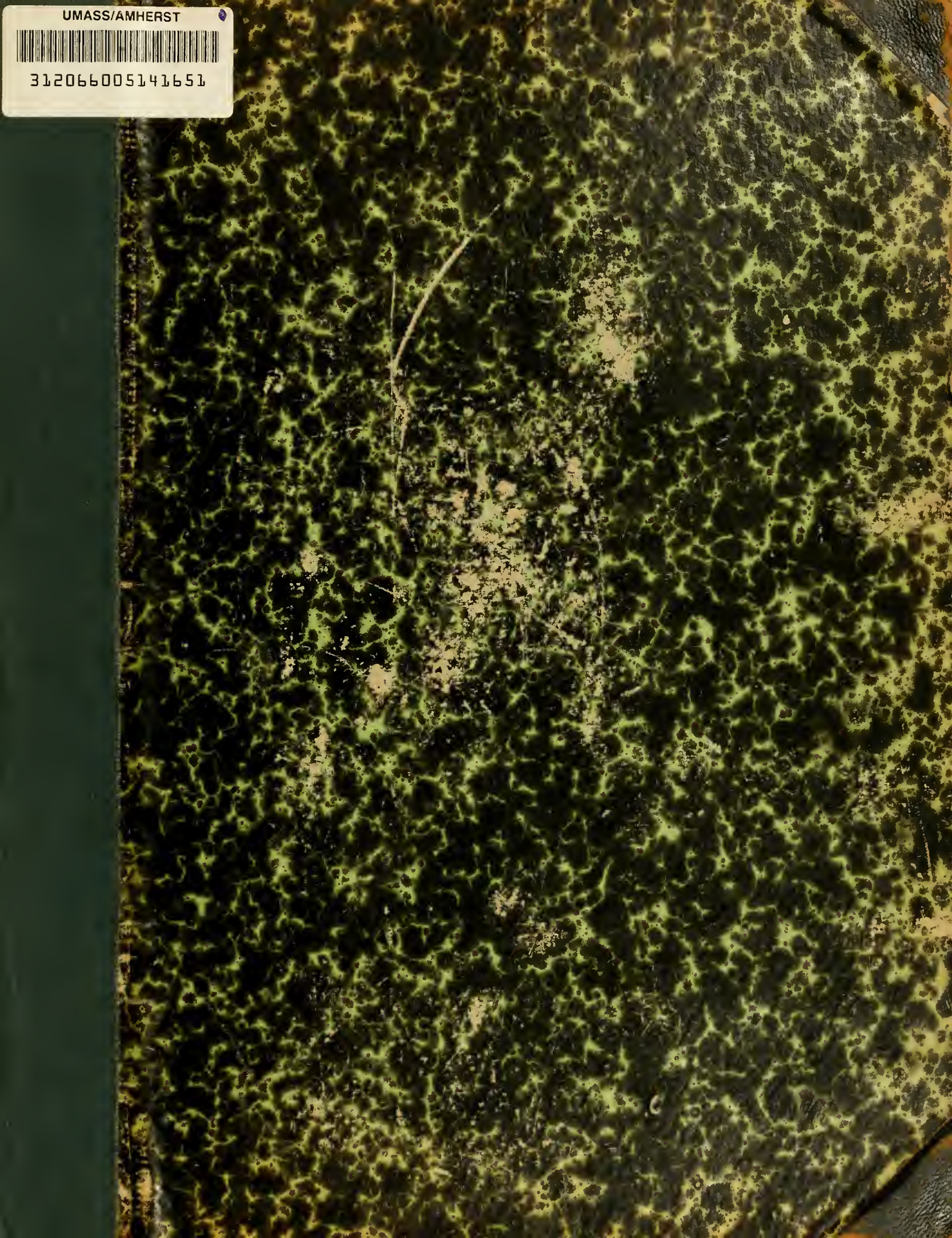

PROCEEDINGS

OF THE

TWENTY-SECOND SESSION

OF THE

American Pomological Society

HELD IN

OCALA, FLORIDA,

FEBRUARY 20, 21, 22, 1889.

COMPILED BY THE SECRETARY.

PUBLISHED BY THE SOCIETY.

1889.

REGISTER PRINTING AND PUBLISHING HOUSE,
ANN ARBOR, MICHIGAN.

CONTENTS.

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,

1889-91.

PRESIDENT:

PROSPER JULIUS BERCKMANS, Augusta, Georgia.

FIRST VICE-PRESIDENT:

T. T. LYON, South Haven, Michigan.

VICE-PRESIDENTS:

Alabama	J. S. NEWMAN	Auburn.
Arizona	WM. A. HANCOCK	Phœnix.
Arkansas	E. F. BABCOCK	Little Rock.
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Colorado	A. E. GIPSON	Greeley.
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Dist. Columbia	WM. SAUNDERS	Washington.
Florida	DUDLEY W. ADAMS	Tangerine.
Georgia	DR. SAMUEL HAPE	Hapeville.
Illinois	PARKER EARLE	Cobden.
Indiana	S. JOHNSON	Irvington.
Iowa	G. B. BRACKETT	Denmark.
Kansas	G. C. BRACKETT	Lawrence.
Louisiana	A. W. ROUNTREE	New Orleans.
Maine	GEO. B. SAWYER	Wiscasset.
Maryland	WM. H. PEROT	Baltimore.
Massachusetts	W. C. STRONG	Brighton.
Michigan	E. H. SCOTT	Ann Arbor.
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Mississippi	W. H. CASSELL	Canton.
Missouri	N. J. COLMAN	St. Louis.
Nebraska	JAS. H. MASTERS	Nebraska City.
New Brunswick	D. P. WETMORE	Clifton.
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New Jersey	DR. GEO. THURBER	Passaic.
New York	C. L. HOAG	Lockport.
North Carolina	J. VAN LINDLEY	Pomona.
Nova Scotia	REV. J. R. HART	Bridgetown.
Ohio	G. W. CAMPBELL	Delaware.
Ontario	L. WOOLVERTON	Grimsby.
Pennsylvania	JOSIAH H. HOOPES	West Chester.
Quebec	ROBERT JACK	Chateauguay B'sn.
Rhode Island	JOSEPH H. BOURN	Providence.
South Carolina	W. D. JOHNSON	Marion.
Tennessee	M. G. SENTER	Humboldt.
Texas	T. V. MUNSON	Denison.
Utah	C. E. JOHNSON	Salt Lake City.
Vermont	DR. T. H. HOSKINS	Newport.
Virginia	HENRY L. LYMAN	Charlottesville.
West Virginia	JOHN T. MCKOWN	Gerrardstown.
Wisconsin	JAMES M. SMITH	Green Bay.
Wyoming	JOHN W. HOYT	Cheyenne.

TREASURER:

BENJAMIN G. SMITH, - - Cambridge, Massachusetts.

SECRETARY:

A. A. CROZIER, - - - - - - Ames, Iowa.

STANDING COMMITTEES.

EXECUTIVE COMMITTEE:

PRESIDENT AND VICE-PRESIDENTS, *ex-officio.*

SAMUEL B. PARSONS	Flushing	*New York.*	DR. H. H. CARY	La Grange	*Georgia.*
CHAS. W. GARFIELD	Grand Rapids	*Michigan.*	O. P. ROOKS	Gardenia	*Florida*
DAVID BAIRD	Manalapan	*New Jersey.*			

FINANCE COMMITTEE:

EDWARD B. WILDER, Dorchester, *Massachusetts.* H. H. HUNNEWELL, Boston, *Massachusetts*
ROBERT MANNING, Salem, *Massachusetts.*

GENERAL FRUIT COMMITTEE:

CHAIRMAN, - - C. L. WATROUS, - - Des Moines, Iowa.

Alabama	J. C. RICHARDSON	Greenville.	
Arizona	WM. A. HANCOCK	Phœnix.	
Arkansas	S. J. MATTHEWS	Monticello.	
California	DR. J. STRENTZEL	Martinez.	
Colorado	D. S. GRIMES	Denver.	
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Indiana	DR. A. FURNAS	Danville.	
Iowa	C. G. PATTEN	Charles City.	
Kansas	G. C. BRACKETT	Lawrence.	
Kentucky	A. D. WEBB	Bowling Green.	
Louisiana	E. M. HUDSON	New Orleans.	
Maine	S. L. BOARDMAN	Augusta.	
Maryland	E. L. ROGERS	Baltimore.	
Massachusetts	ROBERT MANNING	Salem.	
Michigan	L. R. TAFT	Agr'l College.	
Minnesota	S. D. HILLMAN	Minneapolis.	
Mississippi	J. J. COLMANT	Columbus.	
Missouri	W. G. GANO	Olden.	
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New Jersey	E. WILLIAMS	Montclair.	
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North Carolina	J. VAN LINDLEY	Pomona.	
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Ohio	M. CRAWFORD	Cuyahoga Falls.	
Ontario	A. MCD. ALLAN	Goderich.	
Pennsylvania	H. M. ENGLE	Marietta.	
Quebec	CHARLES GIBB	Abbottsford.	
Rhode Island	JOSEPH H. BOURN	Providence.	
South Carolina	H. B. BUIST	Greenville.	
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Texas	WILLIAM WATSON	Brenham.	
Utah	G. E. JOHNSON	Salt Lake.	
Vermont	T. H. HOSKINS	Newport.	
Virginia	FRANKLIN DAVIS	Richmond.	
West Virginia	JOHN T. MCKOWN	Gerrardstown.	
Wisconsin	A. L. HATCH	Ithaca.	

COMMITTEE ON NATIVE FRUITS:

CHAIRMAN, - - DR. F. M. HEXAMER, - - New York City.

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J. T. LOVETT	*Little Silver, N. J.*	" "	DR. J. STRENTZEL	*Martinez, Cal.*	Pacific "
DR. T. H. HOSKINS	*Newport, Vt.*	Eastern "	J. S. NEWMAN	*Auburn, Ala.*	Southern "
J. S. HARRIS	*La Crescent, Minn.*	Northwestern "	CHAS. GIBB	*Abbottsford, Que.*	British Provinces.
C. A. UBER	*Falls Church, Va.*	East'n Middle "	J. H. HALE	*S. Glastonbury, Ct.*	Eastern "

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THOS. B. MEEHAN	*Philadelphia, Pa.*	J. VAN LINDLEY	*Pomona, N. C.*
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F. L. TEMPLE	*Cambridge, Mass.*		

COMMITTEE ON NOMENCLATURE AND REJECTED FRUITS:

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SAMUEL HAPE	*Hapeville, Ga.*		

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T. T. LYON	*South Haven, Mich.*	LOUIS A. BERCKMANS	*Augusta, Ga.*
L. H. BAILEY, JR	*Ithaca, N. Y.*	EDWARD H. BISSELL	*Richmond, Va.*
DR. F. M. HEXAMER	*New York, N. Y.*	C. L. WATROUS	*Des Moines, Iowa.*

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A. H. MANVILLE.....*Denver, Fla.*
O. P. ROOKS.....*Gardenia, Fla.*
DR. J. C. NEAL.....*Lake City, Fla.*
E. N. REASONER.....*Manatee, Fla.*
LYMAN PHELPS.....*Sanford, Fla.*
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DR. GUSTAVE DEVERON.....*New Orleans, La.*
EDGAR L. ST. CERAN.....*Ponchatula, La.*
ELWOOD COOPER.....*Santa Barbara, Cal.*
C. H. WILCOX.....*Oroville, Cal.*

COMMITTEES FOR THE FLORIDA MEETING.

COMMITTEE OF ARRANGEMENTS:

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R. W. PIERCE.....*Indian Springs, Fla.*
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E. T. FIELD.....*Red Bank, N. J.*

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LYMAN PHELPS.....*Sanford, Fla.*
F. W. ANDREWS.....*Boston, Mass.*
E. H. HART.....*Federal Point, Fla.*

CREDENTIALS:

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C. F. A. BIELBY.....*De Land, Fla.*
G. B. BRACKETT.....*Denmark, Iowa.*

PRESIDENT'S ADDRESS:

F. M. HEXAMER.....*New York City, N. Y.*
W. C. STRONG.....*Brighton, Mass.*
DUDLEY W. ADAMS.....*Tangerine, Fla.*

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J. S. NEWMAN.....*Auburn, Ala.*
W. H. YEOMANS.....*Columbia, Conn.*
H. E. VAN DEMAN.....*Washington, D. C.*
C. F. A. BIELBY.....*De Land, Fla.*
H. H. CARY.....*La Grange, Ga.*
G. B. BRACKETT.....*Denmark, Ia.*
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E. T. FIELD.....*Red Bank, N. J.*
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F. M. HEXAMER.....*New York City, N. Y.*
J. VAN LINDLEY.....*Pomona, N. C.*
GEO. W. TROWBRIDGE.....*Glendale, O.*
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G. P. O'NEAL.....*Coronaco, S. C.*

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O. B. HADWIN.....*Worcester, Mass.*
B. T. GALLOWAY.....*Washington, D. C.*

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E. S. HUBBARD.....*Federal Point, Fla.*
A. H. MANVILLE.....*Denver, Fla.*

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A. W. ROUNTREE.....*New Orleans, La.*
A. H. MANVILLE.....*Denver, Fla.*
J. E. CUTTER.....*Riverside, Cal.*

PLACE OF NEXT MEETING:

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F. W. ANDREWS.....*Boston, Mass.*
C. L. WATROUS.....*Des Moines, Ia.*

LIST OF MEMBERS.

LIFE.

Allan, Alex. McD.	Goderich. .	Ontario.
Allan, David	Belmont	Massachusetts.
Allen, Abner	Wabaunsee	Kansas.
Allen, Edwin	New Brunswick,	New Jersey.
Alwood, Wm. B	(For Exp. Station) Blacksburg,	Va.
Ames, Frederick L.	Boston	Massachusetts.
Andrews, Frank W.	Boston	Massachusetts.
Appleton, Francis H	251 Marlboro St., Boston,	Mass.
Atkins, Chas. G	Bucksport	Maine.
Austin, Mrs. Helen V.	Palmyra	New Jersey.
Babcock, E. F	Little Rock	Arkansas.
Baird, David	Manalapan	New Jersey.
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Barry, William C.	Rochester	New York.
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Bowditch, E. F.	Boston	Massachusetts.
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Brill, Francis	Hempstead, L. I.,	New York.
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Buchanan, Isaac	New York	New York.
Bucklin, Simon S.	16 Bulfinch St., Boston,	Mass.
Burnett, Rev. Robert	Burlington	Ontario.
Burnett, Joseph	Southboro	Massachusetts.
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Buswell, E. W.	New York	New York.
Butler, Charles	New York	New York.
Calder, Rev. James	102 State St., Harrisburg,	Pa.
Calkins, John S.	Pomona	California.
Campbell, George W.	Delaware	Ohio.
Carey, Otis	Foxborough,	Massachusetts.
Carpenter, Charles	Kelley's Island	Ohio.
Chase, Howard A.	Philadelphia.	Pennsylvania.
Chase, Lewis.	Rochester	New York.
Cheney, Benj. P.	Boston	Massachusetts.
Childs, Geo. W.	(Pub. Led.) Philadelphia,	Pa.
Clapp, Wm. Channing	Boston	Massachusetts.
Clark, Edmund S.	16 Kingston St., Boston,	Mass.
Clark, James W.	Framingham,	Massachusetts.
Clement, Asa	Lowell	Massachusetts.
Conover, Geo. S.	Geneva	New York.
Colman, N. J.	St. Louis	Missouri.
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Cook, M. S.	Avondale.	Pennsylvania
Cresswell, Jno. A. J.	Elkton	Maryland.
Crozier, A. A.	Ames	Iowa.
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Cummings, A. P.	New York	New York.
Cummings, John	Woburn	Massachusetts.
Davis, Franklin	Richmond	Virginia.
Davis, J. C. Bancroft	1621 H St., Washington,	D. C.
Devol, W. S.	(For Exp. Sta.) Reno,	Nevada.
Dexter, Arthur F.	Providence	Rhode Island.
Douglas, Robert	Waukegan	Illinois.
Durfee, Geo. B.	Fall River	Massachusetts.
Earle, Parker	Cobden	Illinois.
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Engle, Hiram	Marietta	Pennsylvania.
Eshleman, John K.	Downingtown.	Pennsylvania.
Falconer, Wm., Dosoris, Glen Cove, Long Island,		N.Y.
Faxon, M. B.	Boston	Massachusetts.
Field, E. T.	Red Bank	New Jersey.
Fisher, John.	Batavia	New York.
Flint, David B., 358 Commonwealth Ave., Boston,		Mass.
Force, T. S.	Newburg	New York.
French, Jonathan	Boston	Massachusetts.
Frothingham, Isaac W.	Boston	Massachusetts.
Fuller, Andrew S.	Ridgewood	New Jersey.
Furnas, R. W.	Brownville	Nebraska.
Gardette, E. B.	Philadelphia.	Pennsylvania.
Gardiner, Robert H	Gardiner	Maine.
Gardner, Henry J	Boston	Massachusetts.
Gerrish, O. K.	Geneva	New York.
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Goff, E. S.	Madison	Wisconsin.
Gold, T. S.	West Cornwall,	Connecticut.
Goodell, H. H.	(For Ag. Col.) Amherst,	Mass.
Graves, S. S.	Geneva	New York.
Green, W. J.	(For Exp. Sta.) Columbus,	O.
Grosvenor, C. E.	46 Market St., Boston,	Mass.
Guy, T. W.	Sulphur Springs	Missouri.
Hacker, William	Philadelphia.	Pennsylvania.
Hadwen, O. B	Worcester	Massachusetts.
Haines, John S.	Germantown.	Pennsylvania.
Haines, Henry C.	Germantown.	Pennsylvania.
Hance, Benj. B.	Red Bank	New Jersey.
Hancock, Caroline G.	(Free Library) Sacramento,	Cal.
Harris, Geo. W.	(For Cornell Univ.) Ithaca,	N.Y.
Harris, James A.	Citra	Florida.
Haskell, George	Ipswich	Massachusetts.
Helver, J. W.	Lockport	New York.
Hexamer, Dr. F. M.	751 Broadway	New York,

Hoadley, George.....120 Broadway...New York.
Hoag, C. L.....Lockport.....New York.
Holmes, Dr. E. S.....Grand Rapids.....Michigan.
Holton, Warren.....Hamilton.....Ontario.
Hovey, John C.....Cambridge...Massachusetts.
Hubbard, T. S.....Fredonia.....New York.
Hunnewell, H. H.....Wellesley....Massachusetts.
Hunter, John M.....Houston.....Texas.
Hyde, J. F. C.....31 Milk St., Boston....Mass.
Igenfritz, I. E.....Monroe.....Michigan.
Jeter, Tinsley.....Bethlehem....Pennsylvania.
Jones, James.....Leiperville....Pennsylvania.
Kendall, Edward.....Cambridge...Massachusetts.
Kendall, George F.....Cambridge...Massachusetts.
Kent, Joseph H.....Russellville...Pennsylvania.
Kidder, N. T., 163 Commonwealth Ave., Boston, Mass.
King, John A.....Great Neck, L.I., New York.
Kirkpatrick, T. J.....Springfield.....Ohio.
Koen, R. B.....Memphis.....Tennessee.
Kuhn, Hartman.....Philadelphia..Pennsylvania.
Langdon, C. C.....Mobile.....Alabama
Lawver, A. M.....Galena.....Illinois.
Leighton, G. B. F.....Norfolk.....Virginia.
Lester, J. Erastus.....Providence....Rhode Island.
Lindley, J. V.....Pomona.....North Carolina.
Lovett, J. T.....Little Silver....New Jersey.
Luke, Elijah H.....Cambridgeport.....Mass.
Lyman, Henry L.....Charlottesville.....Virginia.
Lyons, James M.....NewBedford, Massachusetts.
Lyon, T. T.....South Haven.....Michigan.
Mann, William R.....Sharon.....Massachusetts.
Manning, Robert.....Salem.....Massachusetts.
Marble, F. M.....Worcester....Massachusetts.
Masters, James H.....Nebraska City....Nebraska.
McCulloch, J. M.....Cincinnati.....Ohio.
MacFerron, David.....Allegheny City, Pennsylvania.
McLaughlin, Henry.....Bangor.....Maine.
Meehan, Thomas.....Germantown, Pennsylvania.
Menke, A. E.....(For Exp. Sta.) Fayetteville, Ark.
Miller, F. R.....Sugar Grove..Pennsylvania.
Mills, W. H.....Hamilton.....Ontario.
Mudd, Henry T.....Pittsfield.....Illinois.
Munson, D. O.....Fall's Church.....Virginia.
Murray, R. D.....Moultrie.....Florida.
Newman, J. S.....Auburn.....Alabama.
Noble, Samuel W.....Jenkintown..Pennsylvania.
Orton, J. G.....Binghampton....New York.
Osborne, Charles.....Vassalboro.....Maine.
Parsons, S. B.....Flushing.....New York.
Payson, Samuel R.....Boston.....Massachusetts.
Pearson, John M.....Godfrey.....Illinois.
Periam, Jonathan, 526 Englewood Ave., Englewood, Ill
Perley, Samuel F.....Naples.....Maine.
Perot, William H.....Baltimore.....Maryland.
Peters, R.....Atlanta.....Georgia.
Phelps, Lyman.....Sanford.....Florida.
Phœnix, F. K.....Delavan.....Wisconsin.
Pierce, Henry L.....Boston....Massachusetts.
Popenoe, E. A.....Manhattan.....Kansas.
Purrington, E. F.....West Farmington....Maine.
Putnam, J. Pickering....Boston.....Massachusetts.
Quinn, P. T.....Newark.....New Jersey.
Richardson, I. D.....Clarksville.....Nebraska.
Riehl, E. A.....Alton.....Illinois.
Rogers, Edmund Law....Baltimore.....Maryland.
Rumph, Samuel H.....Marshallville.....Georgia.
Russell, Gurdon W.....Hartford.....Connecticut.
Russell, Henry S.....Milton.....Massachusetts.
Sadler, Dr. O. W.....Pittsburgh....Pennsylvania.
Salisbury, Stephen.....Worcester....Massachusetts.
Sampson, F. G.....Micanopy.....Florida.
Saunders, William.....Washington, Dist. Columbia.
Sawyer, Geo. B.....Wiscasset.....Maine.
Scarborough, W.....Cincinnati.....Ohio.
Scott, David A.....Newburg.....New York.
Selover, Edward C.....Auburn.....New York.
Shaw, C. C.....Milford....New Hampshire.
Shotwell, J. R.....Rahway.....New Jersey.
Smith, B.....Cuba.....Missouri.
Smith, Benj. G.....Cambridge...Massachusetts.
Smith, W.....Geneva.....New York.
Smith, Wm. Brown.....Syracuse.....New York.
Smith, Wm. Elliott.....Alton.....Illinois.
Smith, Wing R.....Syracuse.....New York.
Smyth, Frederick.....Manchester, New Hampshire.
Southworth, C.....Stoughton....Massachusetts.
Spaulding, Dr. C.W.....2618 Olive St., St. Louis, Mo.
Stark, William H.....Louisiana.....Missouri.
Starr, Robert W.....Cornwallis.....Nova Scotia.
Stewart, Brice.....Clarksville.....Tennessee.
Stewart, Henry L.....Middle Haddam, Connecticut.
Stephens, J. L.....Booneville...Massachusetts.
Stone, J. M.....Calhoun Station, Mississippi.
Streator, George J.....Garretsville.....Ohio.
Strong, W. C.....Brighton.....Massachusetts.
Strother, David H.....Charlestown, West Virginia.
Swan, Robert J.....Geneva.....New York.
Swineford, Howard.....Richmond.....Virginia.
Taft, Edward P.....Providence...Rhode Island.
Tatnall, Edward.....Wilmington.....Delaware.
Taylor, John N.....Brooklyn.....New York.
Taylor, Dr. Thomas.....Washington, Dist. Columbia.
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Temple, John T.....Davenport.....Iowa.
Thomas, George B.....West Chester, Pennsylvania.
Thomas, J. J.....Union Springs...New York.
Thomas, Milton.....Los Angeles.....California.
Thurber, George.....Passaic.....New Jersey.
Townsend, B. C.....Bay Ridge, L. I., New York.
Trowbridge, Francis.....Milford.....Connecticut.
Uber, Carlton A.....Fall's Church.....Virginia.
VanDeman, H. E.....Washington, Dist. Columbia.
Van Gelder, Jacob.....Saugerties.....New York.
Van Lindley, J.....Pomona.....North Carolina.

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

BIENNIAL.

Adams, Dudley W.	Tangerine	Florida.
Albright, Owen	Leesburg, Lake Co.,	Florida.
Alexander, J. H.	Augusta	Georgia.
Alexander, Mrs. J. H.	Augusta	Georgia.
Allen, George K.	Red Bank	New Jersey.
Atwood, Albion	Chelsea	Massachusetts.
Baker, Geo. W.	Mankato	Minnesota.
Barnum, B. B.	Eureka	Florida.
Bean, E.	Jacksonville	Florida.
Bemis, C. A.	Jacksonville	Florida.
Berckmans, Mrs. P. J.	Augusta	Georgia.
Berckmans, Louis A.	Augusta	Georgia.
Berckmans, Robert C.	Augusta	Georgia.
Berckmans, P. J. A., Jr.	Augusta	Georgia.
Bessy, C. E.	(For State Univ.) Lincoln,	Nebraska.
Bielby, C. F. A.	De Land	Florida.
Bishop, P. P.	Citra	Florida.
Blackwell, Ira J.	Titusville	New York.
Brackett, G. B.	Denmark	Iowa.
Brokaw, I. J.	Anthony	Florida.
Brown, Frank E.	Reading	Massachusetts.
Cary, Dr. H. H.	La Grange	Georgia.
Cassell, W. H.	Canton	Mississippi.
Coburn, R. R.	Ocala	Florida.
Colby, Miss C. S.	Boston	Massachusetts.
Cook, Lewis.	Austin	Texas.
Dollins, L. J.	Orlando	Florida.
Dorsett, C. H.	Savannah	Georgia.
Eicheberger, A. L.	Ocala	Florida.
Elliott, David H.	Sanford	Florida.
Evans, John H.	Lewiston	Idaho.
Fairbanks, Geo. R.	Fernandina	Florida.
Fleming, James L.	Augusta	Georgia.
Fosnot, W. E.	Keosauqua	Iowa.
Foster, Dr. Henry	Clifton Springs	New York.
Galloway, B. T.	Dept. Ag. Washington, D. C.	
Glason, Jas.	Oconto	Wisconsin.
Green, Chas. A.	Rochester	New York.
Hape, Dr. Samuel	Atlanta	Georgia.
Harris, J. S.	La Crescent	Minnesota.
Hart, E. H.	Federal Point	Florida.
Hart, W. S.	Hawk's Park	Florida.
Hatch, F. W.	Oak Hill	Florida.
Hayes, Chas. W.	Brooklyn	New York.
Hexamer, Mrs. F. M.	New York	New York.
Hill, E. G.	Lawtey	Florida.
Hillman, S. D.	Minneapolis	Minnesota.
Hopkins, C. L.	Ag. Dep't Washington,	D. C.
Horsford, Mrs. Julia B.	Terre Haute	Indiana.
Hoyt, John W.	Laramie	Wyoming.
Hubbard, E. S.	Federal Point	Florida.
Jones, H. N.	Gainesville	Florida.
Josselyn, Geo. S.	Fredonia	New York.
Justice, J. G.	Marcus	Georgia.
Kedney, H. S.	Orlando	Florida.
King, J. B.	Sanford	Florida.
King, Mrs. J. B.	Sanford	Florida.
King, Wm. R.	Ag. Dep't, Washington,	D. C.
Lee, J. H.	Oviedo	Florida.
Mahan, John L.	Linton	Ohio.
Manning, J. W.	Reading	Massachusetts.
Manning, Mrs. J. W.	Reading	Massachusetts.
Manville, A. H.	Denver	Florida.
Matthews, J. O.	Citra	Florida.
McInnis, Dr. Niel	Augusta	Georgia.
Meehan, Mrs. Thomas	Philadelphia	Pennsylvania.
Meehan, Mrs. Thomas B.	Philadelphia	Pennsylvania.
Meehan, Miss Fannie G.	Philadelphia	Pennsylvania.
Miller, G. H.	Rome	Georgia.
Moore, T. W.	Fruit Cove	Florida.
Mott, James T.	Orlando	Florida.
Newman, Mrs. J. S.	Auburn	Alabama.
Nunnelly, J. K.	Sharpsburg	Kentucky.
O'Neall, G. P.	Coronaco	South Carolina.
Painter, E. O.	De Land	Florida.
Parker, Nelson H.	Longwood	Florida.
Parry, Catherine H.	Parry	New Jersey.
Parry, Charles.	Parry	New Jersey.
Parry, Wm.	Parry	New Jersey.
Parsons, S. B.	Flushing, L. I.	New York.
Partridge, Ernest C.	Longwood	Florida.
Payne, John J.	Warsaw	Kentucky.
Pell, W. H.	Flushing, L. I.	New York.
Pettit, N. C.	Waldo	Florida.
Pierce, R. W.	Indian Springs	Florida.
Reed, Harrison	So. Jacksonville	Florida.
Richardson, J. C.	Greenville	Alabama.
Riggle, Ellsworth	New Comerstown	Ohio

Rooks, Mrs. O. P.	Gardenia	Florida.
Rountree, A. W.	309 Josephine St., New Orleans,	La.
Samuels, J. M.	Clinton	Kentucky.
Smith, Chauncy	Cambridge	Massachusetts.
Smith, George A.	Waltham	Massachusetts.
Smith, Miss Emma	Waltham	Massachusetts.
Speer, R. P.	(For Exp. Sta.) Ames,	Iowa.
Stevens, H. B.	Citra	Florida.
Stevens, Isaac	Ocala	Florida.
Stiles, W. A.	Deckertown	New Jersey.
Strentzel, Dr. John	Martinez	California.
Strong, Mrs. W. C.	Newton Highlands	Mass.
Teague, Sam'l W.	Lady Lake	Florida.
Teas, E. Y.	Dunrieth	Indiana.
Thompson, W. W.	Smithville	Georgia.
Tracy, S. M.	(Ag'l and Mech. Coll.)	Miss.
Trowbridge, Geo. W.	Glendale	Ohio.
Von Luttichau, H.	Earlton	Florida.
Ware, Benjamin P.	Clifton	Massachusetts.
Waring, Geo. H.	Cement	Georgia.
Warren, W. H.	Augusta	Georgia.
Weld, John C.	Cambridge	Massachusetts.
Wheatley, H. L.	Palm Spring	Florida.
White, Charles H.	Citra	Florida.
White, J. H.	Georgiana	Florida.
Wilkinson, Maurice	Charlotte	North Carolina.
Williams, H. S.	Rock Ledge	Florida.
Wilson, Charles G.	Red Hill	Florida.
Wilson, Seth.	Archer	Florida.
Witchers, B. M.	San Antonio	Florida.
Woolverton, L.	Grimsby	Ontario.

