	Hot.....
33	Zinfindal.....	Black.....	Sweet.....	Medium....	Hot.....

No. 5, 29 and 32, with several not tabulated, are highly recommended for central Florida; to be grown in the open air.

Section XI.—Guavas. *Psidium.*

Abbreviations.

QUALITY.	SEASON.	SIZE.	USE.
b-best, g-good, v-very.	A-autumn, S-summer, W-winter.	l-large, v-very. m-medium, s-small,	c-cooking, m-market, d-dessert, s-shipping.

NUMBER.	STATES.									
	Florida.	S. Carolina.	Georgia.	Alabama.	Mississippi.	Louisiana	Texas.	New Mexico	Arizona.	Califor- nia.
1	**	.....	.....	.....	.....	.....	†	.....	.....	†
2	*	.....	.....	.....	.....	.....	†	.....	.....	*
3	*	.....	.....	.....	.....	.....	*	.....	.....	†
4	**	.....	.....	.....	.....	.....	†	.....	.....	†
5	**	.....	.....	.....	.....	.....	†	.....	.....	†
6	**	.....	.....	.....	.....	.....	†	.....	.....	†

Section XII.—Kaki. (Japan Persimmon). *Diospyros Kaki*.

Abbreviations as in Guavas.

NUMBER.	NAMES.	DESCRIPTION.						
		COLOR.	FORM.	ORIGIN.	QUALITY.	SEASON.	SIZE.	USE.
1	Yemon.....	r.	f.	Jap.	g.	a.	l.	.....
2	Costata. <i>Imperial</i> .....	r.	ob.	Jap.	g.	a.	s.	.....
3	Hachiya.....	r.	r. c.	.....	b.	.....	l.	.....
4	Hiyakume.....	r.	ob.	.....	b.	.....	l.	.....
5	Kurokuma.....	r.	.....	.....	f. g.	.....	l.	.....
6	Yedo-ichi.....	r.	r.	.....	v. g.	.....	m.	.....
7	Tane-Nashi.....	r.	r. c.	.....	b.	.....	l.	.....
8	Okame.....	r.	f.	.....	b.	.....	l.	.....
9	Tsuru.....	r.	l. p.	.....	m.	.....	m.	.....
10	Zengi.....	r.	r.	.....	g.	.....	s.	.....

Many of the Kakis are found to succeed in California; but, in the absence of reports, starring is omitted

Section XIII.—Loquats. *Eryobotrya Japonica*.

Abbreviations, Descriptions and States, as for Guavas.

NUMBER.	NAMES.	DESCRIPTION.						
		COLOR.	FORM.	ORIGIN.	QUALITY.	SEASON.	SIZE.	USE.
1	Giant.....	.....	.....	.....	.....	.....	.....	.....

Section XIV.—Mangoes. *Mangifera Indica*.

Abbreviations as for Guavas.

NUMBER.	NAMES.	DESCRIPTION.						
		COLOR.	FORM.	ORIGIN.	QUALITY.	SEASON.	SIZE.	USE.
1	Apricot.....	y. g.	k.	W. I.	v. g.	m.	.....	d. m.
2	Bombay.....	.....	k.	E. I.	b.	.....	.....	.....
3	D'or.....	.....	k.	W. I.	.....	.....	.....	.....
4	Freycinet.....	.....	k.	W. I.	.....	.....	.....	.....
5	Julie.....	.....	k.	W. I.	.....	.....	.....	.....
6	Malda.....	.....	k.	E. I.	b.	.....	.....	.....



Section XV.—Mulberries. *Morus Nigra*.

Abbreviations and States as for Apricots.

States grouped and arranged as for Apricots.

NUMBER.	NAMES.	DESCRIPTION.							I.—N. Div.						
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts.	Rhode Island.
1	Downing.....	m.	ob.	.....	b.	b.	E.	.....	.....	.....	.....	.....	.....	.....	.....
2	Hicks.....	m	ob.	.....	b.	v. g.	E. L.	.....	.....	.....	.....	.....	.....	.....	.....
3	Slubbs.....	v. l.	ob.	.....	b.	b.	M.	.....	.....	.....	.....	.....	.....	.....	.....

1. Lacks hardness at the north. Best in quality.

Section XVI.—Nectarines. *Persica vulgaris, var laevis*.

Explanation same as for Apricots.

NUMBER.	NAMES.	DESCRIPTION.							I.—N. Div.						
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts.	Rhode Island.
1	Boston.....	l.	r. o.	o. r.	v. gg.	F.	M.	Am.	.....	.....	.....	.....	.....	.....	.....
2	Downton.....	l.	r. o.	o. r.	v. gg.	F.	E.	F.	.....	.....	.....	.....	.....	.....	.....
3	Early Newington.....	l.	r. o.	o. r.	v. gg.	F.	E.	Am.	.....	.....	.....	.....	.....	.....	.....
4	Early Violet.....	l.	r.	o. r.	b.	F.	E.	F.	.....	.....	.....	.....	.....	.....	.....
5	Elruge.....	m.	r. o.	o. r.	v. gg.	F.	L.	F.	.....	.....	.....	.....	.....	.....	.....
6	Stanwick.....	l.	r. o.	o. r.	g.	F.	L.	F.	.....	.....	.....	.....	.....	.....	.....

Section XVI.—Olives. *Olea Europea*.

Abbreviations as for Guavas.

NUMBER.	NAMES.	DESCRIPTION.						
		COLOR.	FORM.	ORIGIN.	QUALITY.	SEASON.	SIZE.	USE.
1	Richoline.....	.....	.....	.....	.....	.....	.....	.....

1. Varieties are numerous, nomenclature confused. All do well.



Section XVIII.—Citrus Fruits. *Citrus aurantium.*

Sub-Section I. Oranges.

The columns explain: SIZE—l., large; m., medium; s., small. FORM—ov., oval; r., round; fl., flattened, obl., oblong. QUALITY—f., fair; g., good; v. g., very good; b., best. SEASON—E., early; M., medium; L., late; ORIGIN—F., foreign; N., native. COLOR—d., dark; l., light; o., orange; y., yellow.

NUMBER.	NAMES.	DESCRIPTION.					III.—S. Div.—Bet. 28° & 35°											
		SIZE.	FORM.	QUALITY.	SEASON.	ORIGIN.	California.	South Carolina.	Georgia.	Alabama.	Florida.	Indian Ter.	Arkansas.	Mississippi.	Louisiana.	Texas.	New Mexico.	Arizona.
1	Acapulco.....	l.	r.	v. g.	M.	F.	*											
2	Acis.....	l.	r.	v. g.	L.	F.	*											
3	Atwood Navel.....	m.	obl.	v. g.	M.	F.	*											
4	Bell.....	l.	ov.	v. g.	M.	F.	*											
5	Botelha.....	m.	r.	v. g.	M.	F.	*											
6	Buttercourt.....					F.	*											
7	Centennial.....	m.	r.	v. g.	E. M.	N.	*											
8	Charley Brown.....	l.	fl.	v. g.	M.	F.	*											
9	Double (Imperial) Navel.....	m.	obl.	v. g.	M.	F.	*											
10	Dulcissima.....	s.	r.	v. g.	E.	F.	*											
11	Du Roi.....	m.	r.	v. g.	M.	F.	*											
12	Du Roi Blood.....	m.	r.	v. g.	M.	F.	*											
13	Early Oblong.....	m.	obl.	v. g.	V. E.	F.	*											
14	Egg.....	m.	ov.	v. g.	E.	F.	*											
15	Excelsior.....	m.	r.	v. g.	L.	F.	*											
16	Exquisite.....	m.	r.	v. g.	M.	F.	*											
17	Hart Late. <i>Tardive Brown</i> .....	m.	ov.	v. g.	L.	F.	*											
18	Homosassa.....	m.	r.	b.	M.	N.	*											
19	Imperial Blood.....	m.	r.	v. g.	M.	N.	*											
20	Jaffa.....	m.	r.	v. g.	M.	F.	*											
21	Jaffa Blood.....	s.	ov.	b.	M.	N.	*											
22	Long.....					F.	*											
23	Magnum Bonum.....	l.	r.	b.	M.	N.	*											
24	Majorca.....	m.	r.	v. g.	M.	F.	*											
25	Maltese Blood.....	s.	ov.	v. g.	M.	F.	*											
26	Maltese Egg.....	s.	obl.	v. g.	M.	F.	*											
27	Maltese Oval.....	l.	obl.	v. g.	L.	F.	*											
28	Mediterranean Sweet.....	l.	ov.	v. g.	L.	F.	*											
29	Melitencis Navel.....	l.	r. ov.	v. g.	E.	F.	*											
30	Nonpariel.....	l.	r.	b.	E.	N.	*											
31	Old Vini.....	m.	r.	v. g.	M.	N.	*											
32	Paper Rind. <i>St. Michael</i> .....					F.	*											
33	Prata.....	s.	r.	v. g.	M.	F.	*											
34	Prolific.....	m.	r.	v. g.	M.	F.	*											
35	Queen.....					F.	*											
36	St. Michaels.....	m.	r.	v. g.	M.	F.	*											
37	St. Michael Blood.....	m.	r.	b.	M.	F.	*											
38	St. Michael Egg.....	l.	ov.	f.	E.	F.	*											
39	Star Calyx.....	l.	r.	v. g.	M.	N.	*											
40	Sustain.....	l.	r.	v. g.	M.	F.	*											
41	Sweet Blood.....	m.	r. fl.	v. g.	E.	F.	*											
42	Sweet Seville.....	s.	ov.	v. g.	E.	F.	*											
43	Thorpe Trophy.....	m.	r.	v. g.	V. E.	N.	*											
44	Washington Navel. <i>Parsons Navel</i> .....	l.	r. ov.	b.	E. M.	F.	*											
45	White.....	l.		v. g.		F.	*											

12. Always ribbed.

The following are American varieties, resembling each other, of good quality, and with a local reputation; also Arcadia, Beach 3, Dixon, Dummitt, Higgins, Osceola, Parson Brown, Peerless and Spratt Harmon.

Sub-Section II.—Citrous. *Citrus Medica*.

For Abbreviations, see Oranges.

NUMBER.	NAMES.	DESCRIPTION.					III.—S. Div.—Bet. 28° & 35°
		SIZE.	FORM.	QUALITY.	SEASON.	ORIGIN.	
1	Lyman.....	m.	l.	r. s.	.....	F.	California.
2	Medica (?) ( <i>lemon</i> ).....	l.	l.	.....	.....	F.	South Carolina
3	Tuberosa (?) ( <i>orange</i> ).....	s.	r.	.....	.....	F.	Georgia.
							Alabama.
							Florida.
							Indian Ter.
							Arkansas.
							Mississippi.
							Louisiana.
							Texas.
							New Mexico.
							Arizona.

1 and 2. Citron of commerce.

Sub-Section III.—Kumquat. (*Kinkaus*). *Citrus Japonica*.

For Abbreviations, see Oranges.

NUMBER.	NAMES.	DESCRIPTION.					III.—S. Div.—Bet. 28° & 35°
		SIZE.	FORM.	QUALITY.	SEASON.	ORIGIN.	
1	Naganie.....	s.	ob.	g.	l.	F.	California.
2	Marunie.....	s.	r.	g.	l.	F.	South Carolina
							Georgia.
							Alabama.
							Florida.
							Indian Ter.
							Arkansas.
							Mississippi.
							Louisiana.
							Texas.
							New Mexico.
							Arizona.

Both succeed throughout the Gulf region, on hardy stocks.

Sub-Section IV.—Lemons. *C. Limonum*.

Abbreviation and State Columns, as for Oranges.