PREFATORY NOTE.

At the meeting held in Boston in September, 1887, the Society unanimously accepted an invitation from its Florida members to hold its next meeting in that State. This invitation was afterwards endorsed by the Florida Horticultural Society, and committees of that Society appointed to make the local arrangements for the meeting. In December, 1888, a preliminary circular was sent to the members of the Society, and to some four hundred periodicals. On February first the program was published and widely copied by the press. In addition, a special circular to Southern Pomologists was issued by the President, and an attractive announcement of the meeting was published by the Florida Horticultural Society. Nearly all of the railroads east of the Mississippi River granted a special rate of one and one-third fare to persons attending the meeting. Some of the Florida roads sold tickets to Ocala during the meeting at much lower rates. At the close of the meeting Mr. D. H. Elliott, of the Florida Southern railway, announced that for ten days all of the leading railroads of the State were prepared to furnish free transportation to members of the American Pomological and Florida Horticultural Societies to visit any portion of the State. The hotels at Ocala and at several other points granted reduced rates. The appreciation of the Society for all these courtesies is elsewhere expressed in the form of resolutions, but the Secretary cannot here omit to say that to the committees of the Florida Horticultural Society for their very complete arrangements, to the sub-tropical committee for providing the sub-tropical portion of the program, to the representatives of the press for their liberal notices and full reports, to the managers of the Florida railroads for special courtesies extended, and to the officers of the Semi-tropical Exposition for a place of meeting the Society is indebted for a most enjoyable and successful session.

The present volume is the largest yet issued by the Society and will be found to be particularly full upon citrus and other sub-tropical fruits. Commercial topics are introduced for the first time. The thanks of the Society are especially due to the scientific gentlemen who have contributed many valuable papers. Pomologists will be pleased with the excellent portrait of President Berckmans which serves as a frontispiece to this volume and which has been secured for the purpose at the earnest solicitation of his friends.

PROGRAM.

Following is the order of exercises as carried out at the session of 1889. Owing to lack of time the reading of all papers sent by persons who were unable to be present had to be omitted. Many of these were published, however, in full or in part in the agricultural press at the close of the meeting. The orderly presentation of the remainder of the papers was more or less broken by various causes. For this reason, after the opening session, the papers and discussions are arranged in the Proceedings according to subject, without regard to the time or manner of presentation. Any topic may be readily found from the table of contents or index:

OPENING SESSION.

1. Call to order by President Berckmans.
2. Prayer by Rev. C. B. Wilmer.
3. Welcome on behalf of the Florida Horticultural Society, by President Dudley W. Adams.
4. Welcome to the State by Governor F. P. Fleming.
5. Welcome to Ocala by Mayor Gary.
6. Welcome on behalf of the Semi-tropical Exposition, by President Geo. W. Wilson.
7. Response on behalf of the Society, by W. C. Strong of Massachusetts.
8. Appointment of a committee on Nomination of Officers.

AFTERNOON SESSION.

1. President's Address.
2. Report of the Treasurer.
3. Election of Officers.
4. Paper by Dr. J. C. Neal on Cross-fertilization.

EVENING SESSION.

1. Diseases of the Grape, Prof. B. T. Galloway.
2. The Japanese Persimmon, B. F. Livingston.

SECOND DAY—MORNING SESSION.

1. Joint Report of the Sub-tropical and Florida Fruit Committees.
2. Minor Citrus Fruits, Rev. T. W. Moore.
3. Varieties of the Sweet Orange, E. H. Hart.
4. Botanical Names, D. W. Adams.

AFTERNOON SESSION.

1. Report of the Committee on President's Address.
2. Judging Citrus Fruits, Prof. H. E. Van Deman.
3. Appointment of a Committee on Judging Citrus Fruits, on motion of G. B. Brackett.
4. Ornamental Palms, T. L. Meade.
5. Vitis Vinifera in Florida, Baron H. Von Luttichau and G. H. Norton.
6. Improvement of our Native Grapes, George W. Campbell.
7. American Fruits in Foreign Markets, Dr. Henry Foster.
8. The Fig Industry, Hon. Harrison Reed.
9. Peach Growing in Florida, Geo. L. Taber.
10. Amendment to the Constitution adopted, on motion of G. B. Brackett.

EVENING SESSION.

1. Honesty in Packing Fruits, E. Williams.
2. Orange Growing from a Commercial Standpoint, Hon. Geo. R. Fairbanks.
3. The Pineapple, Rev. J. A. White and G. L. Lucas.
4. The Anguillula or Root Knot, Dr. J. C. Neal.

THIRD DAY—A. M.—CLOSING SESSION.

1. Report of the Committee on Awards.
2. Report of the Committee on New Fruits.
3. Report of the Committee on Credentials.
4. Discussion of New Fruits.
5. Report of the Committee on Resolutions.
6. Report of the Committee on Place of Next Meeting.
7. Adjournment.

PAPERS PRESENTED BUT NOT READ.

Barnett Brothers, Gluts: Their Causes and Remedy.
Bessey, Dr. C. E., A Possible new Fruit from the Plains.
Brown, A. M., Marketing Fruit, and Fruit Exchanges.
Budd, Prof. J. L., Cherries for the Mississippi Valley.
Du Bois, E. M., The Grape in Florida.
Engle, H. M., Nut Culture.
Gillette, Prof. C. P., White Arsenic as an Insecticide.
Girardeau, J. H., The Apple and Pear in Florida.
Goff, Prof. E. S., Unsolved Problems in Pomology.
Halsted, Dr. Byron D., Reserve Food Materials in Fruit Trees and Shrubs in Mid-winter.
Kedney, H. S., The Lemon in Florida.
Lyon, Hon. T. T, The American Pomological Society and Its Rules of Pomology.
Riley, Dr. C. V., The Plum Curculia.
Powers, Stephen, Strawberry Growing in Florida.
Redmond, D., The Fig and Pomegranate.
Smith, Dr. Erwin F., The Chemistry of Peach Yellows.
Watrous, Hon. C. L., Testing and Introducing new Fruits.
Webb, Wesley, The Delaware Fruit Exchange.
Woolverton, L., The Commercial Orchards of Canada.

OPENING SESSION.

At 11 o'clock A. M., February 20, the Society was called to order in the hall of the Ocala Semi-tropical Exposition, by the President, Hon. Prosper J. Berckmans, of Georgia.

About 400 persons were present, including many ladies. Fourteen States were represented, the number being afterward increased to twenty-two.

The stand was decorated with flags and banners, and situated in full view of the magnificent exhibit of fruits and flowers. Among the offerings upon the table was a beautiful floral fan, presented to the President by the ladies of Lake county, Florida.

The rustic orangewood gavel, used throughout the sessions, was a souvenir of the old Florida Fruit Growers' Association, the origin of the present Florida Horticultural Society, and was presented by its former Secretary, Col. D. H. Elliott.

The meeting was opened with prayer by Rev. C. B. Wilmar, of Ocala, after which Mr. Dudley W. Adams, President of the Florida Horticultural Society, delivered the following

ADDRESS OF WELCOME:

Mr. President and Members of the American Pomological Society:

During my somewhat busy life, it has been my good fortune to perform many very pleasant public duties, but among them all none ever gave me more pleasure than now, in behalf of the infant State Horticultural Society of Florida, to receive as our guest that full-grown giant, the American Pomological Society.

To be thus honored by the presence of the foremost Pomological Society of the world, would seem to fill to the brim our cup of satisfaction; but when, as to-day, we can also take by the hand that stalwart organization, the State Horticultural Society of our big sister, Georgia, then, truly, our cup runneth over.

With the reverence due from youth to age, with the respect due from the student to his teacher, with the affection due from the child to his parent, we bid you welcome to our State, our city, our homes, our hearts.

On account of universal and sturdy usefulness, by acclamation the Apple has been called the king of fruits. So, for her sweetness in the bloom of infancy, her beauty, grace and goodness in the flush of womanly maturity, shall the Orange, undisputed, wear the queenly crown. As a loyal subject of our beautiful queen, I bid you welcome to this her chosen realm. Here she reigns supreme, and other fruits which in less favored climes would wear a crown are proud to be seen in her retinue. Her citrus sisters, the lordly pineapple, the peach, and pear, and grape, the guava, banana, mango, strawberry, kaki, loquat, a horticultural aristocracy of purest blood, are her most loyal and faithful subjects. As her loyal and most humble representative I am authorized to offer you the freedom of her dominions, and express the hope that when your duties here are done, you will accept her invitation to travel all over her domain, from ocean to gulf, from Georgia to the Keys, without money and without price,

Come with us to our villages and our homes; get acquainted with our sturdy live oaks and our graceful palms; go among our stately pines and our climbling jessamine; take full draughts of our healing air; take kindly warmth from our Southern sun; and when you return to your own loved homes, carry with you kind memories of your short sojourn in the realm of our "Golden Queen."

The following telegram was then read:

"TALLAHASSEE, FLORIDA, Feb. 19, 1889.

"*To the Gentlemen of the American Pomological Association:*

"In the name and in behalf of the State of Florida, I extend to you a cordial greeting and a

most hearty welcome, with the earnest hope that every hour of your visit to our State may be one of pleasure and enjoyment, as it will be to our people to entertain you, and that Florida, in her offerings to you of the bounty of her products and her pomological exhibits, may establish her claims to the designation of the land of fruits as well as flowers. My only regret is that official duties deprive me of the pleasure of greeting you in person.

"F. P. FLEMING, Governor."

Mayor Gary then presented the following

WELCOME TO OCALA:

To the President and Members of the American Pomological Society:

Through me, their Mayor, the citizens of Ocala extend to you a cordial and heartfelt welcome and the freedom of our city. Your presence among us, as the representatives of the intelligent and scientific men of other cities and States of our great Union of States, causes us to feel more than proud, and our hearts to pulsate with renewed and quickened energy in thanking you for the high compliment paid us in selecting our city as the place of your biennial convocation, to deliberate and discuss those important matters relative to the advancement of the science of pomology, which your faces indicate you so well represent.

It is indeed a great privilege to be permitted to welcome you, and an additional evidence that Florida, though young in the arts and sciences, has within a few short years, by the cultivation of the citrus family and other tropical fruits, placed herself in line with other states in horticultural and pomological productions, and need not be ashamed of the progress made in that direction. We feel that your presence and deliberations will be of incalculable benefit to us, and will result in much good to the cause you represent.

Trusting that each and every one of you will return to your respective homes pleased and amply repaid for the sacrifice made in coming to Florida and Ocala, I again welcome you, and thrice welcome you to the freedom of the exposition and our beautiful city.

The President of the Semitropical Exposition, Mr. Geo. W. Wilson, then greeted the assembled pomologists in behalf of the Directors of the Exposition, and extended to them the freedom of the building during their stay in the city.

The delegates having thus been more than thrice welcomed, President Berckmans felt called upon to respond in their behalf, but as he was suffering from an affection of the throat he requested Mr. W. C. Strong, Vice-President for Massachusetts, to perform the office.

Mr. Strong expressed in fitting words the gratitude of the Society for the warm welcome which it had received, and said that although this was the first meeting that had been held south of Richmond, it was not because there had not been worthy members of the Society in that portion of the country, but because the fruit resources of the South had been comparatively undeveloped.

The Society was glad of the present opportunity to hold its meeting in the extreme south, and to observe the enterprise of its pomologists, and the rapid growth of the fruit industry in that part of the country. The members were glad to be able to renew old acquaintances and form new friendships with those in kindred pursuits. They would return to their homes with renewed zeal for their work, with broader knowledge and added experience, of benefit to themselves and the entire country.

On motion of Mr. H. H. Cary, of Georgia, a committee upon the nomination of officers for the ensuing two years was then voted, to consist of one delegate from each state, territory, and province represented. A recess of ten minutes was then taken to allow the delegates an opportunity to select the members for that committee. Upon reassembling, the nominations for the committee were read and adopted by the Society. The list will be found with the other committees in the earlier part of the volume.

The President then announced the working committees for the session, after which the Society took a recess until 3 o'clock P. M.

PROSPER JULIUS BERCKMANS,

PRESIDENT OF THE AMERICAN POMOLOGICAL SOCIETY.

PRESIDENT'S ADDRESS.

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

The Society reassembled at 3 P.M. in the Opera House, where all subsequent sessions were held, to hear the biennial address of the President.

THE ADDRESS.

Ladies and Gentlemen of the American Pomological Society:

Your Constitution requires from your presiding officer "an address on some subject relating to pomology at every biennial meeting."

When I consider the magnitude which pomological progress has achieved within the past few years, I confess that in thus discharging this duty, I do so with well founded misgivings.

In this age of rapid scientific discoveries, the best results are attained by concentrating the teachings of specialists, and as we are so fortunate as to number among this audience, which I have the honor to address and cordially greet, men whose names have become illustrious in the domain of science, and who will during the session of this society invite your attention to topics germain with its objects, I beg your indulgence for not strictly confining myself to this constitutional clause, and trust that I shall therefore not disobey this formal command, which I will however endeavor to carry out in principle.

The Origin of the American Pomological Society emanated not only from the necessity of advancing the progress of an industry which half a century ago was already considered as one of the great factors in the production of our national wealth, but also from the desire of its founders to unite all the fruit growers of the American continent in one vast brotherhood. These principles were patriotic and eminently practical, in accomplishing by social intercourse and a free exchange of knowledge, the objects which were aimed to perfect. As a nation progresses in refinement there is a corresponding increase in the multiplicity of its wants, and a consequent necessity for their abundant supply; as such wants are the natural results of increased labor, so increased labor must meet the demand of supply.

When an industry or source of production is left to individual resources so far as aiding in its development, its progress is necessarily slow and often unremunerative; but when many men combine their knowlege and efforts with a desire to advance its proficiency, then it is no longer dependent upon the toil of one individual, and thus toil may be made to be no longer without its concurrent reward.

THE POLICY OF THE SOCIETY

has never deviated from this broad and liberal platform, and I am most happy to see in our midst some of the public spirited men who being present at the birth of this grand organization, come here to-day to testify by their presence and counsel that their solicitude for its success is dear to their hearts.

It recognizes pomology both as a science and an art, and as such these must take precedence above all other subjects which may be brought for its consideration. Individual interests must always be ignored, but merits in pomological products will receive such recognition as they are entitled to.

Private enterprises, whose object is the production of pomological commodities for commercial purposes, have special organizations for specified results. Such organizations deserve the cordial commendation of this society for the many benefits they bring to every community in the land, and for practically aiding in carrying out the work of this society.

In the future reunions of men animated with but one desire, the advancement of an intellectual and refining pursuit, rests the perpetuation of this society, its strength and usefulness. So long as this policy is pursued, so long will this society remain the fostering source from which

American pomology has become a rich mine of pleasure, bodily comforts, educational progress and financial returns.

I used the term *patriotic* when referring to the principles which governed the men to whom we owe the existence of this society.

No nation's power and wealth can long be retained where popular education is not considered as the fountain from which these flow. To provide the facilities for instructing the masses under the common school system, is an admirable and wise provision of our far-seeing public men, but there are increased opportunities now available where a special higher class of instruction can be obtained, a knowledge without whose existence and pursuit our present high standard of refinement would not progress as rapidly as required.

Horticulture was the basis upon which these men anticipated building successfully. The magnitude of horticultural taste everywhere visible is mainly due to their untiring efforts. Well do such men deserve the grateful recognition of those who are reaping the benefits of their labors.

Following in the early work of the Society many of our higher educational institutes added a chair of horticulture to their curriculums. To their honor be it said that there is to-day many a happy and useful citizen who owes his enviable lot in life to the special opportunities which were thus afforded him.

European pomologists have long since recognized our Society as the most influential of its kind in existence; our proceedings are quoted by foreign horticultural publications as models worthy of imitation, and that under its auspices American pomology has made most wonderfully rapid progress, while in their own countries a similar result has been slow.

Most enviable is the lot of the American farmer, owner of the land he tills; he works with the assurance that whatever outlay of labor or money he devotes to its improvement, the benefits resulting therefrom will be his own; this leads to a desire to improve the products of the soil, and thus to contribute to the material progress of this great nation. In contrast with this sovereign condition of our own pomologists, the European farmer, being seldom other than a temporary tenant, has no incentive to improve permanently the land of another, or the quality of such products which may not benefit him in the near future. As a tenant he knows that in making his landlord's land more productive he will likely be made to pay an increased rental. Pomological progress being therefore confined to a very small proportion of European freeholders as compared with our own, is necessarily deprived of the vast amount of research and discoveries which are within our own people.

When comparing the relative quality of the soil of certain areas of the United States with the value of their products, we find that it is not always the richest lands or the most favored localities that yield the highest revenue, but where the husbandman is the best educated, there are found the best as well as the most valuable products. Again, it is undeniable that the market value of purely agricultural lands is inferior to those devoted to pomological products. The pomologist not only gives the most refined and valuable products to the food supply, but by his more scientific knowledge of cultivating the soil, adds largely to the public revenue by increasing the taxable value of his land.

Fruit growers of this fair Land of Flowers, to you belongs the honor of having aided more materially to the wonderful development of your State, than any other class of men.

Our venerated friend, Mr. Wilder, never uttered a truer sentiment than when he said, "After all, we pomologists are of some use to mankind."

These words should be preserved by us as emblematical of the importance of our pursuit.

Pleasant as an assembly of educated men unquestionably is, it is enhanced when graced by the presence of refined ladies.

We recognize woman's influence upon all that is elevating and ennobling; when coöperating in promoting the success of this Society we are encouraged to still greater efforts in fulfilling the mission we have undertaken to perform, and they take the place, which is theirs by right, as the devoted and unselfish helpmate of man. I voice the sentiment of every member of this Society when thanking you most cordially for

the interest you thus manifest in the success of this session.

Permit me to call your attention to a few subjects appertaining to the scope of this Society, and which may, perhaps, be considered of sufficient importance to be discussed in the course of your deliberations.

PARIS EXPOSITION.

It is most creditable to our general government that the necessity of giving the pomological products of the United States official recognition in its participation in this forthcoming event is fully recognized. The results of the collective exhibits of the various products of this continent do not merely open additional markets, but will ultimately prove potent factors in uniting the people of this grand Republic in closer bonds of mutual interest and harmony. Of late years it has become obvious that American pomology should receive due recognition by Government aid, it is therefore a source of congratulation that its importance has lately been considered sufficient to cause the establishing of a

DIVISION OF POMOLOGY

by the United States Department of Agriculture, under the care of the Secretary of Agriculture. The division of pomology has done excellent work, his efforts to promote its usefulness are worthy of commendation as well as the liberal support of all American fruit growers.

EXPERIMENT STATIONS,

which by act of Congress are now either established or in process of organization in every State of the union, will greatly increase the facilities for advancing pomological knowledge.

In a few States these stations have been established sufficiently long to have demonstrated their usefulness and have already left their imprint upon many products which have visibly improved through their influence. Where such stations are about to be established, the task of properly organizing will be arduous. There will be little of past work to build upon, successful results must therefore be comparatively slow unless our zealous fruit growers unite their efforts in aiding the officers in charge with their knowledge and practical experience, and thus lessen their difficult task and yield the speediest and best returns.

UTILIZING SURPLUS FRUIT.

This problem, which has been for some years past a practical subject for the consideration of American fruit growers, seems for some sections and for certain classes of fruits near a satisfactory solution. An occasional over supply of fruit in our markets has doubtless had a discouraging influence in increasing products and inducing pomological progress in certain instances. While an over production is likely to occur at times and with certain products, there are beneficial concomitant results. An abundant supply of cheap fruit brings the latter within the reach of those whose circumstances debar them from its constant use, and soon creates a habit that changes to a necessity and a more ready disposal is the consequence. It is a patent fact that the free use of sound fruit conduces to hygienic as well as temperate reform.

The perfection attained in producing evaporated fruit would demonstrate that when an over supply can thus be converted into a wholesome article of food, easily preserved for future use, we are safe in extending the planting of such fruits as can be thus utilized. As the foreign demand is increasing for American products, it is to be anticipated that still greater improvements will be made in the methods for their indefinite preservation.

NECROLOGY.

Would that I were spared the sad duty to chronicle the loss to our society of one who was for many years one of its most zealous friends and co-workers. Wm. Parry, Vice President for New Jersey, died at his home at Parry, N. J., on February 27, 1888. Early in life he began the pursuit of pomology, to which he ever since devoted his attention. Few men have led a more useful life or held more honorable positions involving public trusts; as speaker of the House of Assembly of New Jersey, as International Judge for New Jersey in the department of Pomology at the Centennial Exposition at Philapelphia, as Member of the New Jersey

State Geological Society, Judge for ten years of the Court of Common Pleas of Burlington County, Master in the Court of Chancery, etc., he will long be remembered as a faithful public servant; but to all American fruit growers his name will remain as a household word as the introducer, originator and skillful cultivator of small fruits. To him we are indebted for the introduction of the Kieffer pear, a valuable product for a large section of the country. To his co-workers in this society his genial presence will be sadly missed, but his good work and counsel in our pursuit will forever be gratefully remembered.

A few days since Mr. Richard Peters, of Atlanta, Ga., passed away after a life full of years and usefulness. His death occurred on the 6th of February, when he had attained his 78th year. Mr. Peters early became a life member of this society, and in the early days of this organization held the position of Vice President for Georgia. Although engaged in various pursuits which he invariably made successful, pomology was his favorite occupation. To him Georgia is indebted for the dissemination of many of its native apples and peaches and the promoting of its pomological resources at a time when little attention was paid to this class of products.

Mr. David S. Myer, for many years past the chairman for Delaware of the general Fruit Committee died at his home in Bridgeville, Del., a short time since. His modest and conscientious reports to our biennial proceedings evinced that honesty which characterizes all true pomologists; in him this Society has lost an earnest and faithful worker.

Although not long connected with our Association, Pliny W. Reasoner was nevertheless known to every pomologist of this continent. Endowed with wonderful intellectual gifts, and scarcely passed beyond young manhood, he made such impress in his chosen pursuit as to place him most prominently in the ranks of advanced scientists. To him is horticulture indebted for many practical discoveries and a reliable nomenclature in the section of tropical fruits. Had his life been spared he would ere many years have been ranked as the peer of our most illustrious botanists, but the intense love of his pursuit, which was paramount to his personal safety, was the cost of a precious life. We have lost in him one whose future aid to this Society would have been most precious, as his aspirations were for its success.

At the last session of this Society at Boston, in September, 1887, you accepted the generous gift of Mr. Wilder, who, by the terms of his will donated a fund whose income would constitute a permanent aid to your work, and he thus testified of the great desire of his heart to perpetuate the existence of the American Pomological Society; following your acceptance it became necessary to comply with the legal requirements relating to legacies donated to public organizations. An act of incorporation was secured from the legislature of Massachusetts and your Society acquired a legal existence.

Your mission is plainly defined in the following words of said act: "For the purpose of pro-"moting and encouraging the culture of fruits "with all the powers and privileges, and subject "to all the duties and liabilities set forth in the "general laws which are now or may hereafter "be in force, applicable to such corporations."

As the legal head of your society I have endeavored to faithfully fulfill the duties entrusted to me through your kind condescension. When you selected me to continue the work of the man through whose constant care and solicitude this organization had become the foremost of its kind in the world, and over which he so gracefully presided for nearly forty years, I accepted this honored position with the knowledge that notwithstanding my most earnest efforts to carry out your wishes, my ability would fall short of your expectations.

In the performance of the peculiarly difficult duties which I assumed, I have received the invaluable assistance of your former secretary, Mr. Charles W. Garfield, who, although laboring under great physical difficulties, gave his incessant care to the preparation of the proceedings of your last session, and when unable to longer continue his labors he had to tender his resignation and sever his official relations with you,

but his coöperation in the future work of the Society will always be at your command. To your venerable First Vice-President, Mr. T. T. Lyon, and your honored Treasurer, Mr. Benjamin G. Smith, the trusted and tried friend of Mr. Wilder, I am indebted for wise advice and never failing assistance.

You owe to your Chairman of the General Fruit Committee, Mr. Andrew S. Fuller, a clear and concise report, as well as one which your treasurer will endorse as eminently satisfactory. In appreciating the many difficulties under which I labored he has faithfully performed the labor of that important committee, and thus given me most valuable aid.

From the report of your Treasurer you will see that the inheritance so generously bestowed upon this Society by its founder, has been safely invested, and the intentions of our departed friend and benefactor religiously carried out. Although the then available funds were inadequate to meet the expenditures of your last session, the legacy of Mr. Wilder has remained intact. Your Society is free from pecuniary indebtedness, and there is a very satisfactory balance in your treasury.

I am aware that my work has been criticised by those who were not familiar with the duties I am legally obligated to perform, but in discharging these with fidelity to you and loyalty to the memory of our friend, I trust you will sustain my official acts.

The Address was received with long continued applause. At its close Mr. Brackett was called to the Chair, and appointed a committee to take into consideration the recommendations made in the Address, and report to the Society. The committee consisted of F. M. Hexamer of New York, Wm. C. Strong of Massachusetts, and Dudley W. Adams of Florida.

At a later session this committee made the following report:

Members of the American Pomological Society:

The committee to whom was referred the address of our President, report as follows:

It is fortunate for the Society that we have one to preside over our deliberations and to carry forward the great work which we have in hand, who is so thoroughly imbued with the spirit and the high aims of its founders. We recognize, as one of the important objects of our Society, the cultivation of a feeling of brotherhood among the fruit-growers of our vast domain, whether coming from the cold regions of the North, or dwelling under the sunny skies of the tropics. We are citizens of a common country, which we love. We have widely differing products, it is true, but they are such as we wish freely to interchange; we have a common interest in unrestricted and rapid transportation. We want intelligently to understand the capacities and the demands of each section, and to strengthen the bonds which unite us as a common people. To this end we believe, with our President, that this Society is doing a very important service. Let us see to it that this spirit of brotherhood is maintained.

We may look for important results coming from the establishment of experimental stations by the Federal Government in the various States, in the near future. That they are experimental, and therefore slow in results, in some cases, is to be expected. But there can be no question that the careful study of scientific men, under the most favorable conditions for investigation of the laws of health and disease, will furnish information which will be of incalculable value to the cultivator of fruit. Our Society has been, and will continue to be, the medium by which many papers of greatest importance will be disseminated. We should therefore lend our combined and our individual influence to the support of these stations.

The distance may deter our producers from making exhibits at the coming Paris Exposition. But if there are fruits which can be preserved for so long a time as is necessary, it would be well to make displays, not so much for the purpose of creating a market, as that we may give evidence of the capability of our soil, and thereby encourage a better class of immigration.

The remaining suggestions of our President, and the spirit of his address, we are confident will receive your hearty approval.

F. M. Hexamer,
Wm. C. Strong,
Dudley W. Adams,
Committee.

Treasurer's Report.

The Treasurer then presented his biennial statement as follows:

RECEIPTS.

1887.		
Sept. 10.	Bal. from old account	$5,309 88
Dec. 13.	Received interest to date	31 39
"	D. A. Scott, two extra copies Proceedings	3 00
"	F. G. Sampson, *Donation*	5 00
"	Thos. Hogg, "	2 00
"	Lewis Chase, copy Proceedings	1 50
1888.		
May 1.	Interest on Railroad Bonds	100 00
Nov. 1.	" " " "	100 00
	E. F. Burrington, Life Member	20 00
	F. H. Appleton, " "	20 00
	O. K. Gerrish, " "	20 00
	N. T. Kidder, " "	20 00
	F. L. Temple, " "	20 00
	Geo. W. Childs, " "	20 00
	M. B. Faxon, " "	20 00
	Wm. H. Stark, " "	20 00
	Lyman Phelps, " "	20 00
	David C. Cook, " "	20 00
	E. S. Goff, to complete "	16 00
	J. V. Lindley, " " "	16 00
	E. Williams, " " "	16 00
	110 Biennial Members, at $4	4,140 00
		$ 6,213 77

DISBURSEMENTS.

1887.		
Sept. 16.	Cash paid A. A. Crozier for reporting Boston meeting	15 00
Sept. 12.	Paid express package from Grand Rapids	1 30
Sept. 29.	Prescott Fay, for services in connection with Boston meeting	12 00
Sept. 30.	Ellwanger & Barry, bill, sundries	12 74
Sept. 30.	W. C. Strong, telegram	50
Nov. 2.	A. A. Crozier, for services	9 53
1888.		
Mar. 1.	Charles W. Garfield, bill, postage stamps, expressages, telegrams, circulars, envelopes, and printing, including $30 postage on on Proceedings	57 45
	Printing Company for printing Proceedings and catalogues as per agreement	512 80
Mar. 7.	Paid United States Express on case 700 lbs. from Grand Rapids, Mich.	16 50
Mar. 15.	Boston Safe Deposit and Trust Company	10 00
1889.		
Jan. 10.	S. Ward & Co., stationery and printing	15 16
Feb. 2.	H. Mitchell for "Wilder" medals	52 25
Apr. 2, '88, to Jan. 1, '89.	P. J. Berckmans, postage stamps and printing	37 93
Oct. '87, to Jan. 8, '89.	B. G. Smith, per bill rendered for p. stamps, p. cards, expressage, printing and stationery.	52 98
1887.		
Dec. 13.	Paid for $5,000 Chicago, Burlington & Quincy Railroad Bonds,	
1889.	per order Finance Committee	4,910 83
Feb. 8.	Cash balance to new account	196 80
		$ 6,213 77
1889.		
Feb. 8.	Balance from old account which represents $5000 Railroad Bonds.	$ 4,910 83
Feb. 8.	Cash bal. from old acc't	196 80

BENJAMIN G. SMITH,
Treasurer American Pomological Society.

Boston, Feb. 8, 1889.

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

EDWARD B. WILDER, Auditor.

Boston, Feb. 9, 1889.

The committee appointed at the morning session to nominate a list of officers for the society for the ensuing term then made its report, which was unanimously adopted. A list of the officers will be found at the beginning of the volume.

At this point, Col. D. H. Elliott, Chairman of the Committee on Transportation appointed by the Florida Horticultural Society, announced that arrangements had been made with all the leading transportation companies in Florida, by which during ten days following the adjournment of the meeting members of the Society would be invited to visit any portion of the State within reach of their lines free of expense. Committees would be ready to escort the visiting pomologists wherever they wished to go. Letters were read from the managers of hotels at various points offering special low rates to parties intending to visit their respective localities.

The invitation to remain after adjournment and visit the leading points of interest in the State was accepted by the Society, and its hearty thanks extended to Col. Elliott and his committee and the various transportation companies for their generous hospitality.

Space will not permit a full account of the excursions and festivities following the meeting, and only a brief mention will be inserted here. The weather, which had been chilly and unpleasant during the session, with more or less rain every day, resumed its serenity in time for the first excursion, Friday afternoon, February 22d. At the close of the last session at noon of that day it was announced that a special train was in waiting at the depot of the Florida Southern railroad for all who wished to visit the orange groves at Citra during the afternoon. After dinner at the Ocala house, nearly all of the delegates, together with many of the prominent citizens of Florida, availed themselves of the opportunity and spent several very pleasant and

profitable hours among the orange trees, returning to Ocala in the evening. To the Northern delegates the occasion was of peculiar interest, and one long to be remembered. A considerable portion of the old crop of oranges still remained upon the trees, and the blossoms for the new crop were just beginning to open.

Upon the following day, which was Saturday, the visitors formed parties for various tours through the State, embracing Homosassa, Silver Springs, Tampa, Winter Park, Sanford, DeLand, St. Augustine, Jacksonville, and points as far South as Lake Worth.

Most of the delegates remained in the State until the following week and then gradually dispersed to their homes.

The afternoon session closed with the first paper upon the programme, on "Cross Fertilization," by J. C. Neal, M. D., Vice Director of the Florida Experimental Station.

As it will be more convenient to those using this volume to have the subjects presented at the meeting classified as much as practicable, and as various causes prevented a systematic presentation of all the topics, a consecutive account of the following sessions will be omitted.

SCIENTIFIC POMOLOGY.

Cross-Fertilization.

J. C. NEAL, LAKE CITY, FLORIDA.

I must apologize at the beginning of these notes for a few botanical details. Most of you are familiar with them, but all are not so fortunate, for some of our most successful fruit-growers only know effects, not causes, and would fail in any attempt to cross or hybridize plants, having neither the knowledge, patience or skill that is required in these delicate experiments. For these only, I give a few preliminary explanations:

While in the usual result of nature's methods there is marked similarity to ancestral traits, we find three modes of variation from a recognized type.

1. *Bud variation*—In this case without any known reason, a bud may develop a novelty in fruit or flower capable of propagation by grafting, budding, layering, cuttings, or even ends—as in the case of nectarines, apples, dahlias, zinnias and petunias, but no one knows how to originate these variations, hence there is little practical value in this method of chance growth.

2. By noting the tendency to vary in certain plants, and selecting seeds from those showing the greatest deviation, repeated planting will eventually fix a type with but little tendency to revert to the original. This method is very common, only requiring time, patience and judgment in selection.

3. *Artificial crossing*—I shall restrict this term to the efforts of man to obtain new and valuable varieties by interference.

To me there is a fascination about this process that is not easily described. To be able to change the orthodox plans of dame nature to suit my fancy, is very interesting, and forsooth often quite profitable, especially if the result be a prolific and toothsome fruit or a vegetable having some new and reliable quality.

Darwin has thoroughly investigated the usual compulsory crosses that avoid the evils of in-and-in-breeding, but these are nearly always within a narrow limit and cause little variation, as if the law were for like to produce like, the object of the cross being evidently to keep specific traits in the ascendency. The wild cherry, pawpaw and haw have thus reproduced themselves for centuries with little or no change.

It would be a delightful theme to discuss the many apparent shifts of plants to avoid self-fertilization, and the study of these plants is very profitable, but our time is limited even for a glance, and I need but briefly refer to the process of fertilization.

The grains of pollen, conveyed in any manner to the viscid surface of the stigma, soon burst their exterior coatings, and send slender tubes to the ovary, where the fluid contents of the pollen cells mingle with those of the germinal vesicle of the embryo.

Under proper conditions pollen grains maintain viability for weeks; in fact, so long as the contents are fluid and the exterior unchanged we may assume their potency; but in all cases test with the microscope; sprinkle a few grains on weak syrup in a culture cell and note if delicate filaments extend from the pollen in a few hours.

An important point is the relative maturity of the pollen and the stigma. There are three variations, the Proterandry, in which the stamens ripen and shed pollen some time before the stigmas are prepared to receive it. In this case the chances are that self-crossing will result from the deposit of the pollen of another flower.

The second variation is Proterogyny, when the stigma ripens first, and is impregnated from other plants or blooms, and the third case may be called Isogamy, where there is coördinate action and simultaneous preparation of stigma and pollen.

A knowledge of these peculiar relations of the fertilizing agencies is invaluable to the would-be originator of new varieties, yet while in an average year any grown species of plant will adhere closely to its peculiar law of growth, it is well to know that all are subject to exceptional action from the influence of varying temperature, and that at times a proterandrous flower may become proterogynous or isogamous, and *vice versa*.

I believe Prof. Meehan first demonstrated this. To explain: If a plant is proterandrous at 70°, and is forced to submit to 50°, as the bud opens the pollen will be retarded, but not the stigma, this of course changing the whole programme in reference to fertilization.

My experiments and studies lead me to conclude that the greater number of our fruit trees, especially the Rosaceæ and Aurantiaceæ are proterandrous in the temperature needed to cause normal growth.

At 70° the pear, peach, and apple shed pollen not half an hour after the opening of the bud. The inner whorl of stamens begin and then turn toward the stigma; from two to four hours elapse before the stigma shows moisture; at a higher temperature the pollen often drops prior to the unfolding of the petals.

In the earlier part of the blooming period the chances then are greater for accidental crossing by the agency of the wind and insects.

As soon as the anthers are empty they begin to shrivel, and the filaments usually change color. When fertilized the petals wither and the ovary enlarges.

The practical deductions from natural processes are: Defer the attempt to cross or hybridize till near the close of blooming of the maternal parent.

Remove the stamens at the first appearance of the opening of the petals.

Cover the stigma with the selected pollen, tie a small tissue paper bag over the bloom to prevent interference by wind and insects; remove all other blooms from the branch; record the date, species or variety, and in three days remove the covering and note result; save the seeds, plant; keep records, and await results. Now, this reads as if easy to do, but in addition to influence of temperature we have the fixed habits of the plants to contend with.

For instance, a hybrid between any grape and the Scuppernong would be a boon to Florida; but there is a great gap in time of blooming and the same way with our other fruits. We may meet some of these cases by hastening or retarding growth; the first by heat, moisture, light, and stimulating manures, the latter by dwarfing, cold, dryness, and poor soil.

It is easy to fail; some trees have an aversion to crossing, and in all cases the needed manipulations are very delicate.

For ten years I have been an amateur in this line, experimenting mostly with the grape and peach. I have had some success, but more failures to record; but I still worry the trees and vines each year, living in hopes to at last attain hybrids of grapes and crosses of peaches that I think needful to Florida.

The influence of parentage or prepotency is a problem which, could it be solved, would prove of the greatest value to the pomologist. In this case analogy will give us some clue, though perhaps with great changes as to results. Some years ago I asked some of our leading botanists —including Professors Wood and Gray—this question:

Given the Peen-to stigma, fertilized with pollen from the Onderdonk, what would be the result? They could not answer. Analyzed, the question is this: The Peen-to is a semi-cling, white-fleshed, noyau flavor, flat shape and an early bloomer; the Onderdonk is globular, yellow flesh, free-stone, sub-acid, and a late bloomer. The Peen-to ripens in Florida in May, the Onderdonk in July and August. My guess will be that the cross will be a large, globular, yellow-fleshed cling, with the Peen-to flavor and flesh.

The Honey pollen on Peen-to stigma produces a cling with the size, nearly the shape, and the color of the Honey, but with the vigor, the flavor and texture, and early bearing habit of the Peen-to. I have several trees of both the Peen-to-Honey and Honey-Peen-to just bearing for the first time this year, as well as the Honey-Amelia, the Honey-Onderdonk, and the Peen-to-Amelia. This last cross is a fine fruit, one that would make a peach connoiseur wild with delight—large, early, sub-acid, with a rich flavor, very superior.

At our experiment station in Lake City, I hope to conduct these experiments on a large scale, and in a few years we may have crosses of every variety of peach grown in the South, using stigmas of the Peen-to, Honey, and Chinese Blood, in the endeavor to obtain late blooming, early ripening, and vigor of growth.

A peach that would combine the good qualities of the Peen-to, Onderdonk and Amelia, would at once command attention and put Florida far ahead as to that fruit. As to other fruits, we need many varieties that are only attainable by judicious crossing. A hardy orange combining the traits of the Navel and Satsuma, or the Tardiff and Satsuma, is to be obtained in this way; a plum combining the values of the Kelsey and Washington; a hybrid Scuppernong-Black Hamburg grape, a Bartlett-Leconte pear—these are things we need in Florida, and that I hope to make certainties at our experiment station. My studies in crossing show that with few exceptions there is no effect produced upon the fruit the first year. Maize, Sorghum, and Cucurbitaceæ, are exceptions. The colocynth and watermelon planted together hybridize, producing large bitter melons the first season; they retain their respective shapes; the colocynth becomes more fleshy, the melon is bitter and purgative. Corn shows effect the first year, both in color and quality. Sorghum and broom-corn, Doura and other millets show some changes also the first year, but with grapes, peaches and apples, I have never seen any change.

There are brilliant possibilities ahead of the careful experimenter, and no one should be discouraged at failures, for in time he shall reap a rich reward, if not pecuniarily in the benedictions of a grateful fruit loving people.

DISCUSSION.

JAS. L. MOTT, Pennsylvania: In crossing the Peen-to and Onderdonk which would you use as the female parent?

DR. NEAL: I would use the Peen-to, to get its earliness and vigor. In both flavor and vigor a cross generally resembles the female parent.

T. W. MOORE, Florida: The immediate effect of the cross on the fruit is an important point touched upon in the paper. I have been watching the Navel orange and am satisfied that this variety is immediately affected by the pollen of other varieties, and that it will itself influence other varieties growing near. Smaller varieties are increased in size by Navel pollen and rendered more seedless.

DR. NEAL: In the Peen-to cross no effect on the fruit was seen the first year. The only case in which I am certain of an influence the first year is in a cross between the colocynth and the watermelon, in which the former imparted its bitterness to the latter the first season.

H. E. VAN DEMAN, District of Columbia: I have just been visiting many of the orange orchards in this State and have seen the Navel mark on other varieties, but this is no proof that this was caused by Navel pollen. There are many variations or "sports" among citrus fruits which we cannot account for. I have never seen any evidence to convince me that the effect of a cross will appear the first year. Careful experiments are needed.

HARRISON REED, Florida: I cut a branch from a Navel tree which bore seven or eight oranges which had no navel mark and which contained

seeds. The remainder of the crop had the usual navel mark and were seedless.

T. W. MOORE, Florida: I am glad to see caution exercised, but the uniform observation of our best growers must have some weight, and this is in favor of an immediate influence. I have been growing oranges for ten years. Up to the time of the introduction of the Washington Navel I never saw the navel mark on any variety. I was one of the first to introduce that variety into cultivation, and since then I have found its peculiar mark all through my other trees, and the other varieties show their marks upon the Navel.

B. T. GALLOWAY, District of Columbia: Does the Navel produce sufficient pollen to have such a wide influence?

H. E. VAN DEMAN: My assistant, Mr. C. L. Hopkins, made, about a year ago, an examination of 100 flowers, of Washington Navel obtained from Mr. Lyman Phelps, of this State and J. E. Cutter, of California. There was never more than three or four grains of pollen in a flower. In some of the other varieties of Navel there was plenty of pollen.

J. S. NEWMAN, Alabama: I would like to ask Dr. Neal if he was in a position to know that the melon spoken of had no previous cross.

J. C. NEAL: I obtained the seeds of the colocynth from Frederick Sterns, of Detroit, for medicinal purposes. The seeds of the Rattlesnake watermelon were obtained from Augusta, Georgia, where there were not likely to have been any colocynths near. The colocynths were planted near a portion of the melons for the express purpose of making them bitter and stopping the negroes from stealing them, which it effectually did. They said I had "conjured" the melons.

J. S. NEWMAN: I have known of a field of cantaloupes where there was not one good melon on an acre, in consequence of the melons having been planted the *previous year* near cucumbers. The resulting crop were all hybrids, the melons presenting all gradations in appearance between perfect cantaloupes and good cucumbers.

LYMAN PHELPS, Florida: I have been making experiments in crossing for ten or twelve years and have often thought that I had seen an effect the first year. Nearly all our varieties now occasionally show the navel mark and streaks of blood. How this is caused I cannot say. I have cut out lemon trees growing near oranges because the fruit became unshapely, but I am not prepared to say that the orange pollen was the cause. I believe, however, that there are cases of an immediate influence of pollen, not only on the fruit, but on the plant as well. I once carefully crossed the Navel with pollen of the Maltese Blood, covering the flowers with paper sacks. Two weeks later I removed the nearest bud from below the crossed flower and inserted it in another tree. The bud grew and showed the foliage of the Blood variety.

HARRISON REED: I have two rows of sour orange trees around my grove, but I have never seen any effect upon the sweet varieties from the presence of the sour oranges.

PRESIDENT BERCKMANS: I have had come under my observation a number of instances of the effect of a cross upon the fruit the first year. Some twenty-five or thirty years ago an orchard of Vicar of Winkfield pears was planted in Cobb county, Georgia, by Mr. Archibald Smith. For a number of years no other kinds were planted, and the pears were perfect Vicars. Afterward Seckel and Flemish Beauty trees were planted in the orchard, and when these came to bear their influence was often seen on the appearance of the Vicars. I have seen Yellow peaches grown near trees of the Indian which bore red longitudinal stripes due to that variety. I have seen the downy fruit of the Early York with a portion of the surface entirely smooth when grown near nectarines.

H. E. VAN DEMAN: I have raised peaches from nectarine seeds and vice versa. The nectarine is only a smooth variety of the peach, and intermediate sports are not rare. I do not think that the appearance observed was due to a cross. Mr. Jas. Mott sent me a branch of a Peen-to peach tree on which were several typical specimens, and also others having the shape of the Honey. I can give no explanation.

Anguillula, or Root Knot.

By request Dr, Neal gave a short account of this disease and exhibited specimens of affected trees. He had recently investigated the subject for the Department of Agriculture at Washington, and a full account of his work may be found in Bulletin 20 of the Entomological Division.

The disease is caused by a microscopic nematode worm (*Anguillula arenaria*) thousands of which may be found in each knot. They occur on nearly all plants throughout Florida, and to some extent in Southern Georgia, South Carolina, Alabama, Louisiana and Texas. He had also found them on trees imported by P. J. Berckmans, from China. They do not seem able to withstand cold, and are not found at the North where the ground freezes to any depth. They probably have six or eight generations a year. Except for their sensitiveness to cold they are very tenacious of life, and are contagious, being propagated from tree to tree. Alkaline fertilizers will kill the free worms and are a partial remedy. The disease is most injurious to nursery stock, especially the peach. The Scuppernong grape and some varieties of the plum seem to be free from it.

Unsolved Problems in Pomology.

E. S. GOFF, MADISON, WISCONSIN.

The past year has witnessed what promises to be a new era in the progress of pomology, as well as in all other branches of Agriculture. The establishment of Experiment stations in the different States sets apart about 300 men for the express purpose of investigating questions pertaining to the various branches of Agriculture. Fortunately the department of Pomology is not being slighted by this noble company of workers. If it is not at present receiving its full share of attention, let us hope that the time is not far distant when it shall, and in the meantime, and always, let us watch with encouraging sympathy the work of experimentation in the various departments of fruit growing.

It is proposed to treat the subjects here chosen, from the experimenter's standpoint. All of us, it is true, are not experimenters. But the nearer the relation between the practical fruit grower and the experimental pomologist, the more helpful each can be to the other, and we shall lose nothing by exchanging thoughts.

The office of the experimenter is not simply to propose and try new methods. He should also critically examine existing methods in order to discover if they are not capable of improvement. To him, the general acceptance of a proposition does not establish it. He should analyze the foundation of every proposition in his field, and should condemn all methods, however fully accepted, that are not grounded upon truly scientific principles.

What is the condition of our Pomology today? It seems hardly necessary to cite evidence to show that the crops of our larger fruits are far more precarious than are those of our cereals. A wheat crop that endures the winter is practically certain to yield its grain. A corn field in which the plants are not destroyed before attaining their full stature is sure to give its quota of ears. But how is it with our tree fruits? The trees grow to normal size, and in the greater part of our country, pass the winter uninjured, but how often do they yield a normal crop? Occasional excessive yields are followed by two, three or more very scanty ones, and not infrequently, the crop is a total failure. The indications are that our fruit crops are becoming more and more precarious. Entomologists and Mycologists tell us, and indeed, we do not need to be told, that the injuries to our fruit trees wrought by insects and diseases are increasing. This is certainly not a pleasant state of affairs to contemplate. What are the causes, and what are the remedies? Surely here is a most abundant field for the experimental Pomologist.

The deterioration of our soil through exhaustive cropping is doubtless one of the causes for the capriciousness of our fruit crops. The introduction of destructive foreign insects is unquestionably another. But these causes can hardly account for it all, since our cereal crops are exposed to the same conditions, and as has already been stated, these are far more certain in yielding their returns than are our larger

fruits. Are there not causes inherent to our methods of propagation and culture? It behooves our experimenters to survey the field carefully, in order that they may discover the true source of the evil. The task is not an easy one, and much time will doubtless be required to accomplish it, but the importance of the question at stake fully justifies the labor and cost of any investigations that offer hope for its solution.

From conversation with practical nurserymen, supplemented by my own reading and observation, I have come to the conclusion that many points in relation to the science of propagation are not well understood. It is the aim of the nurseryman to produce salable trees in the shortest time, and at the lowest cost. He knows pretty well how to do this. Whether the methods he pursues in accomplishing this end are, or are not conducive to the future well being of the tree and its fruit, he does not, as a rule, pretend to know. A few general principles in relation to the science of grafting and budding are accepted. These, I think the nurseryman generally observes, so long as the observance of them is as cheap as any other method. But competition compels him to adopt the cheapest methods, sometimes, even, at a sacrifice of accepted principles. The most conscientious nurseryman finds himself hemmed in by the limits of his knowledge, for which he can hardly, in the present state of affairs, be held responsible.

Authors have ascribed much of the degeneracy of our fruits to the improper selection of scions and stocks. Thus Mr. Downing said:* "The apparent decay of a variety is often caused by grafting upon unhealthy stocks. For although grafts of very vigorous habits have frequently the power of renovating in some measure, or for a time, the health of the stock, yet the tree, when it arrives at a bearing state, will sooner or later, suffer from the diseased or feeble nature of the stock. Carelessness in selecting scions for engrafting is another fertile source of degeneracy in varieties."

Ballét, an acknowledged authority upon grafting, says:* "An unsound graft propagates the disease it possesses. The bad choice repeated through several generations brings about a deterioration of the variety."

Carrière, a learned French horticulturist, says:† "All these facts demonstrate how great is the necessity of carefully choosing the parts when seeking to propagate a plant."

But how shall the nurseryman know what to choose? Authors are well agreed that the scions and stocks should be healthy, but beyond this there appears to be a dearth of positive knowledge. This subject should receive attention from our experiment stations. There are many questions connected with it that they will do well to consider. From how old a tree should buds or scions be taken to furnish the most productive and healthy trees? From what portions of the tree do the buds or scions tend most to fruitfulness? Do buds from the leader of a nursery tree produce more or less productive trees than those from the side branches? Does the terminal bud, provided it is well matured, furnish a more or less productive scion than lower buds? How near to the terminus of the shoot should buds be taken for the best health of the future tree? Is not the practice of taking buds or scions from unsalable nursery stock to be condemned?

Possibly these questions may seem far-fetched to some of my practical friends. I mention the fact that their importance has already been demonstrated with reference to certain plants. Carrière found in budding roses, that if he took his buds from a very long branch which does not flower, the plants obtained from these buds flowered very little. He says with reference to this subject,‡ "We can by choosing the branches with care, produce either profuse flowering individuals, or others, that flower little. We may even, by pushing the case sufficiently far, obtain individuals which do not flower at all, or at most flower only exceptionally, and all this in taking the parts for propagation from the same indi-

* Fruits and Fruit Trees of America, Second Rev. Ed., p. 11.

* L'Art de Greffre, p. 50.

† Production et fixation des variétés dans les végétaux, p. 61.

‡ l. c. p. 60.

vidual." He adds in a succeeding paragraph, "What we have said of roses, we may perhaps say of all plants; it is then very probable that we might secure advantageous results from these principles if we apply them to ornamental or fruit trees." While speaking of grafting, I suggest also that the influence of double working upon the prolificacy of the tree and the quality of the fruit offers a fertile field for experiment. Certain varieties of pears and apples have been shown* to be peculiarly well suited as stocks for certain other varieties. Experiments in this direction may not only show us how we may improve the productiveness and quality of our fruits, but they may add to our knowledge of the science of grafting.

To what extent are our native plums and cherries capable of improvement?

The imported plum and cherry can hardly be called satisfactory in this country. The foliage of the former is weak, and its fruit can only be secured through an interminable warfare with the curculio. The trees of the latter are much subject to disease, and the fruit is liable to decay prematurely, and is much damaged by the curculio. We have sought to take advantage of the thousands of years of culture and selection that these fruits have received in the old world, by adopting them directly into our culture, and in the meantime have neglected our native species. The wisdom of this course may be questioned. Attention should be given at our experiment stations to growing seedlings from our native species of these fruits, and especially to attempts at hybridizing our native species with the foreign ones.

We have been compelled to give up the foreign grape, and as the result, within the past few years has sprung up a multitude of improved varieties of our native grapes. The same may be said of the raspberry. Had our other imported fruits proved as marked failures as have the grape and raspberry, we might now have been rejoicing in a long catalogue of improved native varieties better able to cope with our climatic conditions.

May not the hardiness of our peaches be increased by crossing them with the Prunus Simonii? This is a question of much importance. I have heard of no attempts to cross these fruits, but it seems not improbable that a cross between them may be effected. If by so doing, we may extend the area in which this most delicious fruit can be grown, it will be indeed a step of progress.

Are our present methods of pruning the grape conducive to the health of the vine?