NUMBER.	NAMES.	DESCRIPTION.					III.—S. Div.—Bet. 28° & 35°
		SIZE.	FORM.	QUALITY.	SEASON.	ORIGIN.	
1	Belair.....	m.	ob.	b.	l.	F.	California.
2	Bijou.....	s.	l.	g.	l.	F.	South Carolina
3	Eureka.....	m.	l.	g.	l.	F.	Georgia.
4	Everbearing.....	l. m.	l.	g.	l.	F.	Alabama.
5	French.....	l. m.	l.	r.	l.	N.	Florida.
6	Genoa.....	m.	l.	g.	l.	F.	Indian Ter.
7	Imperial.....	m.	l.	g.	l.	F.	Arkansas.
8	Lamb.....	l. m.	l.	g.	l.	N.	Mississippi.
9	Messma.....	m.	l.	b.	l.	F.	Louisiana.
10	Neapolitan.....	m.	l.	f.	l.	F.	Texas.
11	Sicily.....	m.	l.	b.	l.	F.	New Mexico.
12	Villa Franca.....	m.	l.	b.	l.	F.	Arizona.
13	Willow Leaved.....	m.	l.	.....	l.	F.	.....



Sub-Section VIII.—Oranges, Bitter. *C. Bigaradia.*

Abbreviations as for Oranges.

NUMBER.	NAMES.	DESCRIPTION.						III.—S. Div.—Bet. 28° & 35°											
		SIZE.	FORM.	QUALITY.	SEASON.	ORIGIN.	COLOR.	California.	South Carolina	Georgia.	Alabama.	Florida.	Indian Ter.	Arkansas.	Mississippi.	Louisiana.	Texas.	New Mexico.	Arizona.
1	Bitter Sweet.....	l.	r. fl.	.....	s. p.	F.	d. o. y.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	Dwarf.....	l.	r. fl.	.....	s. p.	F.	d. o. y.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	Italian Sour.....	.....	.....	.....	s. p.	F.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	Navel.....	l.	.....	.....	s. p.	F.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	Phillips Bitter Sweet.....	l.	r. fl.	.....	s. p.	F.	d. o. y.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	Sour.....	l.	r. fl.	.....	s. p.	F.	d. o. y.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Sub-Section IX.—Pomelo. (Grape Fruit). *C. panelanus.*

Abbreviations as for Oranges.

NUMBER.	NAMES.	DESCRIPTION.						III.—S. Div.—Bet. 28° & 35°											
		SIZE.	FORM.	QUALITY.	SEASON.	ORIGIN.	COLOR.	California.	South Carolina	Georgia.	Alabama.	Florida.	Indian Ter.	Arkansas.	Mississippi.	Louisiana.	Texas.	New Mexico.	Arizona.
1	Aurantium.....	l. m.	r.	v. g.	l.	N.	p. y.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	Hart.....	s. m.	r.	v. g.	l.	N.	p. y.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	Triumph.....	s. m.	r.	v. g.	l.	N.	p. y.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	Walter.....	l. m.	r.	v. g.	l.	N.	p. y.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Sub-Section X.—Shaddocks. *C. decumana.*

Abbreviations as for Oranges.

NUMBER.	NAMES.	DESCRIPTION.						III.—S. Div.—Bet. 28° & 35°											
		SIZE.	FORM.	QUALITY.	SEASON.	ORIGIN.	COLOR.	California.	South Carolina	Georgia.	Alabama.	Florida.	Indian Ter.	Arkansas.	Mississippi.	Louisiana.	Texas.	New Mexico.	Arizona.
1	Blood.....	l.	r.	f.	l.	F.	v. o. y.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	"Forbidden Fruit".....	.....	.....	.....	.....	F.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	Mammoth (or orange).....	l.	r.	f.	l.	F.	o. y.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

2. The name commonly applied to the entire species.

Section XIX.—Peaches. *Persica vulgaris.*

The columns explain: SIZE—l, large; m, medium; s, small. CLASS—F., freestone; C, clingstone. COLOR—relative to the flesh, w., white or pale color; y., yellow or yellowish; g., greenish white, red at stone. QUALITY—j. v., juicy vinous; m. j. r., melting, juicy, rich; s. j., sweet, juicy; s. j. h., sweet, juicy and high flavored. GLANDS—s., serrated, without glands; g., glands, globose; r., glands, reniform. SEASON—the season of maturity, as Early, Medium or Late; those designated as Early ripen in latitude 43° previous to or about September 1st; Medium, those ripening from 1st to 15th of September; and Late, those after that period; a few of the very early and very late are so designated—E., early; M., medium; L., late; V. E., very early; V. L., very late. ORIGIN—Am., American; F., foreign; P-to, Peen-to; S., Spanish type; N. C. Northern Chinese type; Per., Persian type; N. O. B., New Oriental Bloods.

NUMBER.	NAMES.	DESCRIPTION.						I.—N. Div.							
		SIZE.	CLASS.	COLOR.	QUALITY.	GLANDS.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts.	Rhode Island.
1	Allen October.....						L.	Am.							
2	Alexander.....	m.	F.	w.	s. j.	g.	V. E.	Am.					*	†	
3	Alexander Noblesse.....	l.	F.	w.	m. j. v.	r.	M.	F.							
4	Amelia.....	l.	F.	w.	m. j. r.	r.	E.	Am.							
5	Angel.....	l.	F.	w.	b.		E.	P-to.							
6	Austin. <i>Austin's Late Red</i> .....	l.	C.	w.	j. v.	r.	L.	Am.							
7	Baldwin.....	l.	F.	w.	j. m.	r.	L.	Am.							
8	Barnard.....	m.	F.	y.	j. v.	g.	E.								
9	Beers Smock.....	l.	F.	y.	j. v.		L.	Am.							
10	Bellegarde.....	l.	F.	g.	s. j.	g.	M.	F.							
11	Bergen Yellow.....	m.	F.	y.	j. v.	r.	M.	Am.					*		
12	Bidwell Early.....	m.	C.	w.	g.		V. E.	P-to.							
13	Bidwell Late.....	l.	C.	w.	v. g.		E.	P-to.							
14	Cable Indian.....	l.	C.	purple.	g.		M.	S.							
15	Carpenter Cling.....	l.	C.	w.	g.		M.	S.							
16	Catharine.....	l.	C.	y. g.	j. r.	r.	M.	Am.							
17	Chair Choice.....							Md.							
18	Chinese Cling.....	l.	C.	g.	j. v.	r.	M.								
19	Chinese Free.....	l.	F.	w.	g.		M.	N. C.							
20	Climax.....	m.	F.	y. w.	v. g.		E.	H.							
21	Cole. ( <i>Early Red</i> ).....	m.	F.	w.	m. j. r.	g.	V. E.	Am.					*		
22	Columbia.....	l.	F.	y.	j. v.	r.	M.	Am.							
23	Coolidge.....	l.	F.	w.	s. j. h.	g.	M.	Am.					**	*	
24	Cook Late. <i>Cook's Late White</i> .....	m.	F.	w.	m. j. v.		L.	Am.							
25	Countess.....	l.	F.	w.	g.		M.	S.							
26	Crawford Early.....	l.	F.	y.	j. v.	g.	M.	Am.					***	**	
27	Crawford Late.....	l.	F.	y.	j. v.	g.	L.	Am.					*	*	
28	Deming (Orange). <i>Deming's Sept</i> .....	l.	C.	y.	j. r.		L.	Am.							
29	Druid Hill.....	l.	F.	g.	m. j. r.	g.	V. L.	Am.							
30	Duff.....	l.	C.	y.	m. j.	g.	E.	Am.							
31	Early Admirable.....	l.	F.	w.	m. j.	g.	M.	F.							
32	Early Cream. ( <i>Kites Honey</i> ).....	l.	F.	w.	g.		M.	N. C.							
33	Early Grosse Mignonne.....	m.	F.	w.	m. j. v.	g.	E.	F.							
34	Early Newington Free.....	l.	F.	g.	j. v.	g.	E.	Am.							
35	Early York.....	m.	F.	w.	m. j. r.	s.	V. E.	Am.					*	*	
36	Eaton (Golden).....	m.	C.	y.	s. j.	r.	L.	Am.							
37	Elberta.....	l.	F.	y.	m. j. r.		M.	Am.							
38	Flewellen.....	l.	C.	y.	j. r.		E.	Am.							
39	Fox (Seedling).....														
40	Foster.....	l.	F.	y.	j. v.	g.	L.	Am.					*	†	
41	Florida Crawford.....	l.	F.	y.	b.		M.	S.							
42	Fox.....														
43	General Lee.....														
44	George the Fourth.....	m.	F.	y.	m. j. r.	g.	M.	Am.					*	*	
45	Gibbon October.....	l.	C.	w.	g.		L.	S.							
46	Globe.....	m.	F.	w. y.	s. j.		M.	Am.							
47	Grosse Mignonne. <i>Royal Kensington</i> .....	l.	F.	w.	s. j. h.	g.	M.	F.					*	*	
48	Hale.....	m.	F.	w.	m. j. r.	g.	V. E.	Am.					*	*	
49	Heath Cling.....	l.	C.	g.	s. j. h.	r.	V. L.	Am.							
50	Hill Chili.....	m.	F.	y.			L.	Am.							
51	Honey.....	m.	F.	y.	s. j.		E.	China							
52	Hoover Heath. <i>Hoover's Late Heath</i> .....														
53	Hyslop.....	l.	C.	w.	m. j. r.	r.	V. L.	Am.							
54	Indian Blood Cling.....	l.	C.	y.	j. v.	r.	L.	Am.							
55	Indian Blood Free.....	l.	F.	y.	j. v.		L.	Am.							
56	Incomparable.....	l.	C.	w.	m. j.	r.	L.	Am.							
57	Katie.....	s.			g.		L.	S.							
58	Kenrick's Heath. <i>Heath Freestone</i> .....	l.	F.	g.	j. v.	r.	L.	Am.							
59	Keyport White.....	l.	F.	w. r.	m. j.	r.	V. L.	Am.						†	
60	Lady Parham.....	m.	F.	g.	j. v.	r.	V. L.	Am.							
61	Large Early York.....	m.	F.	w.	s. j. h.	g.	V. E.	Am.							
62	Late Red Rareripe.....	l.	F.	w.	s. j. h.	g.	M.	Am.						*	
63	Late Admirable.....	v. l.	F.	y. g.	m. h.	g.	M.	F.							
64	Lemon.....														

2. Amsden is nearly identical with this, though of distinct origin.  
 4. This originated in South Carolina and differs from the Missouri Amelia.  
 18. Mr. Berkman's thinks it is the same as Shanghai. 28. Resembles Lemou Cling.