The grape, as now grown, is peculiarly subject to disease. Prof. Scribner has described* six different fungus diseases preying upon the vine, three of which are often extremely destructive in certain parts of our country. The question is pertinent, if the exhaustive methods of pruning practiced in the culture of this fruit may not be gradually undermining its vitality. By some of the methods of pruning now in vogue, as much of the wood is removed each year as is possible, and much more than the requirements of culture demand. Here is suggested a field for experiment. While we are carefully testing various fungicide remedies for the widespread destruction wrought by parasitic diseases, may it not be well, also, to see if these diseases may not, in a measure, be thwarted by giving the plant an opportunity to grow more in its natural condition.

Allied to this, is the question whether or not the productiveness of our grapes may not be improved by giving the vines more room in the vineyard. An editorial note in the Country Gentleman for 1885, p. 108, contained the following: "When it was common in the Cincinnati vineyards to train the Catawba to single stakes only a few feet apart, a plantation in the neighborhood was planted with vines twelve feet apart from each other, and full space was allowed for them to run. The bunches, when examined, averaged fully double the size of those on the vines trained to stakes. In another instance, the owner of a successful Isabella vineyard, near Peekskill, who had placed his vines at ordinary distances, allowed the outside row to extend

* For a note of some interesting experiments in this line, see Gardener's Chronicle, Vol. 20, p. 664.

* Fungus Diseases of the Grape Vine. By F. Lamson Scribner, Department of Agriculture, 1886.

twice as far over a roadway. The superior size, quality and appearance of the bunches on these extended vines were in striking contrast with the others."

I am told, however, that experiments made in the vineyards of Chautauqua county did not show that any special advantage followed giving the vines more room. How carefully the tests were made, I am not informed, but the facts cited suggest that our knowledge of this subject is less full than it should be. Another question of practical importance to the grape-grower, is whether or not the girdling of the canes below the bunches to increase the size and earliness of the fruit, is detrimental to the health of the vine. I believe Prof. Maynard's experiments at the Massachusetts Agricultural College have thus far failed to discover any bad effects from it, and it is said that in the island of Xante, the growers of the grape currant make a regular practice of girdling the canes of their vines. If it can be shown that this process is not detrimental to the vine, the advantages gained from it would doubtless make it profitable in many cases.

To what extent can we prevent injury from frost by treatment?

The laws of meteorology enable us to predict frost with a considerable degree of certainty. It is well known that smoke suspended in the air answers to a certain extent the purpose of clouds in preventing radiation of heat from the earth. Fires burning in a fruit plantation also tend to some extent to create currents of air, which assist in preventing frosts. In the vicinity of cities, where coal tar is often little more than a waste product, it has seemed to me that it might in some cases be practicable to use this material for producing smoke at times when the danger of damaging frost is imminent. The liquid might doubtless be conducted from a barrel into a small cavity in the ground, through short sections of gas-pipe. Here it could be safely burned. The consumption of a few barrels of this material on an acre would not be an expensive undertaking, while the result might be sufficient, under certain conditions, to save a crop from destruction.

To what extent may we use mulching with profit as a preventive of injury from drought?

An experiment at the New York Agricultural Experiment Station showed that a mulch only an inch deep retained almost twice as much water in the soil during the dryest part of the season as frequent cultivation to the depth of four inches. This suggests how great is the value of a mulch in times of drought in cases where it can be used. Now that its great superiority to cultivation for retaining moisture in the soil has been demonstrated, it is quite possible that it may be used to advantage in some places in which its use has hitherto been thought undesirable. A series of experiments in this direction might add much to our knowledge.

Experiments at Geneva indicate that Dr. Sturtevant's theory of seedless fruits has some foundation. Seedling currants and raspberries grown from few-seeded specimens produced fruit of better average quality than those from others that had many seeds. This suggests a promising line of experiments to those who are originating new varieties. We know that flower garden plants which do not produce seeds bloom more profusely and through a longer season than varieties of the same species that yield seeds. It seems not unreasonable that we may be able to make use of this principle, applied in a somewhat different manner, to improving the quality and productiveness of our fruits.

Although Pomology may present fair claims to being the oldest art, we have seen that it still has many unsolved problems.

The few lines of suggestion here suggested by no means exhaust the catalogue. We are greatly in need of experimental work that shall be so carefully done that the practical cultivator may safely depend upon its teachings. Let us rejoice at the dawning of the new era which gives so much stimulus to investigation in behalf of Pomology.

The Plum Curculio.

Arsenical Sprays: Wier's Wild Plum Immunity Theory.

C. V. RILEY, WASHINGTON, D. C.

Much interest has lately been excited by the publication of certain articles on the immunity of wild plums from curculio, and an important era in the warfare against this insect has been marked by the recent adoption of arsenical sprays as a preventive of its injury. Experiments have been carried on during the past two years under my direction which disprove the former theory, and which confirm the partial efficacy of a proper spraying with Paris green or London purple. The results are summarized in this communication.

Spraying with Arsenical Mixtures.—Testimony as to the efficacy of this remedy is variable, but theoretically it is a sound one, and such experiments as have been made indicate that it will pay to spray trees for this purpose. It is difficult to properly credit the first suggestion of this remedy; but it is certainly not so recent an idea as is generally supposed. In 1871 it was recommended by Mr. G. M. Smith, of Berlin, Wisconsin, to the St. Joseph (Mich.) Horticultural Society, and from that time on has been occasionally suggested in newspapers. Both entomologists and the more prominent horticulturists, however, were for a long time inclined to discredit its efficacy. Mr. J. Luther Bowers, of Herndon, Va., informs me in conversation, that in the summer of 1880, while he was living in Clark county, Virginia, he sprayed his plum trees with Paris green in the proportion of one tablespoonful of the green to five gallons of water, using for the spraying a Whitman Fountain Pump. He sprayed soon after the petals fell, and again in a week or ten days. The result was the most perfect crop of plums he had ever grown. He removed to California at the close of the season, but did not repeat his experiment and for that reason the remedy did not gain circulation at that time. From 1884 on, the use of arsenicals for the curculio assumed a more important aspect. Mr. Wm. Creed, of Rochester, in the August, 1884, number of Purdy's Fruit Recorder, gave in general the results of a favorable experience with Paris green against this insect, and in the November, 1885, issue of the same journal, recorded the complete success of the remedy. Riley, in an address delivered before the Mississippi Valley Horticultural Society in the early spring of 1885 at New Orleans, in giving his experience as to the feeding habits of the beetles, urged experimentation with the arsenicals in this direction as promising fair results, though in the very nature of the case not as satisfactory as in the case of the codling moth. During the summer of the same year Prof. Forbes began a series of experiments in Illinois. In the article upon the codling moth, published in the Annual Report for 1887, Mr. Howard has given in full Prof. Forbes' table in which the effect of Paris green and London purple upon the plum and apple curculios are given in connection with the effect upon the codling moth. It must be remembered, however, that his experiments were made entirely upon apples. He shows that after spraying with Paris green in the proportions indicated in the other article, 27.3 per cent. of the poisoned lot had been infested by the curculios, and 51.3 per cent. of those not sprayed. With London purple his experiments show that 39 per cent. of the sprayed apples contained curculios and 48 per cent. of those unsprayed. His conclusion is: "If we must judge from results thus far reached, these various applications are of too slight effect upon the apple and plum curculios to make them worthy of use against these insects, Paris green diminishing curculio blemishes less than one-half, London purple about one-fifth, and lime not far from one-fourth."

I undertook some incidental experiments through Mr. Alwood during the season of 1887. They were not begun until after the curculios had begun to work. The following extracts from his notes will indicate results:

"*Paris Green Spray.*—Soon after the beetles appeared I became fully convinced that they ate a considerable amount of food, and decided to try poisoning them. Three trees of Green Gage variety were treated May 13th and 17th with

Paris green at a rate of one pound to fifty gallons of water in very fine spray.

"Some Blue Damsons were being used for other experiments, but I regretted after seeing the results on the Gages, that I did not treat some of the Damsons with poison. Frequent observations showed that the fruit on the treated trees was not being stung so badly as the others. Much of the time a beetle could scarcely be found on them. The first spraying did not seem to injure the foliage, but shortly after second treatment it showed decided injury. I think this is accounted for by the cumulative effects of the poison. Both times the treatment was thorough, and coming so close together they were almost like a double strength application. The foliage was badly burned, and fully fifty per cent. fell off. The trees were set very full of fruit and much of this withered and fell. However, fully one-half the crop was matured. There was one other tree in the orchard of this variety and it matured more fruit than the other varieties, but not one-half as much as those which had been so thoroughly treated with poison. This tree was set in spring as fully as they were. It seems possible from this note that the Gages are not so much injured by curculio as other varieties; however, this is not at all certain. I am confident the curculios eat enough to make it possible to poison some of them but the benefit to be derived from such is as yet unsettled.

"*Treatment with Paris Green under Glass.*—May 23d, placed twenty beetles on a branch of plum tree under bell glass, and sprayed thoroughly with Paris green, one pound to fifty gallons of water. Two hours later several had fallen off and lay on their backs at bottom of glass. Thirteen hours, fourteen out of twenty are dead, and all disabled. Thirty hours, three yet alive.

"May 25, put two lots of curculios under glass as before, one treated, the other not. After twelve hours seven dead of lot treated, five alive. Other lot all right, all eating and ovipositing. Twenty-four hours, all dead in lot treated, having scarcely eaten at all. Others alive and have cut and scarred the fruit badly.

"On May 25, I noticed a number of beetles feeding on tender water sprouts growing around base of trunk of trees. They would gnaw along the side of a sprout for the distance of one-half to one inch. Many sprouts bent over from being thus weakened. This was noticed until curculios disappeared. The young fruit had become so tough they seemed to prefer the twigs. Soon after the beetles appeared on the plum orchard they were also found in cherry orchard in great numbers, ovipositing rapidly. On May 17, two rows, seventeen trees each, were treated, the first with Paris green, one pound to fifty gallons of water, and the second with standard kerosene emulsion diluted ten times. The row treated with Paris green seemed to be much freer from injury than those untreated. I intended to count the product of whole trees, thus getting at some facts in the case, but at picking time I found it impossible to determine accurately all infested ones without opening them. This I undertook to do with three trees only, one from each treatment and one check tree, but the labor necessary to do this was so great that I could not accomplish it before the fruit would spoil, and was compelled to give it up after counting several thousand cherries. So far as counted the tree treated with Paris green showed not quite 16 per cent. injured—an untreated tree 18 per cent."

In December, 1887, I received from Prof. Cook, the following statement, which is printed in his department report of the Michigan Agricultural College for that year:

"Paris green in the proportion of one tablespoonful to six gallons of water was very thoroughly sprayed upon four plum trees May 18. The petals had all fallen, but the dried calyxes still clung to the fruit. On August 20 the trees were visited, when it was found that the two treated trees of the Wild Goose variety had dropped all their fruit, as had the untreated trees of the same kind. Another treated tree of a yellow variety was loaded with plums, of which only fifteen per cent. were stung, and those not badly. The fourth tree treated was a purple variety, and had not less than seventy-five per cent. of its fruit badly stung."

This experiment was worthless, as there is no

record of check trees of the same variety, although the experiment upon the yellow variety looks well.

In Bulletin No. 4 (second series) Ohio Agricultural Experiment Station, Columbus, July 1888, Mr. C. M. Weed records certain experiments upon the cherry which seem to have been made with sufficient care, and from which results of decided value were obtained. His summary shows that on eight sprayed trees 280 infested cherries were found out of 8,000 counted, while on seven check trees (unsprayed) 1,086 infested cherries were found out of 7,500 counted, giving a percentage of benefit resulting from the spraying of 75.8. In other words, 75.8 per cent. of the fruit on the sprayed trees which were liable to curculio damage was saved by the treatment with the poison. The poison used was London purple, one-half pound to fifty gallons of water, and was applied with a Nixon barrel machine and Climax nozzle. The trees were thoroughly wet at each application and no injury to the foliage was done except in the case of two trees on which the liquid was forced in a solid stream. I reproduce Mr. Weed's summary and conclusions:

(1) These experiments were undertaken to learn what effect the application of London purple and lime to cherries soon after the fruit forms would have in preventing the injuries of the plum curculio, or in other words, in lessening the number of wormy cherries.

(2) For the carrying on of the experiment a half-acre orchard of bearing trees was set aside, and a part of it treated while the rest was left as a check.

(3) London purple was applied in a water spray, mixed in the proportion of one-half pound to fifty gallons of water.

(4) Lime was applied in a water spray, mixed in the proportion of four quarts to fifty gallons, until the leaves were whitened.

(5) The cherries were critically examined when nearly ripe, and the exact number of specimens injured by the curculio recorded. In this way 22,500 cherries were individually cut open and recorded.

(6) From eight trees sprayed thrice with London purple 8,000 cherries were examined, of which 280, or 3.5 per cent., were wormy, while from seven companion trees not treated 7,500 were examined, of which 14.5 per cent., were wormy. This represents a saving of $\frac{11}{14}$, or 75.8 per cent., of the fruit liable to injury.

(7) From two trees sprayed four times with London purple 2,000 cherries were examined, of which sixty-nine, or 3.45 per cent., were wormy.

(8) Two quarts of cherries from each of these lots were chemically examined at the time of ripening by Professor H. A. Weber, and showed no trace of arsenic in any form.

(9) Five trees sprayed four times with lime yielded 465 wormy cherries out of 5,000 examined, while five check trees yielded 778 wormy cherries from 5,000 examined. The percentage of the former was 9.3, while that of the latter was 15.6, which gives a percentage of benefit from the treatment of 40.3.

These experiments seem to me to show, so far as the results of a single season's work with a single variety of cherry can be relied upon:

(1) That three-fourths of the cherries liable to injury by the plum curculio can be saved by two or three applications of London purple in a water spray (in proportion one ounce to five gallons of water) made soon after the blossoms fall.

(2) That if an interval of a month occurs between the last application and the ripening of the fruit no danger to health need be apprehended from its use. As a precautionary measure, however, I would advise in all cases, and especially when there are few rains during this interval, that the fruit be thoroughly washed before it is used.

(3) That lime is not so certain in its preventive effect as London purple, saving in these experiments only forty per cent. of fruit liable to injury.

Some careful experiments were made for me upon plums by Professor Herbert Osborn during the past season. He has transmitted a report of the results which he thus summarized:

"Combining the entire account of all varieties we have for the sprayed trees a final of 32.48 per cent. punctured or stung, and 5.71 per cent.

containing larvæ, against a final of 41.36 per cent. stung and 10.39 per cent. containing larvæ for the check trees.

"The proportion of plums injured in this orchard was evidently so small that there would be no profit in spraying, though it can not be said but that curculios were killed on the poisoned trees that otherwise would have laid eggs upon both sprayed and check trees and thus have produced great damage. It is possible also that a stronger solution of London purple would have produced more decided results. The foliage was not injured in the least, and I think a solution one-half stronger might have been used, at least for the second spraying, without injury. It might also be worth while to spray three times at intervals of six days."

Mr. Edwin Yenowine of Edwardsville, Ind., reported to Mr. Webster the result of spraying his plum trees with Paris green in the proportion of one-half a pound of the green to a barrel of water last season. He had the most perfect success, but gives few details. One Wild Goose tree standing in his yard on grass was treated and the fruit was perfect. Two others of the same variety standing in a chicken yard were not sprayed and the fruit was "all stung." Two other trees resembling the Blue Gage, which stood in his yard, and the fruit of which had always before been stung, were sprayed with Paris green mixture and bore a heavy crop.

According to the Prairie Farmer of August 11, 1888, Professor Forbes has been experimenting further in this direction during the past season on peach, plum and cherry, and he has found it practicable to destroy the curculios with one pound of London purple to 100 gallons of water. One to fifty injured the foliage and one to 200 did not kill the curculio. The details of his experiments are not yet published, so far as we are aware, but he doubtless has the best grounds upon which to base so broad a statement.

The testimony which I have so far given is all favorable, in a greater or less degree, to the use of the arsenical sprays against the curculio. The remedy has had to make its way to popular favor against great odds, and so many persons have taken part in placing it before the public that it is useless to attempt to give any one individual particular credit. The successful use of arsenical mixtures against the canker worm and the codling moth has done away with a great part of whatever fear of the poisonous nature of these substances existed, and the objectors to its use have been for the most part those who were more or less familiar with the habits of the insect and who decried the use of this remedy as inconsistent with what they knew of these habits. There have been, however, unsuccessful experiments, and these have doubtless had their effect in deterring other experimentors. For example, the Country Gentleman for December 2, 1886, contained the following paragraph:

"*Paris Green for Curculio.*—The various reports which have been made from the experiments of the present year, lead to the conclusion that arsenic in any form is of little value against the curculio. The insect works inside the fruit, and the egg is laid beyond the reach of the poison; or at best, the spraying affects only a part of them. A report made by G. W. Trowbridge to the Ohio Horticultural Society on this subject, is a fair sample of many others. He stated that he had experimented for two years. The first year he tried Paris green; the next, London purple—in one instance with two applications, and in the other with three, as soon as the blossoms were off. No effect was produced on the curculio, but the poison was perfectly effectual in the codling moth. President Ohmer did not think arsenic would affect the curculio. O. W. Aldrich had tried London purple, a heaped teaspoonful to three gallons of water, at a cost of a quarter of a cent a tree."

On the whole, the remedy is one which is a desirable addition to our list, although it will never become so great a success as the application of these poisons for the codling moth, and for two reasons: (1) The egg is deposited, and the beetle gnaws preferably upon the smooth cheek of the fruit where the poison does not so readily adhere and from which it is more easily washed off. (2) The larva eating directly from the flap does not come in contact with the poison as does the larva of the codling moth.

THE SUPPOSED IMMUNITY OF WILD PLUMS AND MR. WIER'S THEORY.

Mr. B. D. Wier, formerly of Lacon, Illinois, now of California, a well known fruit-grower and writer, has claimed in different publications, and particularly in Bulletin No. 14 of this Division, that the cultivated species of native plums such as Americana, Chicasa, etc., and their varieties, Rollingstone, Miner, Newman, Wild Goose, and others, are curculio proof, from the fact that the larvæ are not able to develop in these fruits. He states that but one egg in each two or three thousand deposited ever comes to maturity, and further, that the beetle is strongly attracted to these varieties in preference to all other fruits. The logical sequence of this would be that to cultivate these varieties in abundance would exterminate the curculio.

In the introduction to Bulletin 14, and in occasional foot notes in the same Bulletin, I have expressed my dissent both from Mr. Wier's premises and from the statements upon which he bases his conclusions. Without giving exact details, however, he claims that his statements are based upon experiments, and we have not been able to repeat them except in a general way, and to a certain degree theoretically. My own past experience has been that wild plums are quite generally affected by *Conotrachelus nenuphar*, and that the insect readily develops in them. This shows, as is well known, that plums generally, either cultivated or wild, have an advantage over peaches and other rough skinned fruit, and we may say that it is also true that a certain percentage (sometimes quite a large one) of the larvæ perish in all kinds of fruit.

In the absence of definite experiment and accurate account to support these views, I have endeavored during the past season to have observations made by certain of my agents and by several persons whom I know to be at the same time accurate observers and more or less extensive growers of plums. The reports from these individuals have not all been received, but from those which have arrived there is a perfect concensus of facts and conclusions, and all are adverse to Mr. Wier's beautiful theory. I quote from a few of these replies:

Mr. F. Lionberger, of New Florence, Mo., writes under date of July 17th, as follows:

"In answer to your inquiry of June 22, as to whether or not the larva of the curculio is able to develop in the cultivated species of Prunus Americana and Chicasa I will have to report that upon a very careful examination I find that at least 50 per cent. of the eggs deposited in my Wild Goose plums have hatched and ruined the fruit. I have carefully examined the fruit and have only based my calculations on the specimens in which I found the larva or where it had been feeding. Upon the wild plums which I examined I found the average to be slightly less. I have also made examinations in other orchards and found the average about the same."

Mr. G. C. Brackett, Secretary Kansas State Horticultural Society, writes under date of July 7, 1888: "* * *, My own experience and observations will not sustain Mr. Wier's declarations in the least, and I have been a close observer of this class of fruit for years in Iowa, where the woods abound with them; also in the thickets skirting the water-courses of this state, and in some seasons have witnessed the total destruction of a heavy crop of fruit by the insect in question. In cultivated plantations of the Wild Goose, Miner, and several other sorts of the Chicasa family, both on my own farm and others which I have had the privilege of visiting in this state, I have not discovered any material exemption in varieties, and these varieties have suffered as much as the Lombard, Washington and varieties of that class. * * *"

Prof. Herbert Osborn, of Ames, Iowa, whose report upon experiments with arsenical poisons will be printed in full in my annual report, and whose careful tables indicating the varieties of plums experimented upon and subsequently examined may be included, writes concerning the Wier theory as follows:

"With regard to the development of the curculio larvæ in wild plums, or varieties recently derived from wild forms, the tables already given will furnish some light, since for those reported as containing larvæ the eggs had in all instances hatched, and in nearly all cases the larvæ were well on their way to full development,

or in some cases fully grown or even escaped from the plum, their presence being indicated by the condition of the pulp. The infested plums were placed in breeding jars, but, since they had all been cut open and could not be given exactly natural conditions, it could not be expected that they would mature as perfectly as under normal conditions. Moreover, some of them produced the common curculio parasite, *Sigalphus curculionis*. Nevertheless, a number of adult curculios were bred from each of the varieties, at least three of which are closely related to wild plums. On June 25, I visited the timber in the vicinity and examined the native plums, cutting open numerous examples of the fruit, and finding in very many cases well developed larvæ. It seems to me, therefore, that there can be no reason to doubt that both curculio and gouger will develop readily in all the varieties of wild plum, although of course many plums will be stung that will not mature the insect, doubtless much of the puncturing being simply for food, and no egg being laid."

The most elaborate experiments which I have had made are those of my agent, Mr. F. M. Webster, of Lafayette, Ind., and those will also be printed in full in said report and are, like the rest, adverse to Wier's theory.

NOTE FROM D. B. WIER.

[The following paragraph is from a letter addressed to the Secretary at Ocala. Mr. Wier was not aware that the above paper was to be presented, and his remarks cannot, therefore, be considered as a reply or a full statement of his views, but, as they were written for the benefit of the Society, they are here inserted.—A. A. C.]

Now a word of the very greatest value to Eastern fruit growers. You are aware that in Illinois I was experimenting largely with native plums, and had by far the largest collection of them in the world. I found in them plain indications that in the two prominent species of these plums, the whole Mississippi Valley, and possibly the whole East, would eventually find one of their most valuable fruits. I demonstrated conclusively that most varieties of both species were practically curculio-proof, and also that most varieties of them were infertile with their own pollen, but fully so with the pollen of nearly any other variety, and also often with varieties of other species of the Almond family. I also proved conclusively, by experimentation on my own place, and have now on file here, reports from other experimenters, establishing these two most valuable facts:

First, that the plum curculio can be absolutely controlled and destroyed by spraying fruit trees with the arsenical poisons about the time the buds begin to swell in the spring, and again one week after the petals have fallen, and then again in two weeks, if necessary.

Second, that wherever the native plum trees are growing among other stone fruits, that the great majority of the plum curculios will seek and be found on them (that being its native food and breeding plant) and that by spraying them at the proper times with the arsenites the other stone fruits will be sufficiently protected; that it is best to spray all, as before said. These grand facts have been proven by the experiments of careful, scientific men at several stations remote from each other, working independently, and there can be no mistake about it. I would add that the matter is a very complicated one, yet there is not the least doubt but that this, the worst enemy of stone fruits, can be controlled.

White Arsenic as an Insecticide.

C. P. GILLETTE, AMES, IOWA.

A series of experiments were carried on at the Iowa Experiment Station the past summer for the purpose of determining whether or not white arsenic in solution can be substituted for Paris green or London purple for insecticidal purposes.

The arsenic was first prepared by boiling a small quantity, usually one ounce, in a gallon of water until all was in solution. This was then used as a standard from which dilutions ranging from one pound in 200 gallons to one pound in 1,200 gallons were used. The applications were made to many trees and plants, including apple, plum, elm, soft maple, box-elder, grape, raspberry and others. After repeating the application many times, the conclusions reached were, that arsenic in solution cannot safely be used stronger than one pound in 1,200 gallons of water on the most hardy foliage.

Leaves treated with this weakest strength were gathered day after day and fed to leaf-eating larvæ which appeared to be unaffected by the poison.

These experiments seem to prove conclusively that white arsenic in solution cannot safely be used against leaf-eating insects of any kind, for when the solution is strong enough to destroy the insects it does much harm to foliage.

This must not be taken as an argument against the use of this poison in cold water, if the application be made before the arsenic has time to dissolve. The principal objection to this method is that the arsenic is so heavy that constant stirring is necessary in order to keep it in suspension.

Results of Recent Experiments in the Treatment of Vine Diseases.

B. T. GALLOWAY, WASHINGTON, D. C.

For more than a quarter of a century grape-vines in this country have suffered from the attacks of several species of parasitic fungi, and of these, two have attained such prominence that they are now regarded by grape-growers everywhere as the most dangerous foes with which they have to contend.

The two to which I refer, and to which I shall for the most part confine my remarks, cause the diseases commonly known as the downy mildew and black-rot. These diseases prevail more or less seriously in all of the States east of the Rocky Mountains, and despite the fact that for many years they have annually destroyed from one-half to three-fourths of the crop, no organized effort has until within the last three years been made to combat them.

Early in 1887 the U. S. Department of Agriculture published a circular, which was widely distributed among grape-growers throughout the country, recommending a line of treatment for the two diseases under consideration, based upon experiments made the previous year in France.

The remedies recommended in this circular were as follows:

(1) Simple solution of sulphate of copper, one pound the of copper to twenty-five gallons of water; (2) Eau celeste, one pound of sulphate of copper and one pint of commercial ammonia to, twenty-two gallons of water; (3) Bordeaux mixture, sixteen pounds of sulphate of copper and thirty pounds of lime to twenty-two gallons of water; (4) David's powder, four pounds powdered sulphate of copper to sixteen pounds of lime; (5) Sulphatine, two and a half pounds of anhydrous sulphate of copper, fifteen pounds of sulphur, and ten pounds of air-slaked lime. These remedies were tested by four special agents of the Department, located in New Jersey, Virginia, Missouri and Texas, as well as by two or three hundred grape-growers scattered throughout the United States. As a result of these trials it was shown beyond question that the downy mildew (Peronospora viticola) could be controlled by any of the preparations aboved named. It was also demonstrated that the simple solution of sulphate of copper, the eau celeste, and the sulphatine would burn the foliage if great care was not exercised in their application.

With regard to black-rot no definite results were obtained, but enough was learned to show the importance of continuing the experiments. Accordingly, early in the spring of 1888 a series of trials was again instituted by the Commissioner of Agriculture with the view of determining whether or not the black-rot could be prevented by the remedies which had given such promising results the preceding year. These remedies were as follows:

1st. Bordeaux mixture, modified formula, containing six pounds of sulphate of copper and four pounds of lime to twenty-two gallons of water; 2d. Eau celeste, made as described above; 3rd. Eau celeste, with the addition of two pounds of carbonate of soda to prevent injury to the foliage. Special experiments were made with these preparations, under the direction of the Section of Vegetable Pathology, by Col. A. W. Pearson, of Vineland, New Jersey; H. L. Lyman, of Charlottesville, Virginia, and Herman Jaeger, of Neosho, Missouri.

DISCUSSION.

J. S. Newman, Alabama: Last summer I tested the value of paper sacks as a protection from rot. In every case (some 7,000 sacks) it was a complete protection if the sacks were put on as soon as the grapes set. Even if put on later the rot did not spread in the bunch. The sacks are also a protection against birds and insects, besides pro-

longing the season on some varieties two to three weeks, thus enabling us to sell for a better price. Our Ives and Concords which had been bagged brought 10 cents a pound net, coming in market after the main crop was gone.

The Chemistry of Peach Yellows.

ERWIN F. SMITH, WASHINGTON, D. C.

The composition of a peach tree, so far as a few chemical analyses enable one to determine, is about as follows:

Constituents.	*Per Cent.*
Inorganic Matter (Ash)	2.00
Water (removed by drying)	45.00
Organic Matter (removed by burning)	53.00
Total	100.00

The amount of P_2O_5 and K_2O in the ash is respectively about 6 per cent. and 16 per cent.

The composition of the peach itself is about as follows:

Constituents.	*Per Cent.*
Inorganic Matter (Ash)	0.75
Water (removed by drying)	81.25
Organic Matter (removed by burning)	18.00
Total	100.00

The amount of P_2O_5 and K_2O in the ash of the fruit is respectively about 14 per cent. and 70 per cent.

The analyses on which the supposed composition of the tree is based are of limbs and twigs, and may not fairly represent the whole tree. Undoubtedly these parts are richer in ash than the tree as a whole, the general rule in such cases being that the ratio of the ash increases as the diameter of the stem diminishes. For reasons not necessary to state here I could use only four analyses, made as follows: B. Kirtland, 1854 (for the per cent. of water only); Connecticut Agricultural Experiment Station, 1884; L. Murbach, University of Michigan, 1888; A. E. Knorr, U. S. Department of Agriculture, 1888.*

The analyses on which the supposed composition of the fruit is based are three in number, made at my request by A. E. Knorr, an assistant chemist of the U. S. Department of Agriculture.†

Upon the presumed correctness of these determinations this paper is based; but I shall return to the subject again when a larger number of analyses are available.

The soil and climate of the Chesapeake and Delaware Peninsula are well adapted to the peach—so well, indeed, that this district has undoubtedly become the greatest peach region on the globe. The trees are set about twenty feet apart each way, which puts 100 trees to the acre. Occasionally in that region I have seen trees set farther apart, but almost never closer together.

The trees do not make as rank a growth as in California, but they are larger than those grown in New Jersey, Michigan and other Northern states. A thrifty, well grown tree, set on fertile loam in the spring of 1882, weighed, roots included, in November, 1888, after the leaves had fallen, 165 pounds. This may be taken as the average weight, in their resting period, of large and vigorous trees after seven years of orchard life. If anything, 165 pounds is above rather than below the actual average. In regions blessed with a less favorable climate and less fertile soil the weight would be much less.

Reckoning on this basis, the weight of a thrifty tree after three years of orchard growth would be about fifty pounds.

Now let us estimate the amount of P_2O_5 and K_2O drawn from the soil and stored in such trees.

In the course of three years the trees on an acre (100) would attain a total weight of 5,000 lbs., of which two per cent., or 100 pounds, would be ash. Of this ash six pounds would be P_2O_5 (phosphoric acid) and sixteen pounds would be K_2O (potash). This is substantially all that would be taken from an acre of soil during the entire three years, because the trees have not yet fruited to any extent, and because, as is well known, the greater part of the P_2O_5 and K_2O contained in the leaves passes back into the tree in autumn before the leaves fall.* The total amount of P_2O_5 and K_2O removed by each tree

*See *Peach Yellows—A Preliminary Report*, U. S. Department of Agriculture, 1888. Appendix A, Chemical Analyses.

†Ibid.

*See Sachs—*Vorlesungen*, 1882; Ebermayer—*Chemie der Pflanzen*, 1882; Lorey—*Handbuch der Forstwissenschaft*, 1888. Sachs may also be consulted in an English translation.

would therefore be only one-hundredth of the above, or about one ounce of P_2O_5 and two and a half ounces of K_2O. Consequently, if we ignore the very slight quantity of P_2O_5 and K_2O lost each season by the fall of the leaves, the average *annual* drain on each acre of orchard up to the time of bearing would be only two pounds of P_2O_5 and five and one-third pounds of K_2O, and the average demand made annually by each tree would be only one hundredth part of this—*i. e.*, about one-third ounce of P_2O_5 and four-fifths ounce of K_2O. For a clearer understanding, the same facts may be stated comparatively, as follows: One hundred peach trees remove from the soil during the first three years of their orchard life about two-fifths as much P_2O_5 and about one and three-fifths as much K_2O as thirty bushels of wheat; or about three-fifths as much P_2O_5 and one-half as much K_2O as one moderate crop of Irish potatoes, say one hundred bushels.*

In case of trees seven years old there would be a larger demand. We may ignore the foliage as before, but we must take into account the fruit. If the seasons have been favorable the orchard will have borne three or four crops. Let us assume three crops, each consisting of three five-eighths bushel baskets per tree, which is a very liberal estimate. Most orchards would not have produced one-half as much.

The total weight of one hundred trees set seven years is 16,500 pounds, 330 pounds of which are ash, 20 pounds being P_2O_5 and 53 pounds being K_2O.

The total weight of 900 baskets of peaches is about 27,000 pounds. Deducting 1,800 pounds for the weight of the baskets, we have 25,200 as the total weight of the peaches produced during the seven years. Of this total 189 would be ash, *i. e.*, three-fourths of one per cent. Of this ash 26 pounds would be P_2O_5 and 132 would be K_2O. In other words, the entire three crops of fruit would only contain about as much P_2O_5 and K_2O as one large crop or three moderate crops of potatoes,—300 bushels of the latter yielding 29 pounds of P_2O_5 and 104 pounds of K_2O. The demand made by each crop of fruit would be for only nine pounds of P_2O_5 and 44 pounds of K_2O, and each tree would require only one-hundredth part of this.

In round numbers, therefore, each tree during the entire seven years of its orchard life will have drawn from the soil for its growth and for the production of nine baskets of fruit a total of seven ounces of P_2O_5 and 30 ounces of K_2O. Each tree has a fertile, cultivated area of 400 square feet from which to draw this, and the demand is distributed over seven years, being greatest, of course, in fruitful seasons.

During this time the soil, containing a supply of mineral matters rich in phosphoric acid and potash, and presumably good for hundreds of years, has been slowly disintegrating under the influence of air and water, and this disintegration and consequent conversion of plant foods from insoluble into soluble forms has been hastened by repeated cultivation, and often by heavy manurings, so that the soil has been put into the best possible condition for the growth of plants. Orchards in Maryland and Delaware, where peach yellows now prevails extensively, are cultivated almost continuously from early spring until July, and in some instances this cultivation has been continued until late autumn. Moreover, our theoretical orchard has received during seven years several hundred pounds per acre of kainite, muriate of potash, and bone, fish, or guano fertilizers, rich in P_2O_5 and K_2O. Let us assume that in addition to thorough cultivation each year, and one moderate dressing of barnyard manure, the soil has received 400 pounds of kainite, 400 pounds of superphosphate, and 200 pounds of muriate of potash, all of which was applied previous to the appearance of yellows, or when the disease first began to show in a few trees. The kainite contains

* Winter wheat (average of 110 analyses) contains 1.96 per cent. of ash, of which about 50 per cent. is P_2O_5 and 33 per cent. is K_2O. The potato tuber (average of 59 analyses) contains 3.79 per cent. ash, of which about 17 per cent. is P_2O_5 and 60 per cent. is K_2O. See Ebermayer—*Chemie der Pflanzen*, Berlin, 1882, vol. I, pp. 727–747. This total ash is, of course, computed upon the *dry* weight. The mean water content of wheat is 13.16 per cent.; and of potatoes, 71.61 per cent. The amount of ash in the *fresh* substance would, therefore, be about as follows: wheat, 1.70 per cent.; potatoes, 0.96 per cent.

about 12½ per cent. of K_2O, and would therefore give to each acre fifty pounds. The muriate of potash contains about 50 per cent. of K_2O, and would give 100 pounds. The superphosphate would give about sixty-four pounds of P_2O_5, if made from bone, or about forty pounds if made from South Carolina rock and other minerals. The earth nourishing each tree in this orchard has, therefore, received during the entire seven years about ten ounces of P_2O_5 and twenty-four ounces of K_2O. All this food has been at the disposal of the tree, or at least it has been in the surface soil in the immediate vicinity of the roots, and in a more or less soluble condition. In addition, the roots have secured an uncertain but very considerable quantity made soluble by their own activity, and have also had access to that produced in the soil naturally by the action of the weather, and to a much larger quantity rendered soluble by cultivation and the use of animal manures.

If the premises on which this paper is based be granted, viz., a sufficient number of correct analyses, it seems to me the chemists will be hard pushed to explain the appearance of yellows in such an orchard, under such conditions, by any lack of phosphoric acid or potash. Yet I can substitute numerous actual orchards for my theoretical one, and can point to several young orchards now ruined by yellows, which have had even better treatment than that here indicated, and which have not borne one-fourth as many peaches.

But assuming, for argument's sake, that this seven-year-old orchard has taxed the soil unduly and given out in consequence, what shall we say of the three-year-old orchard which has drawn from the soil only an insignificant amount of phosphoric acid and potash!

The trees in this young orchard have never borne a crop of peaches, but only here and there a few,—some trees perhaps as many as a dozen; others, two or three; others, not any. Nevertheless, yellows has been present in our orchard *two seasons*, and now affects anywhere from 5 to 25 per cent. of the trees. This theoretical orchard can be matched by many actual ones. Indeed, I know a small three-year-old orchard* in which 3 per cent. of the trees became diseased the *second year* and 43 per cent. last year, making a total of about 46 per cent., not including 7 per cent. probably diseased, but the diagnosis of which was doubtful in 1888. This orchard is on good soil in the heart of the Maryland peach region. By the time it is old enough to bear a crop of peaches it will not be in condition to bear at all. In fact, it will be fit only for firewood!

In conclusion, it should be stated that wheat, corn, vines, berries, and all other orchard fruits grow vigorously and bear abundantly in these localities; and that orchards on the most barren sands in Southern Delaware and Southwestern Michigan are practically free from the disease—a hundred times freer than orchards on good soils in the heart of the peach region.

In view of these facts, and others which space forbids me to mention, I hold that the chemical theory of peach yellows is by no means established. To settle this on a sound basis will require something more than a few discrepant analyses and meagre experiments. If in a badly affected district a man can protect his orchards by a liberal use of fertilizers while those of his neighbors decay, then I will be convinced, particularly if such treatment be found of sufficiently general application to rule out local causes which may have conspired, unknown to the owner, to produce a result attributed wholly to the use of fertilizers. Where so many factors may enter into a result the greatest care must be used in drawing conclusions. In the present imperfect state of our knowledge no very satisfactory conclusions can be drawn. Until such time as we have exact knowledge on a number of mooted points it becomes us all to speak with modesty and to search for the truth in all directions as diligently as possible. The coming season, in connection with further analyses, I intend to begin a series of extensive feeding experiments to determine as nearly as possible the curative and the prophylactic value of various proposed remedies, special care being given to control experiments, and exact records.

At present, the evidence seems to be in favor of the belief that peach yellows is a contagious disease. But as the discussion of that question

* No. 18 of my Preliminary Report.

is beyond the scope of this paper, and would also trench upon time properly belonging to other subjects, I must refer you for further account of this phase of the question to my special Preliminary Report, where also the chemical theory of peach yellows is reviewed with some detail, in the light of all the facts I have been able to discover.

Botanical Names.

DUDLEY W. ADAMS, TANGERINE, FLA.

Of all the sciences, botany is most intimately connected with the art of horticulture.

A knowledge of botany enlightens the horticulturist to his profit, and enlivens his mind to a fuller enjoyment of his chosen calling.

The study of botany brings the student into closer communion with nature in all her loveliest and wildest phases.

It leads him among the green pastures and beside the still waters.

He interviews the majestic palm under a tropical sun and seeks the Eidelweis amid Alpine snows.

He explores the dark lagoons for the graceful lily and braves the burning sands for the rigid cactus. The gorgeous orchid in all its glory is his, and the humble mosses are studied on the bended knee.

He loves alike the flaming poinciana that flaunts its charms under the scorching mid-day rays of a torrid sun, and the lovely cereus that only reveals its beauty by the modest light of the twinkling stars.

From the cradle to the grave we pay unconscious tribute to nature's loveliness by our admiration, and often use of her floral wealth.

We adorn the cradle with roses, and children decorate themselves with endless variety of vine and bloom.

The maiden wears a lily on her bosom, and orange blossoms deck the brow of the bride. The statesman in his prime drops none of his dignity by wearing a bud in his buttonhole. And when the final summons comes, we bring flowers and a wreath of cypress among the last and tenderest services we proffer those we love.

The germinating seed, the unfolding leaf, the stately towering trunk, the ever flowing life currents, the opening bud, and ripening seed are to the botanist an epic poem in whose rhythm is no jar, in whose harmony is no discord, in whose metre is no monotony, in whose teaching is no error, of whose authorship he has no doubt.

Such a science, which enlightens our understanding, introduces us to nature, increases our happiness, beautifies our homes, gratifies every sense of taste, touch, smell, hearing, and sight, touches the heart and fills the purse—such a science we should expect every one to acquire.

But do they? Does everybody understand botany? Most emphatically no. Of the whole population of the civilized world the majority are engaged, to a greater or less extent, in tilling the soil, as the chief aim of their lives, and millions more cultivate fruits and flowers and gardens as a means of relaxation from other more exacting and less pleasant occupations, yet of them all how very few know anything of this most delightful science?

Why? Yes, why? There must be some good and powerful reason for such a practically unanimous neglect of so pleasant and profitable a study. And this is the reason:

All the text books on botany, so far as the nomenclature and descriptions are concerned, are written in a conglomeration, a veritable babel of dead languages, wholly unintelligible and unutterable. That is all there is of it, and that is ample to account for the situation.

Now, here is what the innocent student strikes at the very threshold of his efforts—see Wood's Botany. In the chapter on elementary organs he finds that the skin is a cuticle. He meekly accepts that fact as scientific gospel, and tries to remember that skin is not scientific and that cuticle is. When he turns over two leaves he finds to his dismay that, speaking with scientific accuracy, skin is EPIDERMIS in capital letters. That is a stunner. On the same page he strikes "Lactiferous tissue." The meaning at first is not quite clear, but two lines further on it is defined as "branched anastomosing."

He begins to realize that he is studying botany, and in the next chapter reads: "The vegetable kingdom has long been considered by

botanists under two great natural divisions, namely, Phænogamia or flowering plants, and Cryptogamia or flowerless plants. The Phænogamia abound with ligneous and vascular tissue, while the Cryptogamia consist more generally of the cellular. Hence the former are also called Vasculares and the latter Cellulares. The Phænogamia are also called Cotyledonous and the Cryptogamia Acotyledonous plants.

Now, here are three complete sets of unintelligible, unutterable, polysyllabical names for the same thing. If that don't "knock out" our student for keeps, he is a good one.

If he again advances to the fray he stumbles over "perianth," "achlamydeous," androœcenm and bracteoles. The corolla hurts his head and the calyx cracks his jaw.

See one single paragraph: Pubescent, hirsute, tomentose, arachnoid, sericeous and cilliate, furnish more kinds of hair than boarding-house hash.

He flounders among parenchyma, stomata and angustifolia, and comes to earth among the spongioles. The rubus lacerates his epidermis, and tetradynamia induces tetanus. Dodecagynia and company are like a night-mare in twelve or more styles from which he awakes to an unequal conflict with Infundibuliform and Hypocrateriform. Few indeed survive the hardships and discouragements of these few preliminary skirmishes, and of these few the majority view with dismay the main army of hard words ahead all drawn up in solid columns, and precipitately retreat.

All over the land you can find text books on botany covered over with dust and cobwebs. Examine them, and thumb marks are seen on a few preliminary pages, but untouched leaves thereafter will show you just where the botanical aspirations and ambitions of the owner were wrecked.

I say right here, without fear of contradiction, that the experiment of using dead languages in the nomenclature and description of plants has proved a *disastrous failure*. It is now about one hundred and fifty years since Linnæus introduced his system, and at this writing it is absolutely unknown to 990 out of every 1,000 people of civilized nations. I call that a dead, absolute, unmitigated failure. The pretences for using a babel of dead languages in the science of botany are chiefly so that the whole world can understand and thus bring order out of the chaos of common names. Has it accomplished that? Has it done either? Indisputably no. Not five persons in one thousand can understand botanical names; and even if they could, the confusion among them is much greater than with common names in proportion to the number of people who use them.

As good an authority on botanical names as we have in Florida, and one of their most valiant defenders, is Mr. Theodore L. Mead. In a recent article sustaining them he said, "There are plenty of synonyms in botanical nomenclature. I dare say they would average five synonyms, say ten words, to each plant." Now if that is not a failure I don't know the meaning of the word. A hundred and fifty years ago, more or less, the little knot of scientists agreed to rub out all the names used by common people, to get rid of the synonyms. No doubt they started in with a simple name for each plant. Since then they have multiplied and replenished the earth till now every known plant has five scientific names of two words, each added to an uncertain number of common names.

By having botanical text books in dead languages, the number of botanists in the whole world has been kept down to a few thousand, and still this little select, extra fine circle of scientists are getting every year deeper and deeper in the quagmire of their own unintelligible jargon.

Here is an example or so. If I say cassava, I speak the common name of a well-known tropical plant. I don't know as it has any other common name. Now, let us hear from science and its votaries. They shout all at once, Janipha Manihot, Manihot utilissima, Jatropha Manihot, Manihot aipi, Jatropha Seaeflingii. How is that for scientific accuracy in Latin.

In some of our large markets you will find a sweet Chinese fruit under the name of Lee Chee. I never heard it called anything else. Now science stalks proudly in to clear up the confusion,

and calls it Nephaleum Litchi, Euphorbia punicea, Euphorbia Litchi, Litchi Chinensis, Scytolia Chinensis, Scytalia Loacan, Dimocarpus Lychti, Sapendus edulis. There! "You pays your money and takes your choice."

Our scientist has scaled the East Indian mountains to remove the confusion of names there, and for one of the fruits of that region brings in this assortment: Semi-carpus Anacardium, Anacardium officinarum, Anacardaum Orientale officinalis, and no doubt it will be imported by some scientific nurseryman and sold under all these names.

In view of the facts as they are, how absurd the claim that confusion of nomenclature is removed by the use of dead languages. On the contrary the use of an unknown tongue only introduces a new element of confusion. Instead of correcting the confusion in our common names or superseding them, it has only resulted in adding more names.

The other claim for dead language names is that every one can understand them all over the world, and that in no other way can we have intelligible intercourse with people speaking any other language than our own.

Now, the facts are that when any of our American nurserymen or botanists write to a foreign correspondent they do not write in a jargon of mixed Greek and Latin, but write in our own language or that of the party addressed. If the text of the letter can be translated and understood by the parties to the correspondence, why cannot the names be equally easily translated if they have any meaning at all? Why? I ask again, why? I hear no answer, and no satisfactory answer is possible.

This unutterable jargon not only has almost totally prevented the spread of botanical science, but is now standing as an insurmountable obstacle in the every-day business of our nurserymen.

There is no one thing so much in the way of the nursery business of to-day as the stubborn fact that much of the stock is named in a tongue unintelligible to 990 in every 1,000 of our people.

Of the other ten many do not care to have an ornamental tree or plant which they cannot talk about with a neighbor who probably is one of the 990.

A tree on my lawn is living along under the name "Cupressus pyramidalis sempervirens." When a visitor who speaks only English inquires the name what shall I say? In the pine woods region of South Florida it is not considered good form to parade one's knowledge of Latin in the company of one's guests who only speak English. If I give the full Latin name my guest may feel, though he does not say, "O, don't he put on airs!" If I give the Latin name, and then the translation, I plainly say by implication, "I understand these Latin names, but you don't, so I explain, that you though you are uneducated, can understand." Or should I tell him at once that my tree is an evergreen pyramidal cypress? Then what becomes of the science?

Then, again, if I give my guest the name in English and it happens to be the case that he is acquainted with the Latin name, I am in the position of either betraying my own ignorance or presuming upon his.

The use of long or unmanageable names cannot be forced upon the American people.

When the American Pomological Society was formed forty years ago, the nomenclature of our fruits was in apparently inextricable confusion.

What did that society do? Did it go to work and attempt to bring order out of chaos by giving new names to all our fruits in a hodgepodge of Greek and Latin? Not much! The men at the head of that Society were men of good business, practical common sense, men of culture, whom cultivation had not emasculated or removed from a substantial connection with the realities of earth. They grappled with the confused nomenclature of that day on the basis of talking English to one's English speaking people, and we all knew what they were driving at. Like frost before the sun, synonyms disappeared and order came out of chaos.

How rapidly the true name was accepted. How ruthlessly the long names were pruned down. The whole nation endorsed their common sense course. Wilson's Albany Seedling strawberry is known of all men as simply Wil-

son. Monarch of the West is simply Monarch. Vicar of Winkfield pear is pruned to Vicar. The Duchess d'Angouleme, a most magnificent pear, limped along for years in a vain attempt to become acquainted with a people who could not pronounce its name. The American Pomological Society has cut away one-half the name, leaving the Angouleme alone as the name. But for once even the American Pomological Society is not up to the demands of the people, and they have taken the bits in their teeth and hold on to the English end of the name, which is Duchess, and Duchess it will be to the end of time.

Among the most valuable pears ever introduced was the Beurre d'Angou. Good size, fine quality, vigorous, productive and ripening at a desirable season. Unfortunately it was handicapped by a French name unpronounceable by an American tongue. That is the only reason it does not to-day stand abreast the Bartlett in popular favor. The Bartlett was fortunate enough in crossing the ocean to lose its clumsy foreign name, and that fortunate accident enabled our people to ask for it when it was wanted. Angou don't fit our American tongue, and notwithstanding all its merits, it is comparatively obscure. Yes, the work of the American Pomological Society has been a success. But suppose it had been run on the principle of a modern scientific Botany, and resolved to have scientific names in a dead language for reasons already given. Our principal American apple would have appeared as Pyrus Malus Baldwinii. Our most popular strawberry would have been known to our markets as Fragraria Virginana de Albani Seminoles Wilsonii. Could anything be more absurd? To us pine woods fellows a modern botanical name appears equally so, and I say now you might just as well try to make New York marketmen say Fragraria Virginana de Albani Seminoles Wilsonii as to make the American people use Greek botanical names. We won't do it, and I tell you so right now. A child can lead a mule to water, but a scientific botanist cannot make him drink.

No fruit or flower can become popular without an easy name. Either the name or named must go. That magnificent rose, named for a brilliant French General with the long name is now known among men as Jack, and thus relieved is in wide demand. A no less desirable rose struggles hard against oblivion because its name is so long and so utterly French that we can't pronounce it whole or when cut in two. I mean the Gloire de Disson. If you see the name in print try and pronounce it.

The American Pomological Society, composed as it is of men posessed of business common sense, recognizes this absolute necessity of easy names. Even a cucumber is too much cumbered, so the market man say cuke, unencumbered. They know perfectly well that the busy world will not accept anything else. And if any one brings before this body a new fruit encumbered with a long name see how quick Hexamer and Fuller and Thomas and other veterans, will out with their ready axes and decapitate and curtail its superfluous length.

How I wish they could get a good square whack at the names of our flowers and ornamental trees and shrubs.

We have a tree here in Florida we call an umbrella tree—seems to me that is long enough. Well, here comes our scientific botanist and says to prevent confusion, we must all call it *Melia Azederach umbraculiformis.* Just imagine us pine wood crackers sitting beneath and conversing among ourselves about melia azederach umbraculiformis; can you imagine such a thing?

Another tree that we here in the pine woods are now talking about, and whose melodious name is on all our tongues, is the *Acer polymorphus atropurpureus variegatus.*

Those of us who are fortunate enough to live in a country where there are twelve months in a year have plenty of time to talk about such trees; so when you see us together lying prone on the wire grass beneath the pine, you hear the soft music of our voices deliberately murmuring Acer Polymorphus Atropurpureus Variegatus, seventeen syllables and not one got away. Can scientific impracticability go further? The question that now confronts us is this, shall the science of botany be forever monopolized by a few professional scientists, or shall this most

desirable, humanizing and valuable science be brought within the reach of the people. I know of no organization in the wide world so fit to apply the principles of common sense to the solution of this question as the American Pomological Society. Individuals can do little to relieve the people of this incubus, but a great and powerful organization like this can break the bonds and open to us all the delights of botanical knowledge now monopolized by the few. In behalf of 120,000,000 English people I stand here to ask for botany in English, with the text in English, the descriptions in English and the names in English. We want no double deck arrangement with Greek scientific names for one class and English common names for another class. The American people will not submit to or accept any class arrangement at all. It is foreign to the spirit of our institutions. We want the whole thing straight in our mother tongue, *and we are going to have it.* If you don't do it somebody else will, or the science of botany will never popularize. The love of the beautiful in nature is not confined to the few self-appointed scientists, but is strong in all the good and pure.

I plead for English Botany in behalf of the toiling mechanic whose home he would fain adorn. I plead in behalf of the city seamstress whose solitary geranium in a tin can speaks of her inborn love of the beautiful.

I plead for the wild cowboy of the plains, who stoops from his saddle to pick the humble violet that has touched his heart.

I plead for the millions of farmers whose business keeps them always in companionship with the beauty of nature.

I plead for the child at play amid the flowers, that he may call his pets by name.

I plead in behalf of the judge, that his hours of leisure may be enriched by an understanding of nature.

I plead in behalf of the genuine scientist who would gladly enlarge the number of those who can comprehend his learning.

I plead in behalf of the student just entering on the study of the way of nature. In behalf of the youth, the middle aged, and the old. In behalf of the rich and poor, for the good of the present, for improvement and a larger knowledge for those to come after.

To make us wiser and better and bring us nearer to the great first cause, I plead earnestly, tearfully, and as forcibly as I can for English botany for an English speaking people.

DISCUSSION.

F. L. TEMPLE, Massachusetts: I do not believe that this audience agrees with the sentiments of the speaker. Simple, common names for local use are very convenient, but botanical names, which will be recognized everywhere by scientific men, are necessary.

J. H. WHITE, Florida: While the essay is certainly ingenious, and perhaps ought to be patented, I can assure the strangers present that there are many old residents in Florida who do not agree with its sentiments. The same objections would lie against every science.

T. W. MOORE, Florida: The essay at least shows that there is a great need for some one to popularize the science of botany, but this ought to be done by a scientific botanist.

PRESIDENT BERCKMANS: The point made in regard to the nomenclature of fruits is a good one, but we should never have been able to do such good work without a scientific knowledge of the species. The scientific name is often a guide in determining what common name to adopt.

Reserve Food Materials in Fruit Trees and Shrubs in Mid-Winter.

BYRON D. HALSTED, NEW BRUNSWICK, N. J.

At the suggestion of Capt. R. P. Speer, Director of the Iowa Experiment Station, a series of microscopic observations was made upon the twigs of various sorts of apple trees during the months of December, 1888, and January, 1889, and through the courtesy of that gentleman the facts herein contained are offered to the American Pomological Society in advance of their publication in the Station Bulletin, * as a report upon the investigations above mentioned. The varieties were usually studied in pairs, consisting of a

*"A Study of Apple Twigs," Bulletin 1, Iowa Experiment Station, Ames, Iowa.

tender and hardy sort, as the terms tender and hardy are applied in connection with the trying climate of Iowa. Throughout the series of tests the varieties were known by number or by letter, so that the investigator was not at the time acquainted with the sorts under consideration, and any chance for personal bias was therefore eliminated. The leading point was to determine whether any constant structural difference existed between the hardy and tender sorts, or any difference in amount or character of reserve food material, which would serve to distinguish any sort from all others. It is not the purpose here to enter into all the detailed results, for it is enough to say that no minute structural characteristics were found by means of which one variety of apple could, without doubt, be distinguished from its fellows. It is not by any means asserted that all twigs of all varieties were alike in minute structure, but the range of variation was within the limit of variation for different twigs of the same sort. There is a marked difference between the structure of a mature twig and one that has not completed its season's growth. For example, the slowly grown and fully matured twig from the top of an apple tree is quickly distinguished from the rapidly developed "water sprout" from the base or body of the same tree. The percentage of pith, wood and bark differs widely, especially that of the wood, while the upper parts of such twigs are much more unlike than the basal portions. In mature twigs the terminal bud is well developed and the portion just below it is quite rigid and will snap like a pipe stem when sufficient side pressure is applied. The "water sprout" on the other hand may have its upper portion soft and easily bent to one side like a slender piece of warmed sealing wax. It was not surprising to find marked microscopic difference between a mature and an immature twig, but that is only a difference due to degree of ripeness and therefore to be met with in any tree that has not finished its growth in all its parts before the frosts of autumn put a stop to farther vital activities.