NUMBER.	NAMES.	DESCRIPTION.							I.—N. Div.						
		SIZE.	CLASS.	COLOR.	QUALITY.	GLANDS.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts.	Rhode Island.
65	Leopold I. <i>Leopold Freestone</i> .....	l.	F.	y.	j. v.	r.	M.	F.							
66	Louise. <i>Early Louise</i> .....	m.	F.	w.	m. j.	r.	E.	Eng.							
67	Mammoth Free.....	v. l.	F.												
68	Mitchell. <i>Mitchell's Mammoth</i> .....	l.	C.	g. w.	m. j.		L.	Am.							
69	Molden's White.....	l.	F.	w.	s. j.	r.	L.	Am.							
70	Montgomery's Late.....	l.	F.	w. r.	m. j.	r.	L.	Am.							
71	Mountain Rose.....	m.	F.	w.	s. j.	g.	M.	Am.						†	†
72	Noblesse.....	l.	F.	w.	s. j.	g.	M.	F.							
73	Oldmixon Free.....	l.	F.	g.	s. j. h.	g.	M.	Am.						*	*
74	Oldmixon Cling.....	l.	C.	w.	m. j. r.	g.	M.	Am.						*	
75	Onderdonk.....	l.	F.	w.	b.		M.	S.							
76	Pallas.....	l.	F.	w.	g.		E.	II							
77	Pavie de Pompone.....	l.	C.	w.	m. j.	r.	L.	F.							
78	Petite Imperial.....	l.	F.	w.	m. j. v.	r.	L.	Am.							
79	Peen-to.....	m.	C.	w.	m. j. v.		V. E.	China							
80	Picquett's Late.....	l.	F.	y.	s. j.	r.	M.	Am.							
81	President.....	l.	F.	w.	m. j. r.	g.	M.	Am.						*	
82	Princess of Wales.....	l.	F.	w.	m. j. v.	g.	M.	F.							
83	Pucelle. <i>Pucelle de Malines</i> .....	l.	F.	w. r.	m. j.	s.	M.	Am.							
84	Raymond Cling.....	l.	C.												
85	Red Cheek Melocoton.....	l.	F.	y.	j. v.	g.	M.	Am.						*	
86	Reeves' Favorite.....	l.	E.	y. r.	m. j.	g.	M.	Am.							
87	Richmond.....	m.	F.	w.	m. j.	r.	M.	Am.							
88	Rivers. <i>Early Rivers</i> .....	l.	F.	p. y.	m. r.	r.	E.	Eng.							
89	Rodman's Cling.....	l.	C.	w.	j. v.	r.	L.	Am.							
90	Royal George.....	m.	F.	w.	m. j. r.	s.	E.	F.							*
91	Saint John. <i>Yellow St. John</i> .....	l.	F.	y.	s. j.	g.	V. E.	Am.							
92	Salway.....	l.	F.	y. r.	m. j.	r.	M.	Am.							
93	Scott's October.....	m.	C.	y.			V. L.								
94	Shockley's Early.....														
95	Smock.....	l.	F.	y.	j. v.	r.	L.	Am.							
96	Snow.....	m.	F.	w.	s. j.	r.	M.	Am.							
97	Snow's Orange.....	m.	F.	y.	m. j.	r.	M.	Am.							
98	Steven's Rarripe.....														
99	Stump the World.....	l.	F.	w.	s. j. h.	g.	L.	Am.							*
100	Sturtevant.....	m.	F.	y.	s. j. h.	g.	M.	Am.							
101	Strawberry.....	m.	F.	w.	m. h.	r.	M.	Am.							
102	Susquehanna.....	l.	F.	y.	s. j. v.	g.	M.	Am.							
103	Thurber.....	l.	F.	w.	m. j. r.		E.	Am.							
104	Tillotson. <i>Early Tillotson</i> .....	l.	F.	g.	m. j. r.	s.	V. E.	Am.							*
105	Tippecanoe.....	l.	C.	y.	j. v.	r.	L.	Am.							
106	Tuskana Cling, Lemon.....														
107	Van Zandt. <i>Van Zandt's Superb</i> .....	m.	F.	w.	m. j. r.	g.	M.	Am.							
108	Waldo.....	m.	F.	y. w.	l.		V. E.	P-to.							
109	Ward's Late. <i>Hard's Late Free</i> .....	l.	F.	w.	r. j. s.	r.	L.	Am.							†
110	Washington Cling.....	m.	C.	y. r.	m. j.	r.	L.	Am.							
111	Wheatland.....	l.	F.	y.	s. j. h.	r.	M.	Am.							
112	Wheeler's Early.....	s.	F.	w. r.	m. j.		V. E.	Am.							
113	White Imperial.....	m.	F.	w.	m. j. r.	g.	E.	Am.							
114	Yellow Rarripe.....	l.	F.	y.	j. v.	g.	E.	Am.							*

68. Resembles Heath Cling, but later

110 One of the earliest.

79. Suitable for east and Middle Florida and Southern Texas.



Section XX.—Pears. *Lyrus communis*.

The columns explain as follows: SIZE—s., small; l., large; m., medium. FORM—p., pyriform; r. o. p., roundish obtuse pyriform; r. a. p., roundish acute pyriform; ob. p., obtuse pyriform; ob. o. p., oblong obtuse pyriform; r., roundish; r. ob., roundish obtuse. COLOR—y. g., yellow or yellowish green with a red or russet red cheek; y. r., yellow and russet; y., when mostly yellow or yellowish. QUALITY—g., good; v. g., very good; b., best. USE—F., valuable family dessert; K. M., kitchen and market; F. M., family and market. SEASON—S., summer; L. S., late summer; A., autumn; E. A., early autumn; L. A., late autumn; W., winter. ORIGIN—Eng., English; Am., American; F., French; Fl., Flemish; B., Belgium; H., Holland.

NUMBER.	NAMES.	DESCRIPTION.						I.—N. Div.							
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick.	Maine.	New Hampshire.	Vermont.	Massachusetts.	Rhode Island.
1	Abbott.....	m.	ob. p.	y. r.	v. g.	F.	E. A.	Am.							
2	Amanlis. <i>Beurre d' Amanlis</i> .....	l.	r. o. p.	y. g.	v. g.	F. M.	E. A.	B.							
3	Ananas d'Ete.....	l.	p.	y. g.	v. g.	F. M.	E. A.	H.							
4	Andrews.....	l.	p.	y. g.	v. g.	F.	E. A.	Am.	+						
5	Angouleme. <i>Duchesse d' Angouleme</i> .....	l.	o. b. o. p.	y.	v. g.	F. M.	A.	F.	*						
6	Anjou. <i>Beurre d' Anjou</i> .....	l.	ob. p.	y. g.	v. g.	F. M.	L. A.	F.	*						
7	Ansault. <i>Bonne du Puits Ansault</i> .....	m.	ob. d.	y. r.	b.	F.	L. S.	F.							
8	Bartlett.....	l.	o. b. o. p.	y.	v. g.	F. M.	L. S.	Eng.	*						
9	Baronne de Mello.....	m.	r. a. p.	y. r.	v. g.	F. M.	E. A.	B.							
10	Bergen.....	l.	p. y. r.	y. g.	g.	F. M.	E. A.	Am.							
11	Beurre Precoce.....	m.	ob. p.	y. r.	g.	F. M.	S.	F.							
12	Bilboa. <i>Golden Beurre of Bilbao</i> .....	m.	p.	y.	v. g.	F.	E. A.		*						
13	Bloodgood.....	m.	r.	y. r.	v. g.	F.	S.	Am.							
14	Bordeaux. <i>Duchesse de Bordeaux</i> .....	m.	r.	y. r.	g.	M.	W.	F.							
15	Bosc. <i>Beurre Bosc</i> .....	l.	p.	y. r.	b.	F. M.	L. A.	B.	*						
16	Boussock. <i>Doyenne Boussock</i> .....	l.	r. o. p.	y. r.	v. g.	F. M.	E. A.	B.	+						
17	Brandywine.....	m.	r. ob.	y. g.	v. g.	F. M.	S.	Am.	*						
18	Brialmont.....	l.	ob. p.	y. r.	v. g.	F. M.	A.	B.							
19	Brignais. <i>Beurre de Brignais, Des Nonnes</i> .....	m.	r. ob.	y.	v. g.	F.	E. A.								
20	British Queen.....	l.	ob. p.	y. r.	v. g.	F. M.	A.	Eng.							
21	Buffum.....	m.	r. o. p.	y. g.	g.	M.	E. A.	Am.							
22	Caen de France.....	m.	ob. p.	y. r.	v. g.	F. M.	W.	F.							
23	Catillac.....	l.	r. a. p.	y.	g.	K. M.	W.	F.							
24	Chambers.....	m.	ob. p.	y.	g.	F. M.	S.	Am.							
25	Clairgeau. <i>Beurre Clairgeau</i> .....	l.	p.	y. r.	g.	M.	L. A.	F.	*						
26	Clapp Favorite.....	l.	o. b. o. p.	y. g.	v. g.	F. M.	S.	Am.	*						
27	Columbia.....	l.	r. o. p.	y.	g.	M. K.	W.	Am.							
28	Comice. <i>Doyenne du Comice</i> .....	l.	r. o. p.	y. g.	b.	F. M.	L. A.	F.							
29	Dallas.....	l.	ob. p.	y. g.	v. g.	F. M.	L. A.	Am.							
30	Dana Hovey.....	s.	r. ob. p.	y. g.	b.	F.	W.	Am.							
31	Diel. <i>Beurre Diel</i> .....	l.	r. ob. p.	y. r.	v. g.	F. M.	L. A.	B.	*						
32	Dix.....	l.	ob. p.	y.	b.	F. M.	L. A.	Am.							
33	Doyenne d' Alencon.....	m.	r. p.	y. r.	v. g.	F. M.	W.								
34	Duchess Precoce.....	l.	p. y. r.	y. g.	g.	F. M.	E. A.	F.							
35	Easter Beurre.....	l.	r. ob. p.	y. r.	v. g.	F.	W.	B.							
36	Eastern Belle.....	m.	ob. p.	y. r.	v. g.	F.	E. A.	Am.							
37	Emile d'Heyst.....	l.	ob. p.	y. r.	b.	F.	L. A.	B.							
38	Epine Dumas. <i>Bell Epine Dumas, Duc de Bordeaux</i> .....	m.	r. o. p.	y.	v. g.	F.	L. A.								
39	Flemish Beauty.....	l.	r. ob. p.	y. g.	v. g.	F. M.	E. A.	B.							
40	Fontenay. <i>Jalousie de Fontenay Vendee</i> .....	m.	r. a. p.	y. r.	v. g.	F. M.	A.	F.							
41	Foster Seckel.....	s.	ob. p.	y. r.	b.	F. M.	E. A.	Am.							
42	Frederick Clapp.....	m.	r. ob. p.	y.	b.	F. M.	E. A.	Am.							
43	Fulton.....	s.	r. ob.	y. r.	v. g.	F.	A.	Am.							
44	Garber.....	l.	r. o. p.	y. r.	g.	F. M.	V. L.	F.							
45	Giffard. <i>Beurre Giffard</i> .....	m.	p.	y. g.	v. g.	F. M.	S.	F.							
46	Glout Morceau.....	l.	ob. p.	y.	g.		L. A.								
47	Goodale.....	l.	ob. p.	y. g.	v. g.	F. M.	A.	Am.							
48	Goubaldt. <i>Beurre Goubaldt</i> .....	m.	ob. r.	y. g.	g.	F.	L. S.	F.							
49	Gray Doyenne.....	m.	r.	y. r.	b.	F. M.	L. A.	F.							
50	Hardy. <i>Beurre Hardy</i> .....	l.	ob. p.	y. g.	v. g.	F. M.	E. A.		*						
51	Harris.....	m.	o. b. o. p.	y. r.	v. g.	F.	E. A.	Am.							
52	Helen Gregoire.....	m.	r. o. p.	y. g.	v. g.	F.	E. A.	F.							
53	Henkel.....	l.	r. ob. p.	y. r.	v. g.	F.	E. A.	B.							
54	Hosenschenk. <i>Moore's Pound</i> .....	m.	r. ob.	y.	g.	M.	S.	Am.							
55	Howell.....	l.	r. p.	y. g.	v. g.	F. M.	E. A.	Am.	*						
56	Jaminette.....	m.	r. ob.	y. r.	g.	F. M.	W.								
57	John Williams.....	m.					W.	Am.							
58	Jonah. <i>Winter Jonah</i> .....	l.				F. M.	W.	Am.							
59	Josephine of Malines.....	m.	r. ob. p.	y. r.	v. g.	F. M.	W.	F.							
60	Julienne.....	s.	r. ob.	y.	g.	F. M.	S.								
61	Kieffer.....	l.	r. o. p.	y. r.	g.	K. M.	A.	Am.							
62	Kingsessing.....	l.	ob. p.	y.	g.	F. M.	E. A.	Am.							
63	Kirtland.....	m.	r. ob.	y. r.	v. g.	F. M.	E. A.	Am.	+	+	*				