A brief outline of the microscopic differences between a mature and immature twig will aid in the further consideration of any point of structure that may arise in connection with tender and hardy sorts. The mature twig has, as before stated, a well developed terminal bud, with its thick closely overlapping scales quite impervious to moisture, and often coated with a uniform gray layer of hairs. Within this protective covering of scales, etc., is the seat of vitality of the bud — the point at which growth will take place during the coming spring. Just below the growing point the stem consists mostly of small cells, commonly known as the pith, and outside of this is a thin zone of wood and finally the bark. The stiffness of the mature twig for the first two or more inches below the terminal bud is due in large part to the large amount of pith, which consists of thick-walled cells filled with starch. With a little care the wood and bark may be removed along with the bud, leaving behind the rigid central cone of pith. If a knife is applied to this it will be found to exhibit in a marked degree that quality known to the practical horticulturist as "grit." Portions of the same twig farther from the tip will not exhibit as much "grit"; in fact, the thickness of the walls of the pith cells and their content of starch diminish as the lower end of the year's growth is approached. At the same time the zone of wood increases in thickness, so that there is less need of the pith taking such a prominent part in the mechanical support of the more plastic upper end of the twig. In the immature twig there is very little wood near the tip, which does not end in a well developed bud; the bark is green and contains but little of the tough fibrous part called the bast, and the central part is made up of a pith consisting of thin walled cells which are not packed with starch. It is next to impossible to separate the wood and bark from the central mass of pith, and the latter has no rigidity and none of the so-called grittiness characteristic of the pith of a well matured apple twig. These differences, above briefly stated, are constant between well ripened apple twigs, and those that have not completed the season's growth, no matter what the variety may be. The question of one sort being more inclined to mature its twigs than another is one

outside of the present consideration and, as far as these investigations throw any light, is not to be determined by microscopic inspection of the tissues. Such a question involves a consideration of the past history of the variety; its origin, and the conditions under which it acquired or at least has retained its present peculiarities. A dozen or more factors may enter into the solution of so difficult a problem as that of hardiness.

As it is true that an immature structure is more subject to unfavorable surrounding influences than one that is ripe, it follows that any test for maturity is in some measure one for hardiness, but at the same time it is not one that can be called a strict test. An illustration may help to make this point clear. For example, it was found that all matured twigs, of every sort of the twenty or more varieties examined, were characterized by a rigid mass of pith, which for convenience may be called a "cone," situated a short distance below the perfected terminal bud. This cone is convex at the apex, and in shape not unlike a cartridge bullet. It is surrounded latterly by the layer of wood, and upon the apex is the soft thin walled tissue which constitutes the base of the bud. This cone is highly charged with starch, as may be easily demonstrated by making a thin longitudinal section, and placing it for a short time in a solution of iodine, when the starch bearing portion will exhibit a beautiful blue color, while the remaining parts are uncolored or tinged with orange-yellow. The same test may be applied in an easier way, and usually with sufficient accuracy, by splitting the twig-tip lengthwise with a knife, and placing the half in a dish of iodine. This method is within the reach of any one, as the only requisite aside from a sharp knife is a little iodine solution procurable at any drug store.

When an immature twig is examined in the way above stated the blue cone fails to develop, and instead there is often a bluish tinge to the whole tissue due to the starch being scattered throughout the pith, and especially the bark, but only in small quantities. All gradations may be found between the perfectly clean cut cone of the mature twig, and the entire absence of any signs of a central cone of lignified pith which obtains in twigs that are termed green, and are without rigidity and are killed by the frosts of autumn, or at least rarely survive the winter and spring. The practical horticulturist is usually able to determine the degree of maturity of twigs, but an easily available test to confirm his opinion may not come amiss, and at the same time it will serve to impress the fact that starch is not only a leading reserve food substance in apple twigs, but that it has its assigned place for storage in the well matured twig.

In apple twigs of more than one year's growth, the starch is stored principally in that portion called the wood, although it is not in the woody tissue strictly so-called. Running from the pith to the growing layer (cambium) outside of the wood are many radiating plates of pith-like cells which are known collectively as the medullary rays, or "silver grain." In a transverse section of a twig these rays bear resemblance to the spokes of a buggy wheel—the hub being represented by the pith and the felloe by the cambium, while the tire corresponds in position with the bark. It is in these medullary rays that the greater part of the starch in an old twig is stored. In addition to the medullary rays there are pith-like cells which extend at right angles to the silver grain, that is, parallel with the wood fibres, and in these there are usually quantities of starch. Thus when a thin piece of apple wood is placed in iodine and afterwards viewed with a microscope the blue lines of starch bearing cells, because they cross each other at right angles, present a view not altogether unlike that of a mosquito netting, the vacant spaces in the netting corresponding with the uncolored portions of the wood, which bears no starch. In addition to this mesh of starch bearing cells in the wood there may be a layer of a few cells in thickness, making up the outer zone of the pith, in which there is an abundance of starch. This is especially true of twigs that are not more than a year or two old. In the body of a tree the starch, although present, is not abundant, but in no case was it found absent. Old wood, even, that had died several years before, from the removal of the bark by

rabbits, and had become entirely overgrown with new wood, was found to contain starch. It is safe to say that starch may be expected in all wood; in the pith of young twigs, especially near the tips of matured branches, and along the outside pith of old twigs. In the examination of longitudinal sections of twigs passing through lateral buds it was easy to demonstrate that the greater amount of starch was upon the side bearing the bud, but none in the bud itself, unless it be immature, in which case it may be scattered throughout all its parts. In short, starch is deposited most abundantly near the vital points; that is, the growing points, or, in other words, the buds, both terminal and lateral. In a "water sprout," for example, that had made over six feet of growth during the last season, it was found that nearly all the starch was stored at the base of the lateral buds, and in the long internodes there was an almost entire absence of this reserve food substance. The twig was not mature, and, as a consequence, no cone of starch bearing, thick walled cells was found at the base of the terminal bud – for two or three inches the tip was as pliable as a whip lash, and dead and brown throughout at the time of the examination.

Tests were applied for the detection of sugars, and usually glucose or dextrine, or both, were found in the last formed portions of the buds, and occasionally cane sugar was present also. The sugar group was more abundantly represented in twigs which had been stored in a cellar. It is doubtless true that under the unnatural conditions surrounding these cut twigs a quantity of the starch had been changed into sugar. In many instances there was a marked reduction in the quantity of starch that would be expected in twigs taken directly from the trees. Although the investigations were not projected along that special line, it was quite evident that the starch, under the influence of a slow fermentation in the stored twigs, had first become dissolved from the central pith, and from there outward to, and through, the wood. In some instances there was a decided indication of fermentation having progressed rapidly, due to the warmth, etc., of the cellar, and in such twigs the starch was entirely absent except in the vicinity of the buds. An examination of cuttings of apple and other twigs which had formed callous, others with small roots, and still others with new branches bearing leaves, showed that the same method of withdrawal of the starch had been observed, namely: first from the pith, next from the wood of the internodes, and last of all from the vicinity of the buds.

An examination was made for that class of reserve food substances known as the proteids or albuminoids – those substances which are much more complex in their nature than the carbohydrates (starch, sugar, oil, etc.) and have in addition to the latter a certain percentage of nitrogen in their composition, and are closely associated with protoplasm. Protoplasm, in short, is a nitrogenous compound, wonderfully variable in its composition, that is now considered to be the substance in which all vital activities take place. The albuminoids, which in the winter season are virtually the reserve forms for protoplasm, or at least the substances out of which protoplasm is produced in spring, are naturally to be looked for in the vicinity of the growing points. In other words, a mature bud would be expected to abound in these nitrogenous substances. It also explains why the starch is absent from the bud itself, but produced in large quantities in close proximity to the bud. The proteids in their relation to the vitalized protoplasm occupy the first place, for out of them the protoplasm is able to increase itself, while the carbohydrates are compounds which stand next and furnish the available substance for the building up of plant tissue and assist in other processes of growth. A well matured apple bud, whether terminal or lateral, aside from its framework, consists in great part of albuminoids with a varying percentage of sugar, depending upon the conditions which have previously surrounded the twig. Close to the bud, and making a sharp line with the thin walled protein-bearing cells, is the area of starch-bearing tissue, the individual cells of which have their walls thickened by a process known as lignification. These parts may be easily located by making a longitudinal section through a

mature terminal bud, for the knife will easily pass through the soft part abounding with proteids, but meets with considerable resistance as soon as it strikes the cone of lignified starch bearing cells.

All kinds of fruit trees are by no means alike in the amounts of starch and other reserve food substances, and what has been previously said in this paper pertains more particularly to the apple. Even in the apple there are considerable variations among the various sorts, and as before stated among the twigs of the same sort. In fact, so much probably depends upon surrounding conditions not easily determined, that this portion of the subject cannot be discussed with satisfaction. When the twigs of cherries, for example, are examined, there is found a marked diminution in the amount of starch, and an increase in a gum or mucilagenous substance, which doubtless replaces the starch and performs the same functions in the economy of the plant. Pears, judging from the few sorts examined, are very rich in starch, and in a well matured twig the cone is remarkably developed, and when this starch bearing pith is laid bare and cut with a knife the grit is strikingly manifest. These same pear twigs, however, may not be able to bear the trying changes of temperature of winter and spring, while the cherry twigs with much less starch are uninjured under similar conditions. It therefore follows that the presence of starch, irrespective of the species, is no means of judging of the vital or resistant powers of the plant.

It may be interesting to state that such plants as the currant and gooseberry have almost no starch in the young twigs for the distance of a foot or more from the terminal bud, and that the large pith and surrounding parts are highly charged with albuminoids. An extended search was made for starch in the older parts of the shrub, and it was found that the roots only had large amounts of this reserve food stored in them. It was stored in all parts of the root, but mostly in the outer soft part which may be called the bark. The young roots contained a larger percentage than the older parts. It will be remembered that these shrubs finish their growth early in autumn, and there is sufficient time allowed for the reserve materials to take the positions most advantageous to the successful growth of the plant. The large amount of albuminoids out of which to form protoplasmic substance in spring is remarkable, and this may be the reason for the crowding back of the starch from the upper portions of the twigs. The same condition of things was found in the buckeye, which is another plant maturing its wood early and having the period of actual elongating of the twigs confined to a few weeks. At the time it was not possible to examine the roots of the buckeye and nothing definite can be said of the storage of starch.

There were many trees and shrubs examined, in the twigs of which no starch was found. The willows and poplars belong to this group, and it remains to be determined what characteristics of growth are to be associated with such plants in contrast with those of similar trees or shrubs the twigs of which abound in starch.

COMMERCIAL POMOLOGY.

Gluts, Their Cause and Remedy.

BARNETT BROTHERS, CHICAGO, ILL.

Webster says, "to glut is to furnish an over supply of any article so that there is no sale for it," and this is the general idea that is carried with the use of the term. When, therefore, a commodity is supplied from any source in a quantity that exceeds the demand, a step is taken towards "glutting the market," towards choking up the regular channels of trade, and interfering with the healthy action and circulation, that must be kept up to make commercial transactions profitable.

In manufactured products, that can be kept for an indefinite length of time, the only, or perhaps more properly, the chief result is simple stagnation in trade, that compels a cessation

of manufacture until the surplus enters into the regular channels, and commerce resumes its normal condition.

The manufacturer only faces the loss of possible profits, for with the doors of the factory closed, the pay roll and bills for raw material cease, and only the interest on, and deterioration of, the plant, the "fixed charges" so to speak, go on. Judging from the falling off of his orders, the careful and prudent manufacturer can closely calculate how soon he will be compelled to cease operations, to suffer the minimum of loss, and he can avoid absolute loss if he can hold his product until the market revives.

In the case of the manufacturer of staple goods, lost ground from dull trade has often been recovered, for under the plea of lack of orders, it is possible to reduce wages to a point where the cost of production is so low that he can afford to shut down and wait for a revival of trade, confident that when it comes, it will insure not only the carrying charges, but also in addition a good profit.

The farmer growing wheat, or corn, or cotton, can, if his purse is of sufficient length and depth, carry his crop, without fear that next week or next month, it will be worthless by reason of decay. While depending on the dews, the sunshine and the rain, for the returns of his labor, after his crop *is gathered*, he has time to rest, and can contemplate his harvest, and plan for its disposition.

The Pomologist—the fruit grower—and the Horticulturist, however, who for convenience sake we shall call the fruit grower and shipper, have a very different path to tread, and though the pleasures of the garden and orchard may be greater, and the delight keener, they are at the same time tempered by the certainty of a *decided uncertainty* after the crop has matured. Were the skies always propitious, and the result always sure, an element of confidence sadly wanting would be introduced into the life of the fruit grower.

The area devoted to horticulture and fruit growing in 1887 was not much less than that of 1888, but the proceeds—the crops gathered—were vastly less; and in this case we see one of the chief causes of gluts—the uncertainty of the crop that will be gathered.

No calculation that man can make is proof against a drought; no care can guard against a "wet spell" that may ruin the almost completed work, and if it does not sweep away his work altogether, may render it of a quality so inferior that it is scarcely worth marketing.

Thus the first cause of the state of affairs under consideration, we would call *the absolute uncertainty of the amount to be produced.*

In seasons of normal condition of growth and opportunities for proper marketing of the produce, a given area will produce results that are satisfactory, and in quantity that will prove remunerative to all parties concerned.

In seasons such as prevailed in 1887, the quality and quantity of fruit and vegetables produced was far below the average, and only exceptional localities had a full crop. This was promptly taken by the less favored section of the country, and at prices eminently satisfactory to the few favored ones.

There were exceptional instances of good crops in localities not favored by rain—often the result of sensible and scientific efforts—and these results acted as an incentive to the unfortunate many to renew their efforts and plant again, in the hope that they too should be the happy recipients of exceptionally large returns.

Men are slow to learn, only a few weigh "cause and effect." The great mass of the fruit growers did not for a moment pause to ascertain the cause of the high prices of 1887, but they only saw the golden returns of the fortunate few. The result is known. The "uncertainty" came next time in abundant crops, the largest ever known, and a complete demoralization of the entire trade. Were the season of 1887 repeated, there would be no complaints of gluts or over production. Men calculate on average returns, for extras they are not prepared.

The apple, onion and grape crops of 1888 are illustrations of abundant and unsuspected yields that are at this date fresh and vigorous illustrations of this thought.

Another cause is the general lack of information, and disregard of the movements and operations of others. A market, to which a large or small number of shippers are sending their produce, can take care of only a certain amount at remunerative prices. Each shipper acts as though he considered himself almost the sole source of supply to that market, and ignores absolutely any new source of supply, and considers his own as the supply. In this connection we may mention that the demand, the purchasing power, of the markets is seldom studied with the care that should be exercised for the proper prevention of gluts. When scarce and dear a product may be as much of a "drug" in the market as when very cheap. Whenever the price is beyond the purchasing power of the buyer, the conditions are favorable for a break in the market. Spring products, though tempting when the mercury is at 70°, lose much of their charm when the mercury is at zero, and the snow is two feet deep on the level.

The complaints of the past year that have come prominently to the surface are from large centers, yet complaint has been of the same kind, and proportionately in the same degree, from the smaller and interior points.

Another cause for gluts is the effort on the part of receivers to obtain more than the value of the goods, whether actual or relative. Driven by competition to obtain the highest possible price for consignments; they sell part at a high figure, and the remainder is left on hand to be sold the next day with the fresh receipts, thereby breaking down the market they endeavored to hold up. This driving away of their customers by asking more than the customers can afford to pay, which is the market value of the goods, is one of the incipient causes of plethora in the markets.

Another cause is the sending of products that are utterly unfit. This, however, is *a relative matter* and is lost sight of by many growers, "the unsuccessful ones." In nothing is there keener competition than among those who buy to cater to the taste, the appetites. The finest fruits, the freshest vegetables, are always sought out first. Competition is strong, and *competition is a great educator*. Every point will be eagerly seized upon and turned to advantage to secure the supply when there is a scarcity, and the closest and clearest judgment will be brought to bear on the question. Buying rapidly and quickly on the market, then examining leisurely at home gives an opportunity of correcting erroneous judgment; and when there is a loss of value, giving *point* to the lesson, the process soon educates the ordinary buyer up to the point where he becomes shrewd and careful, and where apparently off-hand work becomes accurate.

The ability thus whetted and sharpened when the supply is limited, is exercised to good advantage when there is a plenty, and if there is no especial need of haste in purchasing, intuition will guide him to the best, and a glance be suffice to condemn the inferior. Keen and sharp in his purchases, he knows what he wants and goes straight to the mark.

In view of this fact, it is folly to send, in time of abundance, anything that can be classed as inferior. It is true that in fruit and vegetables, commercially speaking, quality is comparative; good and inferior are terms that are significant only in relation to other products.

The "good," that commanded good prices, fairly remunerative, in 1887, was decidedly "inferior" in 1888, while the actual quality was the same in each year, the relative value, the selling worth, was wide apart. The berries from Florida are fine when they first arrive in New York, but when Charleston's first pickings come, if the *actual quality* and value is the same, the *commercial worth* is vastly less, the selling value much lower. Florida berries are then "dead dull" in the market, though the supply may be comparatively light.

Peaches are the same, the first that arrive are valuable, but as new varieties and fresher supplies come, the price will decline until no one will care to buy, not that the quality of the later shipments are actually inferior, but because there are *better offered from other points*.

Inferior quality is often a large factor in producing gluts. "A heavy north wind the past few days has leveled many peaches, which had

to be washed previous to being shipped," is a clipping from a paper published in the heart of the peach region of Michigan, Oct. 3rd, 1888. Such stock tends to cause a glut, not only on account of the increased quantity, but also on account of the *actual inferiority* of the fruit shipped, for, as stated above, inferior goods are the last sold, and the market is depressed by these offerings.

It is seldom that a glut of good fruit in really fine condition occurs. We say *seldom*, for it does occasionally come. When there is a general abundance, so that only the large points can be relied upon as consumers, this condition is likely to come about.

During the great glut in the New York markets in May and June of 1888, it was the inferior in quality and condition that suffered most. True, the entire receipts sold at a lower range in sympathy with it, but the immediate causes were cargoes of vegetables from far Southern points arriving at the same time, and being offered in competition with the fresher, finer, and better products of the nearer points.

Sixty-five hundred crates of vegetables were dumped into the sea on the return trip of a steamer, being the balance for which no offer could be had. Being sold for account of the steamship company, any bid would have been accepted. Yet so absolutely worthless were these goods that hundreds of dollars were refunded to the receivers, their utmost efforts failing to realize enough to cover the simple freight charges.

"Relative qualities" must be taken into consideration, for it was not the actual qualities and condition of the dumped goods that produced this state of affairs, but the large supply from points as far north as Norfolk, Va., only eighteen hours from the field, while the bulk of the rejected goods were from Southern Florida, four to six days from the garden. Were there only Florida shipments offered, the result would not have been so disastrous, but with the receipts from all points along the coast from Jacksonville to Norfolk, it was no wonder that Florida shipments suffered.

Another cause of gluts is delayed transportation. A storm on the coast prevents the progress of a vessel until a day is lost; a bridge is washed away, or a wrecked train delays the shipment twelve hours. The following ship or train brings its supply "on time," and while the receipts of either day would have been readily absorbed in the regular channels of trade, when a "double dose" comes the pressure is felt, and buyers hold off. Neither day's work can be cleaned up, or if it is moderately so, by a rapid decline in the asked prices, it results in so filling all the channels by the extra amount forced into them that the demand will be unusually light for the next day's receipts, and it will be some days before trade will resume its normal course. Right here we would notice that the periods of glut come in a season of *constantly increasing and widening area of production*, so that we may reasonably expect larger receipts and somewhat declining prices each day.

The most notable occasion of a glut we had in the Chicago market in 1888 was on Saturday, May 26th. A train due here Friday at 6 A. M., consisting of some eighteen carloads of peas, beans, and kindred truck, loaded at points in Louisiana and Mississippi, did not arrive until Saturday morning. All orders for that class of goods are extra heavy on Friday for city retail trade, and on orders through the country up to a distance of 300 miles, or where it can be sent by freight or express in time for "Sunday's dinner." This trade was lost, for orders could not be filled. Hucksters bought sparingly of the goods left over from Thursday's receipts, and availed themselves of an opportunity to "sell out close." Deliveries of delayed goods were made on Saturday morning, and the local trade selected a fairly liberal portion of the receipts, but it lacked freshness and did not please the eye. By 12 o'clock buyers had supplied their wants and left the market, but it was full 2 P. M. before the last of Friday's receipts were unloaded and checked in. Then followed the delivery of Saturday's receipts proper, and this continued until it was after 8 o'clock when the last lots were invoiced. During the day offers of goods were made at all prices—anything for

a bid on the goods. Orders were "stuffed," "forced shipments" were made, telegrams sent in all directions to find an outlet, and every device known to the Chicago dealer to bring "fruit distribution" into active use was called into service. Yet, when the doors were closed at night, thousands of crates were piled up to lie over Sunday, which was one of the hottest of the entire summer, and on Monday morning they opened up, yellow, mouldy and decaying, to compete with fresh arrivals more than equal to all possible demand.

"To the dump" was the only possible outlet, and reluctantly the truck was carted out, leaving some receivers hundreds of dollars short on freight paid under their guarantee. In this case the actual damage could not be estimated, for the market never recovered from the slump in prices, and the crop remaining did not pay the charges of packing and transportation. In this instance, the cause of the glut was clearly the delay of Friday's train, increased by the fact that the particular day on which it did arrive made it impossible to move the goods, and the hot Sunday following completed the work.

The only other cause that can be enumerated among the causes of loss on account of over supply, especially as applied to fruits, is the prevalence during the ripening season of excessively warm weather, especially if accompanied by a humid atmosphere, which prevents the drying of the fruit, thus ensuring rapid decay.

Men cannot control the sunshine and the rain, and when these conditions prevail, the decay will be rapid, and knowing this, the grower forces the marketing of his fruits even in an unfit condition.

Twice the quantity will ripen in these hot, forcing days that would be ready for market with cool weather, and under these conditions it will decay twice as fast. It will thus be readily seen that it takes but a few days to pile up a surplus that will destroy the market. When the state of the weather is so oppressive and unfavorable as we mention here, *consumption is likely to be restricted*, and the elements of disorder, largely increased supply, inferior condition, and restricted consumption, either of which is sufficient to cause a derangement of the healthy tone of the market, have full play and combine to ruin all prospects of profit.

We have thus somewhat at length, named the cause of "Gluts in the Market," and have data for the theory advanced ready to hand furnished by experience. The "Remedy" to be suggested can only be briefly mentioned, for it is weak to suggest a remedy beyond the control of those engaged in the business.

The first point in the remedy we suggest is a careful gathering of information as to the condition of the crops, and of the supply from competing points. It is not so much what the main market on which you depend can do, as to be sure that some other section will not supply *a better article at a less cost.*

The farmer who grows corn in Florida could make a success of the business, but for the competition of the central Western States, and the grower of beans and berries, cucumbers and tomatoes, in Florida and Louisiana could soon be independently rich were it not for the fresher, better and larger supplies of his competitors nearer the great points of consumption.

When the competition reaches a point where your competitor has a decided advantage, a change is necessary. When the truck farmers of Virginia and Illinois are sending their supplies, by all means let Florida and Louisiana stop shipping the same varieties of fruits.

Again, when the first pickings are made, and the best are gathered and forwarded, use special care in forwarding the later portion of the crop to keep the inferior supplies at a minimum in quantity. In seasons and at times when atmospheric conditions, which are beyond your control, are unfavorable, use all possible caution and care to send only the best, and reject and retain all but your average quantity for shipment, and see that it is in the best possible condition when shipped. *When supplies are abundant, ship no inferior goods*, even though willing to accept reduced figures, for their influence on the market is not confined to their own quality, but extends to all grades.

Study well the problem of transportation, and to ensure the best condition, which is a

prime factor in the selling value, patronize liberally the means that will deliver the product in the best possible condition. Parsimony in this is "penny wise and pound foolish" with a vengeance. Time is a prime factor in the problem, and must be considered of the greatest importance. Bear in mind that *first class* service cannot be secured at *fourth class rates*, and in these days men cannot expect "something for nothing."

The merits of "refrigerator" transportation as compared with "ventilated" cars, we do not consider, except to mention the claim that is made by one line (that is this year a candidate for business in the West) that receipts can be held with safety if necessary in their cars for twenty-four to forty-eight hours after arriving at destination. The claim is based on experiments for a period of five years past, and the work of the last year in regular traffic. If this claim can be substantiated and made good, two important results follow. First, fruit and truck will retain their freshness two days longer, thus preserving them in good condition, and this secondly, will obviate to a certain extent the danger caused by delay in transit on account of accidents on the road. For if fruit can be held twenty-four hours after arrival, it follows that it will keep twenty-four hours longer on the road.

What is within the control of the shippers in shipping, or withholding in selection and rejection, will do much toward the prevention of gluts, and when intelligent united action is taken along the lines suggested, much of the existing evil will be avoided, and a remedy for the rest in some way provided.

[Accompanying the above paper the writers submitted an account of numerous personal transactions, to illustrate and sustain their conclusions.—SECRETARY.]

The Packing of Fruit for Market.

P. M. AUGUR, MIDDLEFIELD, CT.

The first consideration in reference to this matter is to have choice fruit to pack. In order to have good fruit there must be good trees, of such varities as the markets call for, properly cared for in regard to culture and pruning.

The trees, as soon as the fruit is fairly set, should be sprayed with *insecticides* and *fungicides* both. The requisites are to have smooth, uniform sized and well colored fruit, free from insect marks and fungus blemishes.

We must remember that no amount of skill in packing can make poor fruit any more satisfactory to the purchaser.

But having perfect, beautiful fruit, very much depends upon its proper handling.

Therefore, first, let the packages, whether barrels, crates, baskets, or boxes, be sweet, clean, neat and attractive.

Second, let the fruit in any and every package be uniform in appearance, size and quality, from top to bottom, from end to end.

Third, face the packages properly, not with specimens better than the average, but place them with care, so that on being opened the fruit will show to advantage.

Fourth, pack snugly, so that there shall be no jostling and bruising of the fruits rattling against each other.

Fifth, a most important consideration is to pack and ship fruits in the proper state of maturity, allowing neither too green nor overripe fruits to go to market. This is specially important with tender fleshed varieties. Overripe fruit of such varieties when shipped to distant markets is quite sure to entail loss upon both seller and buyer. Such fruits should be placed in home markets, with the slightest possible amount of bruising.

Experience should be the great regulator in these matters.

Fruits should be graded usually into Firsts and Seconds, but let both grades be such as you will not be ashamed of, such as you are willing to put *your brand on*, and remember that the packing of *trash* under any brand is sure to entail loss in the end.

Honesty in Packing Fruit.

E. WILLIAMS, MONTCLAIR, N. J.

Mr. President and Gentlemen:

I shall crave your indulgence but a few moments while at the request of your secretary I offer a few thoughts on the topic assigned me.

Among my earliest recollections of learning to write, the copy set for me by my teacher, more than any others that made the most lasting impression on my mind was this: "Honesty is the best policy," and my experience during a somewhat checkered life has only tended to confirm my conviction of its truth.

As I advanced from childhood to youth the phraseology was changed when applied to disputes arising in our games into "cheat in play will never prosper," and these maxims apply with equal force to all professions and pursuits.

I assume of course, that the advanced and foremost in the pursuit of fruit growing who compose this and kindred societies are too keenly aware of the importance of this matter to need any suggestions from me, and while I am not willing to admit that fruit growers as a class are less inclined to honesty than persons in other professions, I confess there is far too great a tendency among them in that direction for their own good or the welfare of their competing neighbors. This class, and they are largely in the majority, are not identified with organizations of this kind; they regard them with distrust; they are not among the readers of the horticultural papers; they do not believe in "book farmin'," and look upon those who do with a sort of commiseration, if not contempt. They occupy the missionary ground for work of national, state and local societies of this kind. Human nature has not materially changed since the creation, and the temptation that occurred in the Garden of Eden has been constantly repeated in various forms from that day to this.

The desire to trade and get gain is commendable, and has Divine sanction, but when inordinately developed, amounting to avarice, the possessor is very apt to step beyond the bounds of honesty.

An honest fruit grower will not fill his apple barrels with good fruit at the ends, and the middles with a poor and inferior article, if he stops to consider his own interests or has any regard for a good name. Neither will he put all his fine strawberries or grapes on top of his baskets, and the small and inferior ones at the bottom. The man who practices this deception under the idea that it is going to pay, is nursing a delusion and a snare not only to himself, but also to his more honestly inclined neighbor. And yet this is far too often the character of the fruits found in our markets. Those who practice these methods are ever ready to find fault with the prices, and charge the commission merchants with dishonesty, when they alone are the guilty ones.

The purchasers condemn the merchants for topping up the goods, which they are often compelled to do from the inferior quality of the article received in order to attract the eyes of a customer and effect a sale. It is this absurd and erroneous idea of fruit growers that anything will sell for something, and that something is clear gain, that does more to depress prices and lower the tone of the markets than anything else. There are too many farmers and fruit growers whose standing is far below par in their profession, and far too much fruit of the same character in our markets that never ought to have left the farm where it grew. It is these producers and their products with which the careful and conscientious fruit grower has to contend. The man who desires to build up a reputation and a demand for his products will be careful about grading his fruit and see that every package is of uniform quality throughout, and that every package of No. 1 fruit is what it purports to be, and his name on it is his guaranty to that effect. The purchaser or merchant when convinced that his mark can be relied on, looks for that mark; his customers are satisfied and call for more, and the demand keeps pace with the supply. Prices may not always be satisfactory, but he has the satisfaction of knowing that he at least is not contributing to an already depressed condition of the market.

The commission merchants are glad to have brands of this character; they can dispose of such fruit at better prices, with more satisfaction to themselves and their customers, and with less effort. That there are commission merchants whose honesty and methods are not above suspicion I do not deny, but my experience and acquaintance with them lead me to believe that among them are to be found as hon-

est and honorable men as in any other profession, certainly as large a per cent. as among the fruit growers; and those who are the most eager and ready to charge them with fraud need not often go beyond their own doors for the cause and remedy.

If growers could follow their own shipments to their destinations, and observe the time and condition of arrival, and the efforts made to dispose of them, they might learn lessons of real practical value—and one of these would be, that purchasers know a good thing when they see it, and can detect the attempt to deceive in a dishonest package quite as readily as the merits of a good one.

Besides the prevalent practice of dishonesty in the make-up of packages, there is probably no one avenue in which downright fraud is so easily and extensively practiced as in placing grapes on the market in an unripe condition. The fruit itself favors it. With the other fruits the eye is the expert detective. Not so with the grape. Appearances here are often deceptive, and this is the chief reliance. Sampling is the only true test, and this if indulged in to any great extent would soon render the package unsalable, so that the eye really governs the purchase. The intense eagerness to be first in market, and the insatiable desire for the almighty dollar while prices are high, induce a supply of this fruit in our markets weeks in advance of its maturity. A few purchases are disappointing; confidence is destroyed; prices are depressed beyond recovery, and the fruit is voted a fraud, as it really and truly is, and with many people all future offerings are regarded as of the same character. I have often heard people in passing through the markets remark, that they would really like to find some *sweet* grapes once more. In fact this fraud has been practiced so long and effectually, that many people have come to believe that the grapes of the present day are not equal to those formerly grown. I firmly believe that if grape growers could be induced to practice common *honesty* and *common sense* in this matter, they would be better off financially, and grape consumption would largely increase.

In my vicinity are two grape growers competing in the same market. One, whom I will designate as Mr. Smith, strives for quantity, and does not scruple to put his products on the market as soon as they are called for, even if not ripe, and the whole product goes as cut from the vines, with little attention to trimming and attractiveness of appearance, further than to see that nice clusters are on top of the package. He says it is the money he is after, and they can have the grapes green if they want them. The other, whom I will call Mr. Jones, is more particular. He refuses to gather his fruit till it is ripe. He also carefully trims out all green and decayed berries, and all stems from which the berries have fallen. He allows nothing but perfect clusters to go in the package of No. 1 fruit, and tells his commission merchant that he can warrant each package to be of uniform character all through. His name on it is his guaranty. His No. 2 fruit is unbranded, and is sold on its merits alone. The results are that his unbranded fruit has often sold for as much or more than Mr. Smith's branded fruit, and his No. 1 for much more.

The commission merchant, being the same in both cases, when asked how it sold, replied: "Such fruit would sell at any time, no matter what the condition of the market."

It is no trouble to sell first-class stock, because the market is not over supplied. The merchants like to handle it, and take pains and pleasure in endeavoring to get an extra price for it. It pays them to do it. Whether it pays the grower or not, I leave you to judge. Mr. Jones is well satisfied so far with his course, and has a clear conscience. The purchasers seem to be satisfied, as they cheerfully pay the extra prices asked and come back for more.

But a change of latitude occurs, and we are in fair Florida. Your chief fruit industry is raising oranges, an industry peculiarly your own. Are you more honest and less given to practicing the "ways that are dark and tricks that are vain" in the make-up of your packages? How many of your growers are particular in having every package of uniform quality throughout? Do you all get the returns to which you think you are justly

entitled? Have you any fault to find with the transportation companies? Is rapid transit a myth or a reality? Have you confidence in your consignees? How often do you change or divide your shipments with satisfactory results? I have heard rumors in the air since I have been in the state that would seem to indicate a negative answer to some of these questions.

I also find that the eagerness to be early in the market exists down here, for our New York market was more than supplied with unripe Florida oranges early in the winter, which the commission merchants told me were not wanted, and that they did not know what to do with them. I do not *know* whether the growers realized their expectations or not, but I *think*, as I do in respect to many of the apples and pears of our Northern orchards, that if they had never left the farms where they grew, it would have been a mutual benefit to all concerned, except possibly the transportation companies.

A year or so ago one of your orange growers visited his commission merchant in New York, and wanted him to explain, if he could, how it was his oranges did not sell for as much as his neighbor Brown's. He did not like to admit that Brown's fruit was any better than his. "Well," says the merchant, "I will tell you the whole secret. Mr. Brown has always been very particular in grading his fruit and putting it up. His No. 1 fruit is what it purports to be, in size, quality and appearance. He has succeeded in establishing for it a name and reputation which dealers have learned to appreciate. They look for and inquire for it, and often will take no other. If I tell them I have a lot of another brand equally as good, they are inclined to doubt it. I once had an order for twenty boxes of Brown's brand to send out of town. The case was an urgent one, and having none on hand, I filled the order with another brand I thought equally as good, and so advised my customer, but the whole lot was returned to me —they were not wanted. Again, you ship me, say, forty boxes. My customer examines three or four boxes and he finds two or three oranges in each box of second quality. He estimates the whole lot of like character, and makes his offer accordingly. If there is a second class orange in the box it is almost sure to be on the top. Sometimes in order to get what I really think they are worth I have to sort and repack the whole lot. In doing so I will probably get five or more boxes of No. 2 grade. These, of course, I have to sell for less money, which reduces the average.

Thus you see I must not only be able to guarantee my customers, but *convince* them that your fruit is in all respects as good as Mr. Brown's before I can sell it to them at the same figures, and when you put it up and grade it so I can do so, I can and will return you as good prices as I do Mr. Brown, which I would like to do."

This statement of the case carries its own moral. Remember, first, that the cost of the box, labor of packing and transportation is the same in the one case as in the other.

Second. That every box of No. 2 fruit reduces the general average of the whole.

Third. That appearance, quality and uniform size are all important passports to profit, and that *honesty is the best policy.*

Fruit Marketing and Fruit Exchanges.

A. M. BROWN, BALTIMORE, MD.

Mr. President and Gentlemen of the American Pomological Society:

The subject assigned me for this occasion, viz.: Fruit Marketing and Fruit Exchanges, embraces, in my opinion, the most important features of profitable fruit culture.

That I shall be able to offer a satisfactory solution to this problem would be a questionable assertion, but my purpose shall be served if when presenting to you such thoughts and suggestions as have been deduced from practical experience and observation, the subject will elicit such consideration from your society as will result in attaching greater importance to methods of marketing fruit and fruit exchanges.

Theory and practice combined, have made successful fruit production no longer a problem. The necessary conditions of soil, climate, manure and culture are well understood, and

scientific investigation has armed the intelligent fruit culturist with a thorough knowledge of the diseases common to fruits, as well as of destructive insects. Their prevention and cause, in fact all the elements entering into successful production, are so well understood by even the humblest of our calling that all the difficulties over which man has control towards successful fruit growing are removed, and fruit production has attained such proportions, that in this, as in other products of our country, we have the cry of over production on every hand. To this position, maintained by many eminent fruit culturists, I must take exception and assert that there never has been a surplus of fruit grown in this country at any time. Yea, more, the consumptive capacity has never been supplied, and is not likely to be in the near future, as the increase of population is in excess of fruit production.

To prove my position I need simply to make reference to the population of this country in the cities which are accessible to every fruit grower, and compare it with the largest amount of fruit ever yet produced in a single year, and it will be seen that a proportionate division would make of the most bounteous fruit crop a luxury instead of a staple article of consumption. There is no such danger yet as over production, and this brings us to the consideration of the first part of our subject: Fruit Marketing, which, it can be easily shown, is the one feature important and necessary to be thoroughly understood in order to place fruit growing on a more profitable basis than it is at present.

In order to market fruit profitably certain things are necessary. With these, overstocked or glutted markets will be unknown. The first is proper gathering—not green, and yet not fully ripe. There is a stage of ripeness that the careful and experienced fruit grower well knows. Too little importance is attached to this part of the work. The condition of the fruit when it reaches market is usually the unerring thermometer registering the degrees of ripeness at which the fruit was picked. Too often fruit is too much bruised in gathering; this must be avoided.

The second step towards successful marketing is the proper assorting and grading of fruit. There should be three grades, viz., selects, primes, and culls. The selects and primes should be sent to market and the culls should be thrown away or fed to hogs. The culls ought never be sent to market, as this is the principal cause of glutted markets even under present methods of marketing.

The third essential is package and packing. A clean package should always be used, neat and attractive in appearance, so that when the fruit is exposed to view it will present its most attractive appearance. Packages should be of uniform size. More injury to the fruit grower comes from the varying size of packages containing the same kind of fruit than many suppose. In my opinion the profits of the business would be largely augmented by a national law establishing a uniform package. None but those who have been upon the market as sellers can form any conception of the injury resulting from this varying in sizes of almost every style of package in which fruits are conveyed to market.

The fourth and most essential requisite to successful marketing is the matter of a market and proper disposition or sale; and in this is comprehended the work of fruit exchanges. Whenever the markets have been glutted it has been the fault of fruit growers themselves by the want of care in handling, grading and packing, and the want of proper distribution. The farmers and fruit growers are the only class of our citizens engaged in business enterprises that continue to produce year after year, taking apparently no regard for a market for their products, rushing pell mell into this market to-day, to-morrow into that, with no fixed purpose in view toward regulating the supply according to the capacity for distribution and consumption, taking comparatively little heed to the character of the men in whose hands their goods are placed for sale, what their charges are, what the cost of transportation is, or the character of the service given for such perishable products. All these things it is absolutely necessary to consider if we would make fruit growing in this

country the profitable business that it should be, and which it would be if there was united and harmonious action among fruit growers in establishing, maintaining and supporting Fruit Exchanges whenever necessary in this country. These institutions are entirely controlled by farmers; their object is to secure to growers and dealers the necessary facilities for the receipt, sale and transhipment of fruit and produce, and to encourage growers to adopt a better system of grading and improved methods of packing; to secure more prompt delivery, a more systematic distribution in the markets according to supply and demand; a more common sense apportionment of risk, and the supervision of the product by producers; to secure cheaper transportation, cheaper rates, more rapid transit, better service, etc.; also to regulate and equalize distribution as far as possible; to open up new markets; to sell and return to shippers the price for which their goods sell, deducting only the actual cost of handling, abolishing all cartage charges, selling at public auction to the highest bidder, and concentrating buyers and freights in order to secure good markets. These are briefly the objects of fruit exchanges, and if there was one established in every city in the union, controlled and run by the fruit growers themselves, the business of fruit growing would be placed upon a far more permanent and profitable basis than at present.

The Baltimore Fruit and Produce Exchange, established last April, handled over 30 per cent. of the fruit coming to this market. After the exchange opened for the transaction of business, August 1st, we sold fruit at 3 per cent. commission charges, commission men charged 10 per cent.; we made no cartage charges, commission men charged 5c per package; we sold at public auction and had competition in purchasing, so that after we had been fully established, fruit sold by the exchange netted the grower 10 to 20 per cent. more than goods sold in the same markets by individual dealers. The exchange returned the actual amount the goods sold for, less commission and freight. It is too much the practice among commission dealers to take the consignor's goods into account and return a price out of which they deduct commission, freight and cartage and return the balance, and then sell the consignment at a price above that returned and pocket the difference. I have no desire to create doubts in the minds of any one as to the honesty of his commission merchant. There are honest men in this business as well as any other; but I speak of this method of making returns as a practice. What I wish to impress upon you, gentlemen, is the fact that with the proper distribution of your fruit crop, its economical sale and handling in the markets, proper transportation facilities afforded, together with proper picking, grading and packing, fruit-growing is the most profitable business that you can engage in. And these things can be accomplished through fruit exchanges, organizations instituted for this express purpose, and through which and by which alone you can secure that co-operation and united systematic effort that is necessary to improve the business of fruit growing.

The Delaware Fruit Exchange.

WESLEY WEBB, WILMINGTON, DELAWARE.

The original plan of the Delaware Fruit Exchange contemplated its establishment in Wilmington, Del., which stands at the head of the Delaware and Chesapeake Peninsula. It was to be operated as a joint stock company; stock was to be sold in shares of $50.00 each, and annual active membership fees were to be $10.00.

To buy or sell through the Exchange, one must be an active member, but not necessarily a stockholder.

The fruit was to be inspected at the various railroad stations, by sworn inspectors, who should designate its grade. Three or four well defined grades were to be established. This inspected fruit was to be loaded into cars and as soon as a car was filled it was to be reported to the headquarters of the Exchange, by telegraph, giving the car No. and the number of baskets of each grade and of the various varieties contained therein. When so reported, it was to be sold by auction to the highest bidder; for here buyers from all quarters were to be gathered.

This was some eight years ago, and at tha

time sufficient co-operation could not be obtained to warrant its establishment at Wilmington. But Wyoming, Kent Co., Del., was in the midst of the finest peach section on the globe, and the fruit growers opened their eyes and established their Exchange at that point. A canvass of the North, East and West, was made; buyers came, fruit was sold, by auction, having been inspected under the eyes of the buyer, by having a basket or two of each wagon load emptied when required.

To this point 300,000 baskets of fruit could be brought in wagons during the season; as many as twelve or fifteen cars being shipped in a day.

The Exchange placed officers and clerks in the exchange building, and with them the buyers deposited their money in the morning, the clerks taking account of all sales, paying for the fruit, and returning to the buyers, whenever demanded, any money not paid out. The Exchange charged the seller one cent per basket for selling the fruit and the buyer $5.00 per car for loading it.

The plan worked admirably so far as it went; but it did not extend its full benefits to growers at a distance from the seat of its operations.

In 1886 branch exchanges were organized, the plan being to place an inspector and a clerk at each station, where an organization could be effected, to load the cars and report by telegraph to the headquarters of the Exchange, and then offer the car for sale by auction to the highest bidder. But the centre of the fruit crop that year was in Kent Co., Md.,—the crop being a failure in Delaware,—and Still Pond was the point where the fruit could be gathered in large quantities, coming in wagons and boats. So the Exchange was operated at Still Pond, a large number of buyers being present. Here again it proved a success, but the branch exchanges did not go into operation.

In these years the price of fruit at the Exchange was perhaps 25 cents per basket higher than elsewhere on the Peninsula.

During this time some changes had been made. The number of shares of stock had been increased five fold and the price per share reduced accordingly - to $10.00 per share. This was to secure more stockholders and consequently the co-operation of more fruit growers. The $10.00 annual membership fee was abolished, so that any one could buy or sell through the Exchange.

In 1887 the peach crop was limited chiefly to the vicinity of Milford, Del., and here the growers operated on the exchange plan. In 1888 the crop was general and several branch exchanges were operated under the direction of the parent exchange at Wyoming, but each one was local in its operations.

The success of each branch was about in proportion to the amount of fruit it could command, for the more fruit it had, the more buyers it could secure, and hence the greater the competition, the greater the demand for fruit, and the higher the price.

Meantime the Fruit and Produce Exchange of Baltimore had been organized, and handled in 1888 quite a part of the peach crop of the Eastern Shore of Maryland, especially that part along the Chesapeake Bay and the rivers emptying into it.

Every year during this time a canvass has been made among the commission merchants and fruit dealers of the North, East and West to induce them to come to the Peninsula and buy fruit here, rather than depend upon receiving shipments to be sold on commission.

The beneficial results of the Exchange may be summarized as follows:

1st. The farmers have received pay for their fruit at home, thus avoiding all risks in shipments, loss on account of delays, bad markets, and danger of loss from dishonest commission merchants.

2nd. They have received a higher price for their fruit, because it has been better picked and better assorted, for a man will not take unripe or "deaconed" fruit to the auction stand when he is sure it will bring only half price when exposed to the eyes of the buyer.

3rd. Better and more rapid train service; for what individual growers could not accomplish, became easy when the united voice of the growers, with the endorsement and help of the united buyers demanded it, and was secured as soon as this voice was clearly heard.

4th. Cheaper freights; for buyers generally got large rebates from the regular price; and so could afford to pay that additional amount to the growers.

5th. A wider distribution of the fruit; for buyers from cities scattered all over the eastern United States came among the fruit men and shipped peaches regularly to the houses at home, whereas they had previously depended upon the uncertain supply sent on consignment or purchased from dealers in large cities.

6th. The fruit reached market in better condition, because it was sent direct instead of being sold and reshipped, by express perhaps, from New York, Philadelphia, or some other large market; and a still more potential reason, it left home in good condition, inasmuch as it was virtually picked and loaded under the eye of the buyer.

7th. Gluts have been largely avoided, for men would not buy here more than thay could sell in their market; and the more general distribution of the fruit drew the surplus away from the great markets. Then at the close of the day, those who had bought and shipped carloads would learn to what market the most fruit had been consigned, and would frequently be able to change, by telegraph, the destination of their cars to some city that had received a scant supply.

But the Delaware Fruit Exchange has never carried out its original plan of gathering the buyers at one point on the peninsula where the fruit could be sold in car lots by auction, being reported by telegraph. But events have by no means demonstrated that this cannot be done. Rather they are pointing to this as the best and final solution of the great question of the co-operative marketing of our peach crop. The one thing wanting has been the full and hearty co-operation of all growers. The officers of the Exchange have until now, managed it solely in the interests of all the producers of peaches who could understand and appreciate the advantages it offered. They have given their time to it without compensation. They have not managed it with a view to making money for the Exchange, but rather for the fruit growers in general. As a consequence its stock hardly has a market value. Those who hold it or who may purchase, do so in order to get a better price for fruit, and not for expected dividends on the stock. The disadvantages, attending such an organization, are obvious; and plans are under contemplation now for raising enough funds to operate it on its own merits as a stock concern, just as any other business enterprise is managed.

To make it successful on this basis will require that it offer facilities to buyers that they will be glad to have; and offer to producers a method that shall be safer and more profitable than consigning their fruit to commission merchants in distant cities. This can readily be done, as past experience has shown. It will be necessary only to induce a large number of buyers to locate at the most convenient point near the head of the Peninsula, and then place a competent man at each railroad station to inspect the fruit and superintend the loading of it into cars. Buyers will soon learn the quality of the fruit from the several stations and will bid for it accordingly. The producer will know as soon as the fruit is sold what he is to receive and that the money is already in the hands of the treasurer of the Exchange. He had the privilege of putting his own bid upon it, and if the offer is below this price he can ship it on his own account. When the car contains the fruit of several growers, as it generally would, they can have a general understanding among themselves, and with the agent of the Exchange, as to the price they would be willing to accept.

It will be sufficient to say in conclusion that the shrewdest and most experienced business men among the stockholders have entire confidence that the Exchange can be thus managed so as to afford buyers the facilities they require, insure them good fruit well loaded, insure the producer satisfactory prices, and at the same time realize a handsome dividend on their own investment of money in the Exchange as a stock company.

Wilmington, Del., Feb. 7, 1889.

American Fruits in Foreign Markets.

Dr. Henry Foster, of Clifton Springs, N. Y., and Oviedo, Florida, who has extensive orange groves at the latter place, was to give a talk on the above subject, but was prevented from doing so by ill health. He was represented by Mr. J. H. Lee, who gave a brief account of the moderately successful attempts to introduce Florida oranges into European markets. One of the advantages of a foreign market is that it lessens the pressure on the home market in seasons of abundance, thus equalizing prices. With a direct line of steamers from Florida to Liverpool, Mr. Foster believed that a successful foreign market for oranges might be established.

Mr. T. W. Moore said that mildew had been unusually troublesome the past season, but that he had succeeded in preventing it from attacking his fruit by fumigating the boxes with sulphur.

For information on a foreign market for apples, the reader is referred to the paper by Mr. Woolverton on the commercial orchards of Ontario.

SUB-TROPICAL FRUITS.

[Under this heading are placed papers upon all fruits adapted to the extreme southern States. The Sub-tropical portion of the program was in charge of Mr. A. H. Manville, chairman of the Sub tropical committee, and most of the papers were published at the close of the meeting in the *Florida Dispatch Farmer* and *Fruit Grower*.]

Report of Sub-Tropical Committee.

To the President and Members of the American Pomological Society:

GENTLEMEN: At our last meeting, in Boston, two new committees were constituted, the Sub-Tropical Committee and the Florida Fruit Committee, the former a standing committee, the latter a special committee appointed because the next meeting of the Society was to be held in this State. Owing to unavoidable circumstances the Sub-Tropical Committee's report at this meeting must be confined largely to Florida. The work of these two committees necessarily covers to a great extent the same ground, and as it is an initial report for both, they desire, with the consent of the Society to submit a joint report.

In announcing the appointment of the Sub-Tropical Committee, President Berckmans said:

"This committee was added to the working plan of the Society, the importance of the production of the sub-tropical fruits in the United States having need of such recognition, and I am sure that through the faithful labors of that committee much progress will be made in the cultivation of those fruits."

The reports of the California members of the Sub-Tropical Committee, and of other gentlemen who have in response to our request prepared matter for our report for the Sub-Tropical region west of the Mississippi river, have not arrived. We have received a partial report for the Gulf States from Louisiana eastward to Florida.

Edgar L. St. Ceran, member of the Sub-Tropical Committee for Louisiana, referring entirely to Citrus fruits, writes as follows: "Small groves of orange trees are scattered all over lower Louisiana. The infallible orange region extends for about fifty miles along the Mississippi river, ending at the "jump," five miles below Fort Jackson. From the great grove on Gov. Warmoth's famous sugar plantation, Magnolia, there is a continuous growth, a literal forest of orange trees, lining the banks of the Mississippi river for a distance of thirty miles.

"The freeze of January, 1886, was unprecedentedly severe, the thermometer dancing between 16 degrees and 20 degrees above zero for thirty-six consecutive hours. The damage to citrous trees generally was not as great as at first apprehended. Of course the northern parishes in our citrous belt suffered severely. In Plaquemines parish the citrous trees fared better. The injury there consisted in the killing back of the new succulent growth to two year

wood, and complete defoliation; sickly trees all perished.

"'The true orange belt' in Louisiana is found in Lower Placquemines. This favored parish, jutting out peninsula-like into the Gulf, is the Eldorado of the orange grower. Here are combined all the advantages of latitude, soil and climate. Oranges grown in this section are ready for market from four to six weeks in advance of the crop from Northern and Middle Florida, while the California article crosses the continent in February and March. Thus it will be seen that Louisiana stands the peer of all competitors as regards earliness. The soil is an alluvial deposit from the Mississippi river, and richer by far than the famous Nile.

"The entire Louisiana crop is sold on the trees, an immense advantage over the other orange producing sections of the United States. Oftener than not the year's crop of oranges is sold for cash in the bloom, in the spring. Crops are sometimes purchased on a speculation three years ahead. A hundred acre orange grove on the lower coast last year had its prospective crop for the year, sold for thirty thousand dollars last winter, before a bud or blossom had appeared on the trees.

"Thus the lower coast of the Mississippi river is the most advantageous locality for orange growing in the world; it raises more to the acre than any part of North America, and it gets a better price for its products directly on the trees, without one cent's cost of gathering or harvesting and without one cent to pay for freight, commissions, insurance, and a half dozen other charges, which form a heavy tribute to be paid by the orange growers of less favored localities and regions."

Prof. J. P. Stelle, of Mobile, at the request of the committee, sends the following for the coast region of Alabama:

"A good deal of interest is being taken in the LeConte pear and its near relative, the Keiffer, but this covers about all there is to report. A considerable acreage is being put in these pears, and though interest in these fruits is of recent origin, there are nevertheless some orchards in bearing, and these are showing well, and giving quite general satisfaction.

"Other common tree fruits are cultivated here and doing well under intelligent management, as the peach, the Bartlett, and some other pears, several varieties of the plum, quince, most of the early apples, and so on.

"The peach can be made a grand success here, but we have learned from sad experience that our success cannot be attained with the usual popular named varieties grown at the North. Years ago this region was famed for its great abundance of fair quality peaches, but later, when progressive pomology had attempted to give us better fruit by introducing the fine Northern varieties and working out the old seedlings, our peach culture speedily ran down to decided unprofitableness. Now we are falling back to the old sorts, and these, with a few kinds introduced from warm countries abroad, are beginning to give us peaches once more. As yet few people among us are attempting to grow peaches for profit, on a scale that could be considered even reasonably large, but since there are persons now interesting themselves in seeking out and propagating the best varieties of the old-time sorts, there is good reason for promising ourselves that peach culture will ere long receive such fresh stimulus in Alabama's coast belt, as shall make peaches, even first class peaches, take rank as among our most prominent products.

"The fig grows to perfection here, and yields enormously. At present it is receiving a good deal of attention.

"A few years back, before the winter of the great freeze, orange culture was engaging the earnest attention of many along our immediate Gulf coast. But the freeze destroyed all the groves, and at the same time seemed to freeze out all the interest in the industry. The production of no other strictly sub-tropical fruit has ever been attempted here for profit.

"A few of the common small fruits do well in the coast belt of Alabama. The black-cap raspberry gives fair satisfaction under good management, and all the finer blackberries are a splendid success, although not extensively grown. Strawberries are perfection itself. The crop is produced on a large scale by our market garden-

ers, and mainly put upon the early Northern markets.

Many varieties of the grape succeed well throughout the coast belt. The Scuppernong is more extensively cultivated than any other; perhaps it is the only grape employed as yet in the production of wine. Of the bunch grapes, the Concord seems to be receiving more attention than any other variety."