35. Requires very high cultivation.

43. A hardy, productive tree.

56. An old variety; very healthy and productive.

57. Supposed to be Columbia.

59. The finest late winter pear, where it succeeds.

61. Valuable for the South.



NUMBER.	NAMES.	DESCRIPTION.						I.—N. Div.							
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts.	Rhode Island.
64	Knight. <i>Knight's Seedling</i> .....	m.	r. ob.	y.	v. g.	M.	A.	Am.	..	..	..	..	..	..	**
65	Langelier. <i>Beurre Langelier</i> .....	m.	ob. p.	y. r.	v. g.	F. M.	W.	F.	..	..	..	..	..	..	**
66	Lawrence.....	m.	r. o. p.	y. r.	v. g.	F. M.	W.	Am.	..	..	*	..	..	..	**
67	Le Conte.....	l.	ob. p.	y.	v. g.	M.	S.	Am.	..	..	..	..	..	..	..
68	Lindley. <i>Dr. Lindley</i> .....	m.	r. ob.	y. g.	v. g.	F.	E. A.	F.	..	..	..	..	..	..	**
69	Louise Bonne of Jersey.....	l.	ob. p.	y. g.	v. g.	F. M.	E. A.	F.	*	..	..	..	..	..	**
70	Lucrative. <i>Belle Lucrative</i> .....	m.	ob. r.	g. y.	b.	F.	E. A.	Fl.	..	..	**	..	..	..	**
71	Madeleine.....	m.	p.	y. g.	v. g.	F. M.	S.	F.	..	..	..	..	..	..	..
72	Madame Andre Leroy.....	l.	o. b. o. p.	y. r.	v. g.	F.	E. A.	F.	..	..	..	..	..	..	..
73	Madame Eliza.....	l.	r. a. p.	y. r.	v. g.	F. M.	A.	B.	..	..	..	..	..	..	..
74	Madame Treyve.....	m.	r. o. p.	y. r.	v. g.	F.	L. S.	F.	..	..	..	..	..	..	..
75	Manning Elizabeth.....	s.	ob. p.	y. r.	v. g.	F.	S.	.....	..	..	*	..	..	..	**
76	Marie Louise.....	l.	p.	y. r.	v. g.	F.	A.	B.	..	..	..	..	..	..	**
77	Margaret. <i>Petite Marguerite</i> .....	m.	ob. p.	y. g.	b.	F.	S.	F.	..	..	..	..	..	..	**
78	McLaughlin.....	l.	ob. p.	y. g.	v. g.	F. M.	W.	Am.	..	..	*	..	..	..	**
79	Merriam.....	m.	r. ob.	y. r.	v. g.	F. M.	A.	Am.	..	..	..	..	..	..	**
80	Mount Vernon.....	m.	r. o. p.	y. r.	v. g.	F. M.	L. A.	Am.	..	..	..	..	..	..	**
81	Napoleon.....	l.	ob. p.	y.	v. g.	M.	A.	B.	..	..	..	..	..	..	**
82	Onondaga. <i>Swan's Orange</i> .....	l.	ob. p.	y. g.	v. g.	F. M.	L. A.	Am.	*	..	..	..	..	..	**
83	Osband Summer.....	s.	r. p.	y. g.	v. g.	F.	S.	Am.	..	..	..	..	..	..	**
84	Ott.....	s.	r.	y. g.	v. g.	F.	S.	Am.	..	..	..	..	..	..	**
85	Paradise of Autumn. <i>Paradis d'Automne</i> .....	l.	r. a. p.	y. r.	v. g.	F.	E. A.	B.	*	..	..	..	..	..	**
86	Passe Colmar.....	l.	r. o. p.	y.	v. g.	M.	W.	B.	..	..	..	..	..	..	**
87	Pinneo or Boston.....	s.	r. ob.	v. g.	v. g.	.....	S.	Am.	..	..	..	..	..	..	†
88	Pound. <i>Belle Angerine, Winter Bell, Verdale's St. Germain</i> .....	l.	ob. p.	y.	v. g.	K. M.	W.	.....	..	..	..	..	..	..	**
89	Pratt.....	m.	ob. p.	y. r.	v. g.	M.	E. A.	Am.	..	..	..	†	..	..	**
90	Quimper. <i>Supreme de Quimper</i> .....	m.	r. p.	y. g.	v. g.	F.	S.	B.	..	..	..	..	..	..	†
91	Reading.....	l.	ob. p.	y. r.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
92	Reeder. <i>Dr. Reeder</i> .....	s.	r. o. p.	y. r.	b.	F.	L. A.	Am.	..	..	..	..	..	..	†
93	Rostiezer.....	s.	p.	y. g.	b.	F.	S.	.....	..	..	**	..	..	..	**
94	Rutter.....	m.	r. ob.	y. g.	v. g.	F. M.	A.	Am.	..	..	..	..	..	..	..
95	Sand.....	.....	.....	.....	.....	.....	.....	.....	..	..	..	..	..	..	..
96	St. Ghislain.....	m.	p.	y.	v. g.	F. M.	E. A.	B.	..	..	..	..	..	..	**
97	St. Michael Archange.....	l.	r. p.	y. g.	v. g.	F. M.	A.	F.	..	..	..	..	..	..	**
98	Seckel.....	s.	r.	y. g.	b.	F. M.	A.	Am.	*	..	**	..	..	..	**
99	Sheldon.....	m.	r.	y. g.	v. g.	F. M.	A.	Am.	..	..	*	..	..	..	**
100	Smith.....	l.	ob. p.	g.	v. g.	F. M.	V. E.	.....	..	..	..	..	..	..	..
101	Souvenir du Congres.....	l.	p. y. r.	y. g.	v. g.	F. M.	S.	F.	*	..	..	†	..	..	†
102	Sterling.....	m.	r.	y. g.	v. g.	F. M.	E. A.	Am.	..	..	..	..	..	..	**
103	Stevens Genesee.....	l.	r.	y.	v. g.	F. M.	E. A.	Am.	*	..	..	..	..	..	**
104	Summer Doyenne. <i>Doyenne d'Ete</i> .....	s.	r. o. p.	y. g.	v. g.	F.	S.	B.	..	..	**	..	..	..	**
105	Superfin. <i>Beurre Superfin</i> .....	m.	r. p.	y. r.	v. g.	F.	A.	F.	..	..	*	..	..	..	**
106	Therese Appert.....	m.	ob. o. p.	y. r.	v. g.	F.	L. S.	F.	..	..	..	..	..	..	..
107	Triumph of Jodoigne. <i>Triomphe de Jodoigne</i> .....	l.	ob. p.	y. g.	v. g.	F. M.	A.	B.	..	..	..	..	..	..	..
108	Tyson.....	m.	r. a. p.	y. g.	b.	F.	S.	Am.	..	..	..	..	..	..	**
109	Upper Crust (local).....	m.	r.	g. rus	poor	.....	S.	Am.	..	..	..	..	..	..	..
110	Urbaniste.....	m.	p.	y. g.	v. g.	F. M.	A.	B.	..	..	..	..	..	..	**
111	Vicar. <i>Vicar of Winkfield, Le Cure</i> .....	l.	p.	y.	v. g.	K. M.	W.	F.	*	..	..	..	..	..	**
112	Washington.....	m.	ob. o. p.	y.	v. g.	F. M.	E. A.	Am.	..	..	..	..	..	..	**
113	White Doyenne. <i>Virgalieu</i> .....	m.	ob. p.	y. g.	b.	F. M.	A.	F.	..	..	..	..	..	..	**
114	Wilbur.....	s.	r.	y. r.	v. g.	F.	E. A.	Am.	..	..	..	..	..	..	**
115	Willermoz.....	l.	ob. p.	y. r.	v. g.	M.	W.	B.	..	..	..	..	..	..	**
116	Winter Nelis.....	m.	ob. p.	y. r.	b.	F. M.	W.	B.	*	..	..	..	..	..	**
117	Windsor. <i>Summer Bell</i> .....	l.	p.	g.	.....	M.	S.	.....	..	..	..	..	..	..	**

66. A hardy tree; valuable.  
 67. Valuable for the South.  
 69. Very productive and profitable.  
 70. Not profitable for market.

76. A capital pear but unreliable.  
 77. Superior to Summer Doyenne.  
 79. Valuable for market.



Section XXI.—Pineapple. *Ananas sativa*.

Abbreviations.

SIZE.	FORM.	COLOR.
l-large, m-medium, s-small, v-very.	c-conical, k-kidney shape, o-oval, ob-oblong, p-pear shape, r-round.	b-brown, g-green, p-pink, r-red, w-white, y-yellow.

NUMBER.	NAMES.	DESCRIPTION.						
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.
1	Abachi (Abakka).....	m.	ob.	.....	b.	D. K. S.	S.	.....
2	Bird's Eye.....	s.	ob.	.....	gs.	D. K. S.	S. S.	.....
3	Black Antiqua.....	l.	ob.	.....	b.	D. K. S.	S. S.	.....
4	Black Jamaica.....	l.	ob.	.....	b.	D. K. S.	S. S.	.....
5	Black Prince.....	l.	c.	.....	b.	D. K. S.	S. S.	.....
6	Blood.....	m.	.....	.....	gs.	D. K. S.	S. S.	.....
7	Charlotte Rothschild.....	m.	c.	.....	b.	D. K. S.	S. S.	.....
8	Crown Prince.....	l.	c.	.....	gs.	D. K. S.	S. S.	.....
9	Lady Beatrice.....	l.	c.	.....	b.	D. K. H.	S. S.	.....
10	Lord Carrington.....	l.	c.	.....	b.	D. K. S.	S. S.	.....
11	Mammoth Kew.....	v. l.	.....	.....	b.	D. K. S.	S. S.	.....
12	Porto Rico.....	v. l.	r.	.....	gs.	D. K. S.	S. S.	.....
13	Prince Albert.....	l.	o.	.....	b.	D. K. S.	S. S.	.....
14	Queen.....	m.	c.	.....	b.	D. K. S.	S. S.	.....
15	Red Spanish.....	m.	r.	.....	f.	D. K. S.	S. S.	.....
16	Ripley Queen.....	m.	c.	.....	b.	D. K. S.	S. S.	.....
17	Smooth Cayenne.....	l.	o.	.....	gs.	D. K. S.	S. S.	.....
18	Sugar Loaf.....	m.	c.	.....	gs.	D. K. S.	S. S.	.....
19	Trinidad.....	l.	c.	.....	gs.	D. K. S.	S. S.	.....
20	White Antiqua.....	m.	ob.	.....	b.	D. K. H.	S.	.....

15. Is most extensively grown.



Section XXII.—Plums. *Prunus*.

Abbreviations.

SIZE.	FORM.	COLOR.
l-large, m-medium, s-small.	o-oval, ob-obovate, r-roundish.	g-greenish, p-purplish, r-reddish, y-yellow.

Sub-Section I. *P. Americana*.

NUMBER.	NAMES.	DESCRIPTION.							I.—N. Div.						
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts.	Rhode Island.
1	Canawa. <i>Peach Leaved</i> .....	m.	o.	r.	gs.	F. M.	V. L.	Am.	.....	.....	.....	.....	.....	.....	.....
2	De Soto.....	m.	r. o.	y. r.	v. gs.	F. M.	M.	Am.	.....	.....	.....	.....	.....	.....	.....
3	Forest Garden.....	m.	r.	r.	v. gs.	F. M.	E.	Am.	.....	.....	.....	.....	.....	.....	.....
4	Hawkeye.....	.....	.....	.....	.....	.....	.....	Am.	.....	.....	.....	.....	.....	.....	.....
5	Miner.....	m.	ob.	r.	gs.	F. M.	M.	Am.	.....	.....	.....	.....	.....	.....	.....
6	Rockford.....	.....	.....	.....	.....	.....	.....	Am.	.....	.....	.....	.....	.....	.....	.....
7	Weaver.....	m.	flat.	r.	gs.	F. M.	M.	Am.	.....	.....	.....	.....	.....	.....	.....
8	Wolf.....	m.	o.	y. r.	gs.	F. M.	M.	Am.	.....	.....	.....	.....	.....	.....	.....

Cheney has a \* for Wisconsin; and Forest Rose one \* for Mo.

Sub-Section II. *P. Chicasa*.

NUMBER.	NAMES.	DESCRIPTION.							I.—N. Div.						
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts.	Rhode Island.
1	Cumberland.....	m.	r.	y.	gs.	F. M.	L.	Am.	.....	.....	.....	.....	.....	.....	.....
2	Golden Beauty.....	l.	.....	y.	gs.	F. M.	L.	Tex.	.....	.....	.....	.....	.....	.....	.....
3	Indian Chief.....	l.	.....	r.	gs.	F. M.	L.	Am.	.....	.....	.....	.....	.....	.....	.....
4	Newman.....	m.	o.	r.	gs.	F. M.	E.	Am.	.....	.....	.....	.....	.....	.....	.....
5	Pottawattamie.....	m.	r.	r.	gs.	M.	M.	Am.	.....	.....	.....	.....	.....	.....	.....

Caddo Chief also has \*\* for Louisiana.

Section XXII.—Plums. *Prunus*.

Abbreviations.

QUALITY.	USE.	SEASON.	ORIGIN.
b-best, g-good, v-very.	F-family, M-market.	E-early, L-late, M-medium.	Am-American, F-Foreign.

Sub-Section I. *P. Americana*.

Between 42° and 49°.		II.—CENTRAL DIVISION.—Between 35° and 42°.		III.—S.Div.—Bet. 28° & 35°	
NUMBER.		NUMBER.		NUMBER.	
1	Connecticut.	1	Pennsylvania.	1	South Carolina
2	New York.	2	New Jersey.	2	Georgia.
3	Ontario.	3	Delaware.	3	Alabama.
4	Michigan.	4	Md. and D. C.	4	Florida.
5	Wisconsin.	5	Virginia.	5	Indian Ter.
6	Minnesota.	6	North Carolina	6	Arkansas.
7	Dakota.	7	Ohio.	7	Mississippi.
8	Montana.	8	Indiana.	8	Louisiana.
9	Wyoming.	9	West Virginia.	9	Texas.
10	Idaho.	10	Kentucky.	10	New Mexico.
11	Washington.	11	Tennessee.	11	Arizona.
12	Oregon.	12	Illinois.	12	
13		13	Iowa.	13	
14		14	Missouri.	14	
15		15	Nebraska.	15	
16		16	Kansas.	16	
17		17	Colorado.	17	
18		18	Utah.	18	
19		19	Nevada.	19	
20		20	California.	20	
21		21		21	
22		22		22	
23		23		23	
24		24		24	
25		25		25	
26		26		26	
27		27		27	
28		28		28	
29		29		29	
30		30		30	
31		31		31	
32		32		32	
33		33		33	
34		34		34	
35		35		35	
36		36		36	
37		37		37	
38		38		38	
39		39		39	
40		40		40	
41		41		41	
42		42		42	
43		43		43	
44		44		44	
45		45		45	
46		46		46	
47		47		47	
48		48		48	
49		49		49	
50		50		50	

Sub-Section II. *P. Chicasa*.

Between 42° and 49°.		II.—CENTRAL DIVISION.—Between 35° and 42°.		III.—S.Div.—Bet. 28° & 35°	
NUMBER.		NUMBER.		NUMBER.	
1	Connecticut.	1	Pennsylvania.	1	South Carolina
2	New York.	2	New Jersey.	2	Georgia.
3	Ontario.	3	Delaware.	3	Alabama.
4	Michigan.	4	Md. and D. C.	4	Florida.
5	Wisconsin.	5	Virginia.	5	Indian Ter.
6	Minnesota.	6	North Carolina	6	Arkansas.
7	Dakota.	7	Ohio.	7	Mississippi.
8	Montana.	8	Indiana.	8	Louisiana.
9	Wyoming.	9	West Virginia.	9	Texas.
10	Idaho.	10	Kentucky.	10	New Mexico.
11	Washington.	11	Tennessee.	11	Arizona.
12	Oregon.	12	Illinois.	12	
13		13	Iowa.	13	
14		14	Missouri.	14	
15		15	Nebraska.	15	
16		16	Kansas.	16	
17		17	Colorado.	17	
18		18	Utah.	18	
19		19	Nevada.	19	
20		20	California.	20	
21		21		21	
22		22		22	
23		23		23	
24		24		24	
25		25		25	
26		26		26	
27		27		27	
28		28		28	
29		29		29	
30		30		30	
31		31		31	
32		32		32	
33		33		33	
34		34		34	
35		35		35	
36		36		36	
37		37		37	
38		38		38	
39		39		39	
40		40		40	
41		41		41	
42		42		42	
43		43		43	
44		44		44	
45		45		45	

Sub-Section III.—*P. domestica.*

NUMBER.	NAMES.	DESCRIPTION.						I.—N. Div.						
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick.	Maine.	New Hampshire.	Vermont.	Massachusetts.
1	Bavay. <i>Bavay's Green Gage</i> .....	l.	r.	g. y.	b.	F.	L.	F.	*	*	*	*	*	*
2	Belgian Purple.....	l.	r. o.	b. p.	v. g.	F. M.	M.	F.	*	*	*	*	*	*
3	Bleeker Gage.....	m.	r. o.	y.	v. g.	F. M.	M.	Am.	*	*	*	*	*	*
4	Blue Imperatrice.....	m.	o. ob.	p.	v. g.	F. M.	L.	F.	*	*	*	*	*	*
5	Boddaert. <i>Boddaert Green Gage</i> .....	l.	r.	g. r.	v. g.	F. M.	M.	F.	*	*	*	*	*	*
6	Bradshaw.....	l.	o. ob.	r. p.	v. g.	M.	M.	Am.	*	*	*	*	*	*
7	Bryanstone. <i>Bryanstone Gage</i> .....	m.	o.	y. r.	v. g.	F.	L.	F.	*	*	*	*	*	+
8	Coe Late Red.....	m.	r.	p.	v. g.	F. M.	L.	F.	*	*	*	*	*	*
9	Coe Golden Drop.....	l.	o.	y. r.	v. g.	F. M.	L.	F.	*	*	*	*	*	*
10	Columbia.....	l.	r.	p.	v. g.	M.	M.	Am.	*	*	*	*	*	*
11	Copper.....	m.	o.	p.	v. g.	F. M.	M.	F.	*	*	*	*	*	*
12	Cruzer Scarlet.....	m.	r. o.	r.	v. g.	F.	M.	F.	*	*	*	*	*	*
13	Damson.....	s.	o.	p.	v. g.	M.	L.	Am.	*	*	*	*	*	*
14	De Caradeuc.....	m.	r.	y. r.	v. g.	F. M.	E.	Am.	*	*	*	*	*	*
15	De Monfort.....	m.	r.	p.	v. g.	F. M.	L.	F.	*	*	*	*	*	*
16	Denniston. <i>Denniston Superb</i> .....	l.	r.	g. y.	v. g.	F. M.	M.	Am.	*	*	*	*	*	*
17	Domine Dull.....	m.	o.	p.	v. g.	M.	M.	Am.	*	*	*	*	*	*
18	Drap d'Or.....	s.	r.	y.	v. g.	F.	E.	F.	*	*	*	*	*	*
19	Duane Purple.....	l.	o.	r. p.	v. g.	F. M.	E.	Am.	*	*	*	*	*	*
20	Early Favorite.....	m.	r. o.	p.	v. g.	F.	E.	F.	*	*	*	*	*	*
21	German Prune.....	l.	o.	p.	v. g.	F. M.	M.	F.	*	*	*	*	*	+
22	General Hand.....	l.	r. o.	g. y.	v. g.	F. M.	M.	Am.	*	*	*	*	*	*
23	Green Gage.....	s.	r.	g. y.	b.	F.	M.	F.	**	**	**	**	**	**
24	Hudson Gage.....	m.	r.	g. y.	v. g.	F. M.	E.	Am.	*	*	*	*	*	*
25	Heeling. <i>Heeling Superb</i> .....	l.	r. o.	g. y.	v. g.	F. M.	M.	Am.	*	*	*	*	*	*
26	Imperial Gage.....	l.	o.	g. y.	b.	F. M.	M.	Am.	*	*	*	*	*	*
27	Imperial Ottoman.....	m.	r.	y.	v. g.	F.	E.	F.	*	*	*	*	*	*
28	Italian Prune. <i>Fellemburg</i> .....	m.	o.	p.	v. g.	F. M.	M.	F.	*	*	*	*	*	*
29	Jefferson.....	l.	o.	y. r.	b.	F. M.	M.	Am.	*	*	*	*	*	*
30	July Green Gage.....	m.	r.	y. r.	v. g.	F.	E.	F.	*	*	*	*	*	*
31	Kirke.....	m.	r. o.	p.	v. g.	F.	M.	F.	*	*	*	*	*	*
32	Lawrence. <i>Lawrence Favorite</i> .....	l.	r.	g. y.	b.	F.	M.	Am.	*	*	*	*	*	*
33	Lombard.....	m.	r. o.	r. p.	v. g.	M.	M.	Am.	*	*	*	*	*	*
34	Long Scarlet. <i>Scarlet Gage</i> .....	m.	r. ob.	r.	v. g.	F.	M.	F.	*	*	*	*	*	*
35	Mariana.....							Am.	*	*	*	*	*	*
36	MacLaughlin.....	l.	r.	y. r.	b.	F. M.	M.	Am.	*	*	*	*	*	*
37	Monroe.....	m.	o.	g. y.	v. g.	M.	M.	Am.	*	*	*	*	*	*
38	Moore Arctic.....	m.	r. o.	p.	v. g.	F. M.	M.	Am.	*	*	*	*	*	*
39	Nota Bene. <i>Corse</i> .....	l.	r.	r. g.	v. g.	F.	M.	Am.	*	*	*	*	*	*
40	Orleans. <i>Red Damask</i> .....	m.	r.	r.	v. g.	F.	M.	F.	*	*	*	*	*	*
41	Oullin Golden.....	l.	r. o.	g. y.	v. g.	F. M.	M.	F.	*	*	*	*	*	*
42	Peach.....	l.	r.	p.	v. g.	M.	E.	F.	*	*	*	*	*	*
43	Pond. <i>Fonthill</i> .....	l.	o.	y. r.	v. g.	M.	M.	F.	*	*	*	*	*	*
44	Prince Engelbert.....	l.	o.	p.	v. g.	F. M.	M.	F.	*	*	*	*	*	+
45	Prince Yellow Gage.....	m.	o.	y.	v. g.	F. M.	E.	Am.	*	*	*	*	*	+
46	Prune of Agen.....	m.	o.	p.	v. g.	F.	M.	F.	*	*	*	*	*	+
47	Purple Gage.....	m.	r.	p.	v. g.	F. M.	M.		*	*	*	*	*	*
48	Purple Favorite.....	m.	r. ob.	p.	b.	F. M.	E.	Am.	*	*	*	*	*	*
49	Reagle Gage.....	m.	r.	g. y.	v. g.	F. M.	M.	Am.	*	*	*	*	*	*
50	Richland.....	m.	o.	p.	v. g.	F. M.	M.	Am.	*	*	*	*	*	*
51	Quackenboss.....	l.	r.	p.	v. g.	M.	M.	Am.	*	*	*	*	*	*
52	Royale Hative.....	m.	r.	p.	v. g.	F. M.	E.	F.	*	*	*	*	*	*
53	Royale de Tours.....	l.	r.	r.	v. g.	M.	E.	F.	*	*	*	*	*	*
54	Schenectady Catharine.....	m.	r. o.	r.	v. g.	F.	M.	Am.	*	*	*	*	*	*
55	Shropshire Damson.....	s.	o.	p.	v. g.	F. M.	L.	Eng.	**	**	**	**	**	**
56	Smith Orleans.....	l.	o.	r. p.	v. g.	F. M.	M.	Am.	**	**	**	**	**	**
57	St. Catharine.....	m.	ob.	g. y.	v. g.	M.	L.	F.	*	*	*	*	*	*
58	St. Martin, St. Martin Quetsche.....	m.	o.	g. y.	v. g.	M.	L.	F.	*	*	*	*	*	*
59	Sharp Emperor.....	l.	r. o.	y. r.	v. g.	M.	M.	F.	*	*	*	*	*	*
60	Transparent. <i>Transparent Gage</i> .....	m.	r. ob.	g. y.	v. g.	F.	M.	F.	*	*	*	*	*	*
61	Wangenheim.....	m.	o.	p.	v. g.	M.	M.	F.	*	*	*	*	*	*
62	Washington.....	l.	r. o.	g. y.	v. g.	F. M.	M.	Am.	*	*	*	*	*	*
63	Yellow Egg. <i>White Magnum Bonum</i> .....	l.	o.	y.	v. g.	F. M.	M.		**	**	**	**	**	**



Sub-Section III. *P. Hattan.*

NUMBER.	NAMES.	DESCRIPTION.							I.—N. Div.						
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick.	Maine.	New Hampshire.	Vermont.	Massachusetts.	Rhode Island.
1	Botan ( <i>Abundance</i> ).....	m.	r. o.	p.	g. g.	F. M.	M.	Jap.							
2	Botan ( <i>White</i> ).....	m.	r. o.	r. p.	g. g.	F. M.	M.	Jap.							
3	Burbank.....	m.	r.	p.	g. g.	F. M.	M.	Jap.							
4	Chabot.....	m.	ob.	p.	g. g.	F. M.	M.	Jap.							
5	Hattankio No. 1.....	l.	ob.	y.	v. g. g.	F. M.	V. E.	Jap.							
6	Hattankio No. 2.....	m.	ob.	y.	g. g.	F. M.	M.	Jap.							
7	Kelsey.....	v. l.	cordate	y. r.	g. g.	F. M.	E.	Jap.							
8	Ogon.....	m. l.	r.	y.	g. g.	F. M.	V. E.	Jap.							
9	Pissard.....	m.	r.	r.	g. g.	F. M.	E.	For.							
10	Satsuma.....	m.	r.	d. p.	g. g.	F. M.	M.	Jap.							

Botan, Kelsey, Ogon, Pissard and Simon (not in list) have been recommended for trial in the South. Of these, Botan, Simon and Pissard are found promising in the Middle States and perhaps even farther north.

Section XXIII.—Pomegranates. *Punica Granatum.*

NUMBER.	NAMES.	DESCRIPTION.							I.—N. Div.						
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick.	Maine.	New Hampshire.	Vermont.	Massachusetts.	Rhode Island.
1	Acid.....	v. l.	r.	d. r.											
2	Dwarf.....	s.	r.	r.	f.										
3	Sweet.....	l.	r.	r.	b.		F.								
4	Violet.....	v. b.	r.	v.	b.		F.								

Section XXIV.—Quinces. *Cydonia vulgaris.*

Abbreviations.

SIZE.		FORM.		COLOR.
l-large.	s-small.	o-obl.	p-pyriform.	g-greenish.
m-medium.	v-very.	ob-obl.	r-roundish.	y-yellowish.

NUMBER.	NAMES.	DESCRIPTION.							I.—N. Div.						
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick.	Maine.	New Hampshire.	Vermont.	Massachusetts.	Rhode Island.
1	Angers.....	v. l.	ob. p.	y.	t.	M. K.	E. L.	F.	*	*	*	*	*	*	*
2	Apple or Orange.....	l.	r.	y.	h. t.	M. K.	E. L.		*	*	*	*	*	*	*
3	Champion.....	v. l.	ob. p.	y.	t.	M. K.	L.	Am.							
4	Chinese. <i>Cy. Chinensis</i> .....	v. l.	ob.	y.	h. t.	M.	L.	F.							
5	Pear.....	l.	p.	y.	t.	M. K.	L.	Am.	*						
6	Portugal.....	v. l.	ob. p.	y.	t.	M. K.	E.	F.							
7	Rea.....	l.	r. ob. p.	y.	h. t.	M. K.	E.	Am.							

3. Rather late for the North.

4. Large and valuable at the South in strong soils.

Sub-Section III. *P. Hattan.*

Between 42° and 49°.		II.—CENTRAL DIVISION.—Between 35° and 42°.		III.—S. DIV.—Bet. 28° & 35°	
NUMBER.	Connecticut New York Ontario Michigan Wisconsin Minnesota Dakota Montana Wyoming Idaho Washington Oregon Pennsylvania New Jersey Delaware Md. and D. C. Virginia North Carolina Ohio Indiana West Virginia Kentucky Tennessee Illinois Iowa Missouri Nebraska Kansas Colorado Utah Nevada California South Carolina Georgia Alabama Florida Indian Ter. Arkansas Mississippi Louisiana Texas New Mexico Arizona	1 2 3 4 5 6 7 8 9 10	.	.	.

Section XXIII.—Pomegranates. *Punica granatum.*

Between 42° and 49°.		II.—CENTRAL DIVISION.—Between 35° and 42°.		III.—S. DIV.—Bet. 28° & 35°	
NUMBER.	Connecticut New York Ontario Michigan Wisconsin Minnesota Dakota Montana Wyoming Idaho Washington Oregon Pennsylvania New Jersey Delaware Md. and D. C. Virginia North Carolina Ohio Indiana West Virginia Kentucky Tennessee Illinois Iowa Missouri Nebraska Kansas Colorado Utah Nevada California South Carolina Georgia Alabama Florida Indian Ter. Arkansas Mississippi Louisiana Texas New Mexico Arizona	1 2 3 4	.	.	.

Section XXIV.—Quince. *Cydonia vulgaris.*

Abbreviations.

QUALITY.	USE.	SEASON.	ORIGIN.
H-half tender, T-tender.	F-kitchen, M-market.	E-early, L-late,	Am-American, F-Foreign

Between 42° and 49°.		II.—CENTRAL DIVISION.—Between 35° and 42°.		III.—S. DIV.—Bet. 28° & 35°	
NUMBER.	Connecticut New York Ontario Michigan Wisconsin Minnesota Dakota Montana Wyoming Idaho Washington Oregon Pennsylvania New Jersey Delaware Md. and D. C. Virginia North Carolina Ohio Indiana West Virginia Kentucky Tennessee Illinois Iowa Missouri Nebraska Kansas Colorado Utah Nevada California South Carolina Georgia Alabama Florida Indian Ter. Arkansas Mississippi Louisiana Texas New Mexico Arizona	1 2 3 4 5 6	.	.	.

Section XXV.—Raspberries. *Rubus*.

Abbreviations.

SIZE.		FORM.	COLOR.	
l-large, m-medium,	s-small, v-very.	e-conical, o-obtuse, r-roundish.	b-black, p-purplish,	r-reddish, y-yellow.

Sub-Section I. *R. Idæus*.

NUMBER.	NAMES.	DESCRIPTION.						I.—N. Div.							
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts	Rhode Island.
1	Clarke.....	m.	r.	r.	g.	F. M.	E.	Am.	*	*	*	*	*	*	*
2	Fastolf.....	l.	r. c.	r.	v. g.	F.	M.	F.	*	*	*	*	*	*	*
3	Fontenay. <i>Belle de Fontenay</i> .....	l.	e.	r.	g.	F.	L.	F.	*	*	*	*	*	*	*
4	Four Seasons Red. <i>Merveille de Quatre Saisons</i> , <i>October Red</i> .....	l.	r. c.	r.	v. g.	F.	L.	F.	*	*	*	*	*	*	*
5	Franconia.....	l.	r. c.	p.	v. g.	F. M.	M.	F.	*	*	*	*	*	*	*
6	French.....	m.	r.	r.	v. g.	F.	M.	Am.	*	*	*	*	*	*	*
7	Herstine.....	l.	ob. c.	r.	v. g.	F. M.	M.	Am.	*	*	*	*	*	*	*
8	Hornet.....	l.	e.	r.	v. g.	F. M.	M.	F.	*	*	*	*	*	*	*
9	Hudson River Antwerp.....	l.	e.	r.	b.	F. M.	M.	Am.	*	*	*	*	*	*	*
10	Knevett.....	l.	ob. c.	r.	b.	F.	M.	F.	*	*	*	*	*	*	*
11	Orange. <i>Brinckle's</i> .....	l.	e.	y.	b.	F.	M.	Am.	*	*	*	*	*	*	*
12	Pallnau.....	l.	e.	r.	v. g.	F.	M.	F.	*	*	*	*	*	*	*
13	Souchetti.....	l.	e.	y.	g.	F.	M.	F.	*	*	*	*	*	*	*
14	Superb.....	l.	r.	r.	v. g.	F. M.	M.	Am.	*	*	*	*	*	*	†

14. Superb is placed in this class in compliance with high authority, though its propriety may be open to doubt.

Sub-Section II. *R. neglectus*.

NUMBER.	NAMES.	DESCRIPTION.						I.—N. Div.							
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts	Rhode Island.
1	Caroline.....	m.	r. o.	y.	g.	F.	M.	Am.	*	*	*	*	*	*	*
2	Montclair.....	l.	r.	p.	v. g.	F.	M.	Am.	*	*	*	*	*	*	*
3	Philadelphia.....	m.	r.	p.	g.	M.	M.	Am.	*	*	*	*	*	*	*
4	Purple Cane.....	m.	r.	p.	g.	M.	M.	Am.	*	*	*	*	*	*	*
5	Reliance.....	l.	r. o.	r.	g.	F. M.	M.	Am.	*	*	*	*	*	*	*
6	Shaffer.....	v. l.	r.	p.	g.	F. M.	M.	Am.	*	*	*	*	*	*	*



Sub-Section III.—*R. occidentalis*.

NUMBER.	NAMES.	DESCRIPTION.							I.—N. Div.						
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts.	Rhode Island.
1	Doolittle. <i>American Black</i> .....	s.	r.	b.	g.	M.	M.	Am.	..	..	..	..	*	..	*
2	Earhart.....	v. l.	r.	b.	g.	F. M.	M.	Am.	..	..	..	..	*	..	+
3	Gregg.....								..	..	..	..	..	..	..
4	Hilborn.....								..	..	..	..	..	..	..
5	Hopkins.....								..	..	..	..	..	..	..
6	Johnston's Sweet.....								..	..	..	..	..	..	..
7	Mac'ormick. <i>Mammoth Cluster</i> .....	m.	ob. c.	b.	v. g.	F. M.	L.	Am.	..	*	..	*	*	*	
8	Miami.....	m.	r.	b.	g.	F. M.	M.	Am.	..	..	..	..	..	..	
9	Nemaha.....								..	..	..	..	..	..	
10	Ohio.....	m.	r.	b.	g.	F. M.	M.	Am.	..	..	..	..	..	..	
11	Ohio Everbearing.....	m.	c.	b.	g.	F. M.	L.	Am.	..	..	..	..	..	..	
12	Smith.....	v. l.	r.	b.	g.	F. M.	M.	Am.	..	..	..	..	..	..	
13	Souhegan.....	m.	r.	b.	g.	F.		Am.	..	..	*	..	**	..	
14	Tyler.....	m.	r.	b.	v. g.	F. M.	E.	Am.	..	..	..	..	**	+	

2. Valued for bearing late berries on shoots of the current season.

Sub-Section IV.—*R. Strigosus*.

NUMBER.	NAMES.	DESCRIPTION.							I.—N. Div.						
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts.	Rhode Island.
1	Brandywine. <i>Susqueco</i> .....	m.	r. c.	r.	g.	F. M.	M.	Am.	..	..	..	..	..	..	..
2	Cuthbert. <i>Queen of the Market</i> .....	l.	r. o.	r.	g.	F. M.	M.	Am.	..	..	..	..	*	*	*
3	Golden Queen.....	l.	r. c.	y.	v. g.	F. M.	M.	Am.	..	..	..	..	..	..	..
4	Hansell.....	m.	r. c.	r.	v. g.	F. M.	V. E.	Am.	..	..	..	..	..	..	+
5	Highland.....	m.	r. o. c.	r.	g.	F. M.	E.	Am.	..	..	..	..	..	..	..
6	Imperial Red.....	m.	r.	r.	b.	F. M.	M.	Am.	..	..	..	..	..	..	..
7	Marlboro.....	l.	r. c.	r.	g.	F. M.	M.	Am.	..	..	..	..	..	..	..
8	Thwack.....	l.	r.	p. r.	g.	F. M.	M.	Am.	..	..	..	..	..	..	..
9	Turner.....	m.	r.	r.	g.	F. M.	E.	Am.	..	..	..	..	..	..	..

Sub-Section III.—*R. occidentalis*.

Between 42° and 49°		II.—CENTRAL DIVISION.—Between 35° and 42°		III.—S. Div.—Bet. 28° & 35°	
NUMBER.					
1	Connecticut.		Pennsylvania.		South Carolina
2	New York.	*	New Jersey.	*	Georgia.
3	Ontario.	*	Delaware.	*	Alabama.
4	Michigan.	*	Md. and D. C.	*	Florida.
5	Wisconsin.	*	Virginia.	*	Indian Ter.
6	Minnesota.	*	North Carolina	*	Arkansas.
7	Dakota.	*	Ohio.	*	Mississippi.
8	Montana.	*	Indiana.	*	Louisiana.
9	Wyoming.	*	West Virginia.	*	Texas.
10	Idaho.	*	Kentucky.	*	New Mexico.
11	Washington.	*	Tennessee.	*	Arizona.
12	Oregon.	*	Illinois.	*	
13		*	Iowa.	*	
14		*	Missouri.	*	
		*	Nebraska.	*	
		*	Kansas.	*	
		*	Colorado.	*	
		*	Utah.	*	
		*	Nevada.	*	
		*	California.	*	

9. As late and hardier than Gregg, which it resembles.

Sub-Section IV.—*R. Strigosus*.

Between 42° and 49°		II.—CENTRAL DIVISION.—Between 35° and 42°		III.—S. Div.—Bet. 28° & 35°	
NUMBER.					
1	Connecticut.	*	Pennsylvania.	*	South Carolina
2	New York.	*	New Jersey.	*	Georgia.
3	Ontario.	*	Delaware.	*	Alabama.
4	Michigan.	*	Md. and D. C.	*	Florida.
5	Wisconsin.	*	Virginia.	*	Indian Ter.
6	Minnesota.	*	North Carolina	*	Arkansas.
7	Dakota.	*	Ohio.	*	Mississippi.
8	Montana.	*	Indiana.	*	Louisiana.
9	Wyoming.	*	West Virginia.	*	Texas.
10	Idaho.	*	Kentucky.	*	New Mexico.
11	Washington.	*	Tennessee.	*	Arizona.
12	Oregon.	*	Illinois.	*	
13		*	Iowa.	*	
14		*	Missouri.	*	
		*	Nebraska.	*	
		*	Kansas.	*	
		*	Colorado.	*	
		*	Utah.	*	
		*	Nevada.	*	
		*	California.	*	

Section XXVI.—Strawberries. *Fragaria*.

The columns explain: SIZE—l, large; s, small; m., medium. SEX—B., bisexual; P., pistillate; P. B., nearly pistillate. COLOR—d. c., deep crimson; d. s., deep scarlet; b. s., bright scarlet; w. t., whitish tinted with red; l. c., light crimson. FORM—r. c., roundish conical; o. c., obtuse conical or coxcomb form; c., conical; r., roundish; r. o. c., roundish obtuse conical. FLESH—s., soft; f., firm; m., medium. SEASON—E., early; M., medium; L., late; E. L., early to late. ORIGIN—Am., American; F., foreign.

NUMBER.	NAMES.	DESCRIPTION.							I.—N. Div.						
		SIZE.	SEX.	COLOR.	FORM.	FLESH.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick.	Maine.	New Hampshire.	Vermont.	Massachusetts.	Rhode Island.
1	Alpha.....	m.	B.	d. c.	c.	m.	V. E.	Ont.							
2	Bidwell.....	v. l.	B.	b. s.	c.	f.	M.	Am.							
3	Black Defiance.....	l.	B.	d. r.	r. o. c.	f.	M.	Am.			*				
4	Bubach No. 5.....		P.					Am.							
5	Captain Jack.....	l.	B.	d. r.	r. c.	f.	L.	Am.			*				
6	Champion. Windsor Chief.....	l.	P.	d. c.	r.	m.	L.	Am.	*			†		*	
7	Charles Downing.....	l.	B.	d. s.	e.	f.	M.	Am.	*		*		**	*	*
8	Col. Cheney.....	l.	P.	b. s.	o. c.	f.	M.	Am.	*		*			*	
9	Crawford.....	l.	B.	b. c.	o. c.	m.	M.	Ohio.							
10	Crescent.....	l.	P.	b. s.	r. c.	m.	M.	Am.	*		*		*	*	*
11	Cumberland. Cumberland Triumph.....	v. l.	B.	b. s.	r. c.	s.	M.	Am.	*		†	**	*	*	†
12	Downer. Downer's Prolific.....	m. l.	B.	b. s.	r. c.	s.	E.	Am.						*	
13	Duchess.....	l.	B.	b. r.	r. c.	f.	E.	Am.						*	
14	Duncan.....	m.	B.	b. r.	r. c.	s.	E.	Am.							†
15	Eureka.....	l.	P.	b. r.	r.	m.	M.	Ohio.							
16	Finch.....	l.	B.	s.	r.	f.	M.	Am.							
17	Florence.....	m.	B.	b. c.	r. e.	f.	M. L.	Ohio.							
18	Gandy.....		B.	b. r.	c.	f.		Am.							
19	Glendale.....	l.	P.	b. r.	e.	f.	L.	Am.	*		*				
20	Great American.....	l.	B.	d. r.	r. e.	f.	M.	Am.							
21	Gypsy.....	m.	P.	c.		f.	M.	Am.				†			
22	Hart's Minnesota.....	m.	B.	e.	r.	f.	E.	Am.							
23	Haverland.....	l.	P.	r. s. c.	o. c.	m.	M.	Am.							
24	Hervey Davis.....	l.	B.	b. s.	o. c.	f.	M.	Am.						**	
25	Hovey. Hovey's Seedling.....	l.	P.	b. s.	r.	f.	M.	Am.	*		*	*	*	*	*
26	James Vick.....	m.	B.	e.	r. c.	m.	M.	Am.							
27	Jersey Queen.....	v. l.	P.	b. s.	r. c.	f.	L.	Am.				†		*	
28	Jessie.....	v. l.	B.	b. s.	r. c.	m.	M.	Am.							
29	Jucunda.....	l.	B.	b. s.	o. c.	f.	L.	F.	**					*	
30	Kentucky.....	l.	B.	b. s.	r. c.	f.	L.	Am.				†		*	
31	Logan.....	l.	B.	r.	r.	f.	M.	Am.							
32	Lunaxi.....														
33	Manchester.....	l.	P.	s.	o. c.	f.	M.	Am.			†		*	*	
34	Martha.....	m. l.	P. B.	d. s.	o. c.	f.	M.	Minn.							
35	Miner. Miner's Great Prolific.....	v. l.	B.	e.	r. c.	m.	M.	Am.	*		*		**	**	*
36	Monarch. Monarch of the West.....	v. l.	B.	b. r.	r. o. c.	f.	M.	Am.							
37	Moore.....	v. l.	B.	b. c.	r. c.	m.	M.								
38	Mount Vernon.....	l.	B.	l. s.	r. o. c.	m.	L.	Am.						*	
39	Mrs Cleveland.....	l.	P.	b. c.	r. c.	m.	M.	Ohio.							
40	Neuman. Neuman's Prolific, Charleston.....	l.	P.	l. s.	e.	f.	M.	Am.							
41	Old Iron Clad. Phelps' Seedling.....	l.	B.	s.	o. c.	f.	M.	Am.				†		*	
42	Ontario.....	l.	B.	b. r.	o. c.	f.	M.	Am.							
43	Parker Earle.....	l.	B.	b. r.	l. e.	f.	M.	Tex.							
44	Pearl.....	m.	B.	d. r.	o. c.	f.	M.	Am.							
45	Pioneer.....	l.	B.	e.	r.	m.	M.	Am.						*	*
46	Piper's Seedling.....	l.	B.	c.	r. c.	f.	E.	Am.				†		*	
47	Primo.....	m.	B.	s.	e.	f.	L.	Am.				†		*	
48	Russell's Advance.....	l.	B.	e.	r.	f.	L.	Am.							
49	Seneca Queen.....	l.	B.	d. c.	e.	m.	L.	Am.						†	
50	Seth Boyden.....	l.	B.	r.	o. c.	f.	M.	Am.	*				*	*	*
51	Sharpless. Ontario.....	v. l.	B.	b. r.	o. c.	f.	M.	Am.			*	*	*	*	*
52	Shirts.....	v. l.	B.	b. c.	e.	f.	M.	Am.							
53	Sucker State.....	m.	B.	r.	e.	m.	M.	Am.							
54	Triomphe de Gand.....	l.	B.	l. e.	o. c.	f.	M.	F.	*		*	*	*	*	*
55	Triple Crown.....	l.	H.	d. e.	e.	f.	M.	Am.							
56	Triumph.....														
57	Truitt's Surprise.....	l.	H.	d. r.	o. c.	f.	M.	Am.							
58	Warfield.....	m.	P.	d. r.	e.	f.	M.	Ill.							
59	Warrior.....														
60	Wilder. President Wilder.....	l.	H.	d. s.	r. o. c.	f.	M.	Am.			*		*	*	†
61	Wilson. Wilson's Albany.....	l.	H.	d. e.	r. c.	f.	E. L.	Am.	**		*	**	*	*	*

6 Valuable late sort. 37. A Michigan Seedling, much like Jessie, Hoffman, Cloud, 20. Needs good soil and high cultivation. Michael Frumlat and Federal Point, are also reported suc- 23. An old and highly valued sort. cessful in Florida and several of the Gulf States.



Section XXVII.

CATALOGUE

OF

Native and Introduced Species of Fruits and Nuts,

IN THE UNITED STATES AND CANADA, NOT INCLUDED IN THE FOREGOING TABULATIONS.

NOTE.—The following Catalogue is intended to include all species of native and introduced *Fruits* and *Nuts* growing or cultivated in the open air in any part of the United States or the Dominion of Canada, that have proved to be or promise to be of value to the grower.

The "starring" of this table has necessarily been done with insufficient data, and any information that will help to perfect it or make additions to the list itself will be thankfully received.

NUMBER.	NAMES.		ORIGIN.	I.—N. Div.						
	BOTANICAL.	COMMON.		Nova Scotia.	New Brunswick.	Maine.	New Hampshire.	Vermont.	Massachusetts.	Rhode Island.
1	Achras Sapota.....	Sapodilla Plum.....								
2	Adansonia digitata.....	Baobab.....	Afr.							
3	Aegle Marmelos.....	Bengal Quince.....								
4	Amelanchier Canadensis.....	Service Berry.....	N.	*	*	*	*	*	*	*
5	Antedisma Brenne.....		Java.							
6	Anacardium occidentale.....	Cashew Nut.....								
7	Asimina triloba.....	Pawpaw.....	N.							
8	Averrhoa carambola.....		Ind.							
9	Berberis vulgaris.....	Barberry.....		*					*	*
10	Cactus (Opuntia).....	Indian Fig.....								
11	Calodendron capensis.....	Cape Chestnut.....	S. Af.							
12	Carica Papaya.....	Melon Papaw.....	S. Am.							
13	Carissa acuminata.....		S. Af.							
14	Carissa Arduina.....		Aus.							
15	Carissa Carandas.....									
16	Castanea Americana.....	American Chestnut.....	N.	*	*	*	*	*	*	*
17	Castanea pumila.....	Chinquapin.....	N.							
18	Castanea sativa.....	European Chestnut.....								
19	Chrysophyllum Cainito.....	Star Apple.....	W. I.							
20	Chrysophyllum cainito.....	Star Apple, var.....	W. I.							
21	Cicca disticha.....	Otaheite Gooseberry.....	W. I.							
22	Cocos nucifera.....	Cocoa Nut.....								
23	Corylus Americana.....	American Hazel.....	N.	*						
24	Corylus Avellana.....	Filbert.....		*						
25	Corylus rostrata.....	Beaked Hazel Nut.....	N.			*	*	*	*	*
26	Diospyros Texana.....	Black Persimmon.....	N.							
27	Diospyros Virginiana.....	Persimmon.....	N.							
28	Durio Zibethinus.....	Durion.....	E. I.							
29	Eugenia brachyloba.....	Brazil Cherry.....	S. Am.							
30	Eugenia Michelli.....	Surinam Cherry.....	S. Am.							
31	Eugenia Jambos.....	Rose Apple.....	E. I.							
32	Fagus ferruginea.....	Beech.....	N.	*	*	*	*	*	*	*
33	Feronia elephantum.....	Elephant Apple.....	E. I.							
34	Ficus glomerata.....	Cluster Fig.....	Aus.							
35	Fragaria Chilensis.....	South American Strawberry.....	N.	*						
36	Fragaria vesca.....	English Wild Strawberry.....	N.	*						
37	Garcinia Mangostana.....	Mangosteen.....	E. I.							
38	Gaylussacia frondosa.....	Dangleberry.....	N.							
39	Gaylussacia resinosa.....	Black Huckleberry.....	N.	*						
40	Grias cauliflora.....	Anchoy Pear.....	W. I.							
41	Hibiscus sabdariffa.....	Jamaica Sorrel.....								
42	Hicoria alba.....	Shell Bark Hickory.....	N.	*					*	*
43	Hicoria pecan.....	Pecan.....	N.							
44	Hicoria sulcata.....	Large Shell Bark Hickory.....	N.							
45	Juglans cinerea.....	Butternut.....	N.		*	*	*	*	*	*
46	Juglans nigra.....	Black Walnut.....	N.							*
47	Juglans regia.....	European Walnut.....	Persia.							



NUMBER.	NAMES.		ORIGIN.	I.—N. Div.					
	BOTANICAL.	COMMON.		Nova Scotia.	New Brunswick.	Maine.	New Hampshire.	Vermont.	Massachusetts.
48	<i>Juglans Seiboldi</i> .....	Japan Walnut.....	Jan.						
49	<i>Lucuma mammosa</i> .....	Mammee Sapota.....							
50	<i>Lucuma rivicosa</i> var <i>Angustifolia</i> .....	Egg Fruit.....							
51	<i>Mammea Americana</i> .....	Mammee Apple.....							
52	<i>Mespilus Germanica</i> .....	Medlar.....		*					
53	<i>Monstera deliciosa</i> .....	Ceriman.....	Mex.						
54	<i>Morus alba</i> .....	White Mulberry.....							
55	<i>Morus nigra</i> .....	Black Mulberry.....							
56	<i>Morus rubra</i> .....	Red Mulberry.....	N.	*				*	*
57	<i>Musa Paradisiaca</i> .....	Plantain.....							
58	<i>Myrtus tomentosa</i> .....	Downy Myrtle.....	China.						
59	<i>Nephelium Litchi</i> .....	Chinese Leechee.....	China.						
60	<i>Opuntia Tuna</i> .....								
61	<i>Opuntia Ficus Indica</i> .....								
62	<i>Passiflora edulis</i> .....	Granadilla.....	W. I.						
63	<i>Passiflora quadrangularis</i> .....								
64	<i>Persea gratissima</i> .....	Avocadoor Alligator Pear.....	Cen. Am.						
65	<i>Phoenix dactylifera</i> .....	Date Palm.....	Afr.						
66	<i>Phyllanthus emblica</i> .....		E. I.						
67	<i>Platanus insignis</i> .....	Bacury.....	S. Am.						
68	<i>Podophyllum peltatum</i> .....	May Apple.....							
69	<i>Amygdalus communis</i> .....	Almond.....							
70	<i>Prunus maritima</i> .....	Beach Plum.....	N.	*					
71	<i>Prunus pumila</i> .....	Dwarf or Sand Cherry.....	N.	*					
72	<i>Pyrus coronaria</i> .....	American Crab.....	N.	*					
73	<i>Pyrus rivularis</i> .....	Oregon Crab.....	N.						
74	<i>Shepherdia argentea</i> .....	Buffalo Berry.....	N.						
75	<i>Spondias lutea</i> .....	Hog Plum.....	W. I.						
76	<i>Tamarindus indica</i> .....	Tamarind.....	Afr.						
77	<i>Terminalia Catappa</i> .....	Tropical Almond.....	E. I.						
78	<i>Vaccinium Canadensis</i> .....	Canada Blueberry.....	N.	*	*	*	*	*	*
79	<i>Vaccinium corymbosum</i> .....	Swamp Blueberry.....	N.	*	*	*	*	*	*
80	<i>Vaccinium macrocarpon</i> .....	American Cranberry.....	N.	*					
81	<i>Vaccinium Pennsylvanicum</i> .....	Dwarf Early Blueberry.....	N.		*	*	*	*	*
82	<i>Vaccinium virgatum</i> , var., <i>tenellum</i> ..	Southern Blueberry.....	N.		*	*	*	*	*
83	<i>Varegueria edulis</i> .....	Von Vanga.....	Mada.						
84	<i>Ximenia Americana</i> .....		India.						
85	<i>Zizyphus Jujuba</i> .....	Jujube.....	India.						



# RULES FOR EXHIBITING AND NAMING FRUITS.

## SECTION I.

### NAMING AND DESCRIBING NEW FRUITS.

*Rule 1.*—The originator or introducer (in the order named) has the prior right to bestow a name upon a new or unnamed fruit.

*Rule 2.*—The Society reserves the right, in case of long, inappropriate, or otherwise objectionable names, to shorten, modify, or wholly change the same, when they shall occur in its discussions or reports; and also to recommend such changes for general adoption.

*Rule 3.*—The name of a fruit should, preferably, express, as far as practicable by a single word, a characteristic of the variety, the name of the originator, or the place of its origin. Under no ordinary circumstances should more than a single word be employed.

*Rule 4.*—Should the question of priority arise between different names for the same variety of fruit, other circumstances being equal, the name first publicly bestowed will be given precedence.

*Rule 5.*—To entitle a new fruit to the award or commendation of the Society, it must possess (at least for the locality for which it is recommended) some valuable or desirable quality or combination of qualities, in a higher degree than any previously known variety of its class and season.

*Rule 6.*—A variety of fruit, having been once exhibited, examined and reported upon, as a new fruit, by a committee of the Society, will not thereafter be recognized as such, so far as subsequent reports are concerned.

## SECTION II.

### COMPETITIVE EXHIBITS OF FRUITS.

*Rule 1.*—A plate of fruit must contain six specimens, no more, no less, except in the case of single varieties, not included in collections.

*Rule 2.*—To insure examination by the proper committees, all fruits must be correctly and distinctly labeled, and placed upon the tables during the first day of the exhibition.

*Rule 3.*—The duplication of varieties in a collection will not be permitted.

*Rule 4.*—In all cases of fruits intended to be examined and reported by committees, the name of the exhibitor, together with a complete list of the varieties exhibited by him, must be delivered to the Secretary of the Society on or before the first day of the exhibition.

*Rule 5.*—The exhibitor will receive from the Secretary an entry card, which must be placed with the exhibit, when arranged for exhibition, for the guidance of committees.

*Rule 6.*—All articles placed upon the tables for exhibition must remain in charge of the Society till the close of the exhibition, to be removed sooner only upon express permission of the person or persons in charge.

*Rule 7.*—Fruits or other articles intended for testing, or to be given away to visitors, spectators, or others, will be assigned a separate hall, room or tent, in which they may be dispensed at the pleasure of the exhibitor, who will not, however, be permitted to sell and deliver articles therein, nor to call attention to them in a boisterous or disorderly manner.

## SECTION III.

### COMMITTEE ON NOMENCLATURE.

*Rule 1.*—It shall be the duty of the President, at the first session of the Society, on the first day of an exhibition of fruits, to appoint a committee of five expert pomologists, whose duty it shall be to supervise the nomenclature of the fruits on exhibition, and in case of error to correct the same.

*Rule 2.*—In making the necessary corrections they shall, for the convenience of the examining and awarding committees, do the same at as early a period as practicable, and in making such corrections they shall use cards readily distinguishable from those used as labels by exhibitors, appending a mark of doubtfulness in case of uncertainty.

## SECTION IV.

### EXAMINING AND AWARDING COMMITTEES.

*Rule 1.*—In estimating the comparative values of collections of fruits, committees are instructed to base such estimates strictly upon the varieties in such collections which shall have been correctly named by the exhibitor, prior to action thereon by the committee on nomenclature.

*Rule 2.*—In instituting such comparison of values, committees are instructed to consider: 1st, the values of the varieties for the purposes to which they may be adapted; 2d, the color, size, and evenness of the specimens; 3d, their freedom from the marks of insects, and other blemishes; 4th, the apparent carefulness in handling, and the taste displayed in the arrangement of the exhibit.

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