FLORIDA.

Within the limits of the State of Florida, the changing conditions of soil and climate, as we proceed southward, give a wide range of productions, embracing many of the hardy fruits and annuals of the Northern States in the northern tier of countries, but become purely tropical in the extreme South. It will be convenient in treating of the Pomological resources of Florida to divide the State into three geographical sections, producing respectively hardy, semi-tropical and tropical fruits.

The Northern Fruit District.— North of a line drawn across the State from Cedar Keys to the bend of the St. Mary's river, soil and climate approximate closely those of the coast line of Georgia, Mississippi, and portions of Southern Texas. Here great progress has been made in the culture of the peach, pear, and plum. Some of the lands of this section, especially those with a clay subsoil, have proved the veritable home of the peach, but the standard Northern varieties have been largely discarded in favor of the Oriental strains, and new and improved varieties and crosses between the Peen-to and Honey are being rapidly produced and propagated. Some of the old native varieties have been rescued from the neglect into which they had fallen, and promise to substantially reward the attention bestowed upon them.

The apricot, but not the nectarine, is recommended for further trial.

The newly introduced Oriental plums, of which the Kelsey is the first representative in this country, are believed to have great value for this State; the Kelsey has already proved so, the Botan, Blood plum of Satsuma and others promise well or better, but have not been long enough in cultivation to give assured results.

The LeConte and Keiffer pears are as successfully cultivated here as in other parts of the Gulf coast, and extensive orchards have been planted.

In grape culture the experience of the past few years bids fair to remove the prejudice against the American vines grown in the Northern States, early experiments with most of which prove failures. Certain varieties, among which the Delaware is prominently mentioned, are now grown with success at various points in the northern counties.

The Scuppernong, which reaches its southern limit only in the tropical portion of the State, is much more extensively grown than formerly, and its value as a wine producing grape is fully recognized. The progress of the wine industry has already passed out of the domestic stage and attained a commercial importance, the rapid growth of which seems assured.

Of small fruits, only the strawberry is cultivated for market, and its cultivation is on the increase under the impetus of better transportation facilities, and particularly the business enterprise of certain Eastern dealers in this fruit, who are providing the growers with refrigerators and other conveniences for the safe marketing of their crops. The lands are equally well adapted to the culture of the blackberry, and one variety of the raspberry, Cuthbert, is known to produce well.

The pecan makes remarkably thrifty growth, and bears abundantly, not only in this district, but also southward far down the peninsula. The raising of the nuts for market is strongly recommended, and greatly improved varieties are being offered by nurserymen for this purpose. The planting of trees for home consumption is constantly increasing, but thus far few groves of large extent have been set out.

The English walnut has been fruited, but its value to this region has not yet been fully ascertained.

The Orange and Sub-Tropical Districts.— From the northern fruit region in which the peach and the LeConte pear are most at home, southward to the 28th parallel of latitude, in fact in the great body of the peninsula of Florida,

the cultivation of citrus fruits has been and is still the absorbing industry. Within this region, in all sorts of soil, in all sorts of situations, the orange thrives and grows like a native weed. Here the tree attains its largest size and most perfect development. Every new introduction from abroad is improved in quality and flavor of its fruits, and native seedlings yearly contribute new and valuable additions to a long list of varieties, some of them rivaling the best productions of other and older lands.

In many countries, less favorable to the orange, the imperfect ripening of the fruit tends to produce a sour orange, and discriminating growers are limited in their choice of varieties to those which produce the most saccharine fruit. The juices of such fruit in Florida become sugary in sweetness, while more acid kinds, unserviceable in many regions where the orange is grown, develop a vinous flavor and boquet which is prized by experts as the highest type of excellence.

With climatic conditions favoring the development of every known variety of the orange, a great impetus has been given to the introduction of novelties from abroad and the propagation at home of the most profitable and desirable sorts for market.

The popularity of the Navel in California has called wide spread attention to this variety, and has raised its price in the Northern markets, as the knowledge of its excellences became more generally recognized by consumers.

Special requirements of the trade are rapidly solving the questions of relative values commercially of the Tangerine and Mandarin, and in some cases a tendency to over production of such marked varieties has been checked by the fluctuations of the market.

The subject of early and late fruit has received much consideration. The respective advantages of each in different sections of the orange belt is well shown in the essay of Hon. C. F. A. Bielby.

The Florida seedling, unbudded, has its advocates for grove culture, and it is claimed for it that it produces the finest and longest lived tree, the best bearer in the long run, and satisfactory, if not the best fruit. But the weight of opinion, and the almost universal practice in the older parts of the field, is to bud with known and approved varieties as furnishing the only guarantee of excellence and giving the quickest returns in fruit. The native seedling naturally constitutes the source from which in the past most of the budded stock of the State has been derived, and the numerous varieties having this origin form a very distinct group or family, at the head of which in point of excellence may be mentioned the Dummitt, Madam Vinous, Homosassa, Cunningham and Centennial. The Early Oblong family, of which the Sweet Seville is the type, offer a desirable quality in the early ripening of the fruit, and the Tardif or Hart's Late prolongs the marketing season into late spring or early summer. The pre-eminence over all varieties belongs to the imported Malta family, of which are the Jaffa, Majorca, Blood Oranges, Maltese Oval, and Mediterranean Sweet, the last two nearly identical. The members of this family are distinguished for delicacy of pulp and texture, thinness of rind, and include variations of sweetness and flavor suited to all tastes.

Next in importance to the Orange the Lemon claims attention, and it is the opinion of not a few authorities that the growing of the latter will prove more profitable than the former. Although in the more northern portions of the State the lemon trees were badly decimated by the freeze of 1886, and their cultivation in some localities checked in consequence, in the southern counties the damage did not prove irreparable. The planting of lemons has steadily increased since that time. Substantial progress has been made in the knowledge and choice of varieties and the proper harvesting and curing of the fruits that from the unsaleable product of a few years ago the Florida lemon has risen in value in our markets until it now leads all competitors.

Curing houses have been established at the North to which the grower may send his fruit to be prepared for market if he desires to be spared the labor and trouble of curing it himself and to save himself the expense of a plant. Three standard varieties may be men-

tioned as general favorites, the Bellair, Villa Franca and the Sicily, but the varieties best adapted to particular localities have hardly as yet been determined.

The Pomelo (Grape Fruit).—This fruit has quite recently conquered a market for itself in the North, and now begins to appear in company with the orange on fruit stands in New York and other Northern cities. Its cultivation cannot fail to be greatly increased in consequence, since it has always been a home favorite and widely grown for local consumption. Many varieties are known to exist throughout the State, most of the fruiting trees being seedlings of local parentage. Improved varieties are demanded, and will certainly make their appearance. The few importations that appear in nursery catalogues have for the most part not been fruited.

The Lime is less extensively cultivated than it deserves. Seedling plants are grown throughout the orange district, and produce abundant fruit for home consumption. Small quantities of inferior quality are sent to market, and of this the greatest part goes from the Keys and the lower East Coast. The Tahiti is a large and greatly improved variety. Many other varieties have been so recently introduced that their merits have not yet been made known.

A great number of minor fruits of the citrus family have been introduced and are sparingly used in making preserves for domestic use. Of these the Citron is best known, but the variety commonly grown is inferior and of slight commercial importance. The better varieties are little disseminated.

The Shaddock is only raised as a curiosity in Florida. The best known kinds have little or no value as edible fruits; the Whittaker Shaddock is, however, a good and palatable fruit.

The Kumquat, a diminutive Japanese orange of great value for preserving, is already at home in many gardens and collections of citrus plants, and is fully worthy of more extensive cultivation. The fruit is not unlikely to prove acceptable at the North.

The Otaheite, the Bergamot and the Trifoliata emons are very peculiar species, found only in collections of plants. The fruit of the first, together with that of numerous varieties of the sour and bitter-sweet orange, are used in marmalade.

As several papers on the Grape in Florida will be read before the Society, very little need be added to what has been said in treating of this industry in the northern portion of the State. Several varieties from the vineyards of the Northern States are understood to succeed in Southern Florida. The European grape has been the subject of numerous experiments, most of which have resulted in failure. Success in its culture has been at last announced near Waldo, at Eustis, and a few other points. A native species (*Vitis coriacea*), producing a palatable fruit, with a berry as large as the Concord, has been discovered in the vicinity of Tampa, and, although only a few individual vines have been brought into cultivation, its appearance has excited great interest among experimental horticulturists in that part of the State.

The Fig.—This is considered by many a profitable fruit to raise in Florida, and factories are being erected over the State to put up guava jelly and fig preserves.

There are many varieties cultivated in the State, the most promising at present being the White Adriatic. This fig was introduced from Smyrna by way of California, where it is highly spoken of as a drying and preserving variety. The fruit is large, of a gray-white color, the meat being of a bright pink shade. Other varieties that promise well are Foundling, White Smyrna, White Genoa, Brown Turkey and Celestial or Sugar fig. The cultivation of the fig is very simple, the most important point being not to plow too deeply near the tree. On the pine lands of South Florida they require the same cultivation and fertilization as the orange, but seem to do equally well in Northern and Western Florida with less care. At present the northern portion of the State is undoubtedly adapted to the culture of this important fruit, but it has not proved so much of a success in the orange belt. With the advent of other varieties, such as White Adriatic, etc., this may be

changed, as a single tree of the latter variety, two years of age, bore at Eustis, 1,000 figs.

The Loquat.—(Also known as Japan plum or Medlar)—This fruit was introduced into Florida several years ago, and has been widely disseminated over the State. Along the St. Johns and in some places in the interior where it has been planted for market, it has proved quite profitable. It is susceptible of great improvement by selection of varieties and grafting the same on seedlings, or, as is done in California, on quince roots. The Giant Loquat was introduced from Japan in 1886, but has not been fruited yet. It is said to be larger and better than the common kind. The Loquat delights in a rich moist soil, but fine specimens can be seen on the pine land soils all over the State.

The Kaki.—The culture of this fruit, commonly called the Japan Persimmon, has passed out of the realm of experiment. Our knowledge of the varieties and their proper uses is still far from complete, but great progress has been made. In color and appearance some of the varieties may be said to be the most gorgeous of any fruit in existence, and its flavor is not far behind its appearance. Its introduction into Florida marks an era in the history of fruit culture in the State. There is little doubt that the market will increase with the production.

The Guava, notwithstanding the tropical character of the plant and its inability to endure more than ten degrees of frost, is a favorite domestic fruit in most gardens throughout the orange district. When frozen down the plant soon restores itself and heavy crops of fruit are obtained the second season following a disastrous frost. The Frost Proof, or Catley guava, owing to its superior hardiness is much cultivated in districts subject to annual frosts.

The Olive.—Trees of the olive grow rapidly and luxuriantly in all parts of Florida, but they seldom come into bearing at the early age reported in California. Some varieties, however, have been known to produce fruit in four to six years. In Spain the age of bearing depends upon the size of the cuttings from which the trees are propagated. At Fernandina, from the famous old trees at Dungeness, fine fruit is obtained every year. Some thousands of young plants are set out annually by way of experiment or in the hope of future returns in fruit, and varieties with foreign names, but of whose qualities little or nothing is known, are readily sold by nurserymen. Trees of ten to fifteen years' growth are frequently to be found producing flowers, but still in the adolescent state and setting no fruit. Much older trees are to be found which bear crops of inferior fruit, and belong in all probability to worthless and undesirable kinds.

The culture of the Date is in very much the same state as that of the olive, although it is not as extensively grown as the latter. Scattered plants, mostly very young, are found here and there in gardens throughout the State. Except in the case of a few trees in the extreme south, no edible fruit has been produced. The fruit from trees at Tampa and other points around the lower coast is pronounced good. Old trees at Mandarin produce worthless fruit, which, however, is ripe enough to germinate. Many old trees are barren for want of fertilization, as the plant is dioecious. Fertilization is accomplished artificially in some date bearing countries.

The Carob (*Ceratonia siliqua.*)—This plant, a native of the Mediterranean, produces edible pods, which are used chiefly as a food for stock, but are not unpalatable, and have the flavor of gingerbread. It is widely exported and used in all parts of Europe as well as in some parts of the United States, and as a food for horses and mules would be invaluable in Florida. The trees grow well and reach a large size here. They have been fruited in one or two places in the orange district, but are as yet little known although well worthy of general cultivation.

Downy Myrtle. (*Myrtus tomentosus*)—produces red fruits of the size of large gooseberries, having an agreeable sweetish taste. The tree bears in its third year, and is very prolific. The fruit is preserved in a variety of ways. The northern limit of its production thus far has been Federal Point, Putnam County.

The Chinese Leechee or Litchi, (*Nephalium Litchi*)—a famous Chinese fruit introduced

within the last five years at different times. As the tree is hardy and productive at an early age it will be propagated and planted everywhere in the State. The dried fruit is called by some "date-prunes."

The Jujube. (*Zizyphus injuba*)—This hardy plant is of small commercial value, but aside from its usefulness as a hedge plant, the pleasant sub-acid and mucilaginous fruit is an admirable adjunct to our household resources for the making of jellies and kindred sweetmeats. The plant grows thriftily in our lightest soils, and should be more widely known and propagated. It is perfectly hardy in this State and northwards along the Atlantic coast to the Carolinas.

The Tropical Region. From the 28th parallel southward, most of the arable lands are found upon the Keys and comparatively narrow strip of territory along the Gulf and Atlantic coasts. In this region the Pine Apple and Cocoanut are of chief commercial importance and form the main reliance of the population. The native fruits of this region are few and mostly of slight importance except for home use, but many of the best productions of the tropics have been grown and fruited by resident horticulturists. A very complete essay on this subject has been prepared by Mr. E. N. Reasoner, of Manatee, and will be submitted to the Society. Contributions to our knowledge of pineapple culture by Rev. J. H. White, of Georgiana, and Mr. Thos. E. Richards, of Eden, have been incorporated in Mr. Reasoner's paper.

The following account of the tropical plants that are grown or have been introduced and fruited in this State, has been prepared at the request of the committee by Messrs. R. D. Hoyt, of Bay View, and E. N. Reasoner of Manatee. For convenience an alphabetical arrangement of the plants considered has been followed, rather than one that would emphasize the relative importance of each.

The Anonas constitute a very important family of fruit plants for the extreme southern portion of the peninsula, and the income derived from their sale by the inhabitants of the Keys, is to them quite as important as that from any of the small fruits grown in the northern part of the State is to the growers there.

The principal varieties grown are the Sugar Apple (*A. squamosa*), of which more are grown than all others combined, as it seems to be most in demand in the markets of Key West. The Cherimoya (*A. cherimolia*) has for some unaccountable reason been much neglected. The fruit is much larger than the foregoing, and fully better in quality.

The Sour Sop (*A. muricata*) is grown to some extent. The large acid fruit is much esteemed, and is used for making cooling drinks, and is an important adjunct to the sick room. Of the Custard Apple (*arliculata*) there are few trees fruiting in the State, although it is worthy of more extended culture.

Alligator Pear (*Persea gratissima*) is grown to quite an extent on the Keys, on the mainland as far up as Tampa Bay and on the west coast, and extensively along Indian River and southward. The fruit ships well, and has become quite popular in the New York market, where it sells for high prices. The tree stands light night frosts without injury.

The Bengal Quince (*Eyle marmelos*), a low tree from India, nearly related to the citrus, has grown fairly well, but has not yet fruited. Recommended for trial in frostless regions.

Banana.—The various species of *Musa* are at home in the lower portions of the peninsula. Several varieties are grown, but owing to the high winds which prevail along the coast and to the fact of heavier production, the only variety grown to any extent is the Dwarf (*M. Cavendishii*). The Orinoco is quite hardy, and has produced fruit as far north as the Georgia line. Hart's Choice, Red Baracoa and Dacca are other varieties of great value. The banana, though tender as regards frost, is successfully grown for home use, and for market all over the citrus belt of Florida.

The Bread Fruit (*Artocarpus incisa*) has never been planted to any great extent. It would probably prove valuable for cultivation on the Keys if introduced.

The Cashew Nut (*Anacardium occidentale*) has never been introduced to any extent, and is grown more as a curiosity than for its fruit.

The Ceriman of the West Indies (*Monslera*

deliciosa) has produced fruit, and should be more generally cultivated in all regions free from injurious frosts.

The Cocoanut.—The well known fruit of the Cocoa Palm (*Cocos nucifera*), extensively cultivated both on the reef Keys and coast of the mainland on both sides of the peninsula, extends to, or somewhat north of, Lake Worth on the east, and to Charlotte Harbor on the west side. Probably little care has been exercised in the selection of varieties, and many small and inferior nuts are the result.

Egg Fruit (*Lucuma rivicosa*, var. *angustifolia*).—A good table fruit, grown as far north as the twenty-eighth parallel, and enduring light night frosts without injury. Not cultivated to any extent, which is probably due to the difficulty of obtaining plants.

Granadilla.—The fruit of several species of *Passiflora*, is known under this name, the best of which is *Passiflora edulis*, which might more properly be classed among the semi-tropical fruits, as it will endure several degrees of frost without injury. *P. quadrangularis* is also an excellent fruit.

Guava (*Psidium-guayava*).—These are divided into two classes, the summer, and late ripening, or winter. Of the former there are as many varieties almost as there are trees, varying widely in shape and in color of both skin and pulp. Poor fruit is largely in the majority, and only layers or cuttings from the best trees should be planted. The White Winter, on the contrary, reproduces itself from seed, and for canning is the best fruit. Both make an excellent jelly, and there are several firms in the State engaged in its manufacture for export.

The Jack Fruit (*Artocarpus integrifolia*) has not been fruited here to our knowledge. Recommended for trial in the extreme southern portion of the State.

Mammee Apple (*Mammea Americana*) is grown to some extent on the Keys and should be more extensively cultivated as far North as Charlotte Harbor. The fruit meets with ready sale in the principal cities of Florida, large quantities being imported from Havana.

Mammee Sapota (*Lucuma mammosa*).—Not grown to any extent, although the fruit is in demand at good prices. Has fruited as far north as the Pinellas Peninsula.

The Mango (*Mangifera Indica.*) This fruit is very extensively grown throughout southern Florida. The industry promises to be a very remunerative one, as the fruit carries well to distant markets, and meets with a ready demand whenever introduced. The home consumption is also large, and the many uses to which the fruit may be put renders its over production almost an impossibility. The best new Indian sorts are Apricot, Julie, D'Or, Freycinet, and varieties of apple-shaped fruit. Of the East Indian, of which few are growing, the Bombay, Large Malda and other very late varieties are the best. These are grafted on the common seedling tree.

Otaheite Gooseberry (*Cicca disticha.*)—Of value for home consumption, the fruit making a good preserve.

The Pawpaw (*Carica papaya.*)—Several varieties of the same general character varying in size and quality. Of value for home use, but not adapted to general cultivation.

Sapodilla (*Achras sapota.*)—One of the most valuable of tropical fruits, grown to some extent on the Keys and on the main land of the southern part of the State, and will succeed in regions where occasional frosts may be expected. Recommended for more extensive planting.

Spanish Lime (*Melioca bijuga.*)—Of value for home consumption only. The thin acid pulp surrounds a large seed, which may be roasted and used as chestnuts.

Jamaica Indian Sorrel (*Hibiscus sabdiriffa.*)—Not a fruit but the calix of the flower used as a fruit, making a very superior jelly, which if properly placed on the market would meet with a ready demand. The plant is an annual and produces also a valuable fibre, the Rosselle hemps of commerce.

Tamarind (*Tamarindus Indicus.*)—Well adapted to cultivation here, but grown only to a limited extent. The fruit preserved in sugar meets with ready sale in the markets of the South, but nearly all that is used now is imported from the West Indies.

Tropical Almond (*Terminalis catappa.*) A great many are growing in Key West, where the fruit is used for home consumption, it has no particular commercial value.

Chinese Guava (*Psidium Chinensis*).—Known as the yellow Cattley, the best of the hardy guavas, both for home use and for commercial purposes. Thousands of plants have been planted throughout the orange belt, and several factories are to be established to work up the product. This fruit is entirely distinct from *P. guayava*, both in habit of growth and hardiness, as it withstands without injury 10 degrees of cold, which would entirely destroy the tropical species.

The Cattley (*P. Cattleyanum*) is another hardy species, differing but little from the foregoing in habit of growth. The fruit is claret colored, somewhat smaller, and contains a larger proportion of acid, of equal value for preserving purposes. A chance seedling of this is deeper colored, larger, and more productive, and is named Adam's Purple.

Pineapple (*Ananassa sativa*).--Pineapples are the most important at present of the tropical fruits grown in Florida. The Red Spanish is grown to a greater extent than other varieties, chiefly through ignorance, and because of the difficulty in obtaining plants of better varieties. Sugar-loaf, Smooth Cayenne, Queen, Ripley Queen, Trinidad, and Porto Rico are the choicest.

The "Hog Plum" (*Spondias*) of the West Indies, a delicious plum-like fruit, quite well known, is being planted out in many southern counties. The tree is deciduous, grows from cuttings, and will stand light frosts unharmed.

Barbadoes Gooseberry (*Pereskia aculeata*) is a fruit bearing cactus. It is useful for preserving only, and as the vine is easily produced from cuttings, is being commonly planted out.

Star Apple (*Chrysophyllum cainito*), another West India tree, has fruited in limited quantity, and deserves a place in every garden, as it is an excellent table fruit.

The committee has asked competent specialists to prepare papers on the most important of the fruits of Florida, and a number of such essays will follow this report.

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Tropical Fruits.

E. N. REASONER, MANATEE, FLORIDA.

A brief sketch only of our subject can be given. At present the planting of tropical fruits is on the increase, steadily but surely, as it has been ascertained that a freeze only checks fruit production for a short time. The trees for the most part after being frozen, spring up into bearing size, within two or three years, from the collar of the roots. The principal area of planting will be confined to the Keys, and the mainland of Florida below the 28th parallel of latitude; but the warm Lake Regions of Poke, Lake, Orange, and Volusia counties, will nearly always prove safe harbors for their planting and fruiting.

The culture of Pineapples, Bananas, and Cocoanuts takes the lead, and plays the most important part in tropical fruit production in this State. There are many hundred acres devoted to these staples, but on the Keys in only a few cases has enough thorough care been given them. With a more liberal system of cultivation, and shipping by direct lines of steamers or railways, we may soon expect Florida to supply a very large part of the demand from the North for these three fruits, and also for a few of the better known tropical products, such as guava jellies and various marmalades and preserved fruits.

We will divide this list of fruits into three classes, according to their comparative hardiness as regards frost. First, those for general planting over the extreme south of the peninsula and the Keys, among which, and at the lead, are Pineapples, Bananas, and Cocoanuts. Second, for extensive planting, the following are the best known: Alligator Pears, Guavas of all

sorts, Anonas, including Cherimonias, Sugar, and Custard Apples, as the best sorts, Star Apples, Atalicite Gooseberries, Sea Grapes, Tropical Almonds, Egg Fruit, Gineps, Rose and Mammee Apples, Mammee Sapotas, Mangoes, Pawpaws, Hog Plums, Tamarinds, and Cocoa Plums. Third, all the fruits and products of the torrid zone can be grown, but in limited quantities, and at well protected places. Among those which have been already introduced we may mention the Cashew Nut, the Baobab, Otaheite Plum, Jaca, Darion, Bread Fruit, Sonari Nut, Chocolate, Rubber, Calabash, Vanilla, Kola Nut, Pepper, Allspice, Nutmeg, Coffee, Cloves, and others equally important. A few best known in each of these classes I will describe.

"The pineapple," says Rev. Jas. H. White, of Merritt's Island, Indian River, "is successfully grown without protection as far north as the 28th parallel, on the west side of Indian River, and half a degree further north on the east side. Within these limits the crop is in no more danger from frost than the corn crop of Ohio or the wheat crop of East Tennessee. On Merritt's Island, in latitude 28° 18', pineapples have been injured but twice in the fourteen years of their growth; slightly in 1876, and very seriously in 1886. Within the limits of successful cultivation the area is rapidly extending, which is conclusive evidence that the returns are remunerative, and my experience is in the same line. But neither the acreage nor production can be more than estimated. On Indian River, including Merritt's Island, there are probably about 200 acres, one-third of which were in partial bearing in 1888, producing not less than three hundred thousand apples. At Lake Worth but little attention is given to this industry, hence both acreage and yield are small."

Mr. Thomas E. Richards, of Eden, Florida, speaks of the Pineapple as follows: "As I have been engaged for the last eight years solely in growing pineapples on the east coast of Florida, about fifteen miles below the Indian River Inlet, and as it is a new industry for this part of the United States . . . . I think it might be of some advantage to others to know how they pay. I will say that with the growing of pines I am well pleased, and think it is as sure a crop as wheat or corn at the North.

I, at first, set the plants 18 inches apart each way, making 19,000 to the acre, but now I plant two feet apart, or ten thousand to the acre, and use more fertilizer to make larger plants, as they must be close enough together to hold each other's apples up, when in fruit. If too far apart the weight of the apple will cause the stem to lean on one side, thus allowing the sun to blister and spoil the fruit. We get from fifty to eighty per cent. of the plants to fruit, and the net receipts are from five to twelve dollars per hundred, according to size. The main cost of a pineapple plantation is clearing the new land, and the seed plants. The after work of cultivation on a large scale is small in comparison with other crops. One man can take care of twenty acres after they are planted. The Scarlet, or Red Spanish pine is planted mostly, as the choicer varieties are scarce. The Egyptian Queen is an excellent sort, and is well thought of here. There is plenty of room for more people to engage in the culture of this fruit, and it will pay any man with ordinary intelligence and push to enter into it.

The only disadvantage of the pineapple culture is frost; as the pineapple is purely tropical it will not stand any cold of consequence; but freezing happens very rarely, and does not prove a very serious drawback."

The largest supply of fruit, however, comes from the Lower Keys. Messrs. White and Richards' observations are confined to Indian River, where the Pine has been so successfully grown for some years past. On keys Largo, Plantation, and Matacombe, the principal stock is grown, and the planters consider five cents an apple for medium sizes a fair price on the ground.

Their rocky soil does not permit of horse cultivation, and all work connected with growing any fruits or vegetables is done by hand, thus making the production of fruit more expensive and laborious than on the mainland. Only one crop is grown on the same land, new clearings being made and planted every year. Their shipping facilities are also very poor. All fruit

goes by sail-boat to Key West, and occasionally heavy losses are made in successive trips by rotting. This condition of affairs must be improved before the business will attract many more planters. A few of the best sorts grown, are the Porto Rico, Sugar-Loaf, Queen, Egyptian Queen, Trinidad, and Smooth Cayenne.

The Cocoanut industry is yet in its infancy, but we can reasonably expect it to prove reliable and profitable when confined to the lower Keys and extreme southern main land.

At Lake Worth are thirteen large trees, whose age is probably not less that thirty years, and which have borne for twenty years. Younger trees are bearing at many points north of this. The freeze of 1886 killed the only fruiting tree on the Manatee River. Along the whole southern coast young groves of twenty to forty thousand trees are not uncommon. There is a flourishing two acre grove at Merrit's Island, which is without doubt the most northerly one in the United States.

On the Keys, at various points besides Key West, where they have been grown for years, are scattered small groves in bearing. The freeze of 1886 caused a part of the crop then on the trees to drop when immature, but the trees sustained no damage. There several sorts, but none of the East Indian sorts have as yet been introduced. The tall tree with large nuts is the only variety known here, but in other tropical countries many superior dwarf, and other early bearing sorts are known.

The Banana should be grown where rich soil is abundant, or in those favored spots where fertilizers can be cheaply applied. The plants are adapted to our low moist lands and prefer a mulching of palmetto leaves and roots to cultivation. The large plantations are confined to extreme South Florida, where the dwarf sort—Musca Cavendishii—is grown. This sort is rather tender, but is the most productive variety grown. A hard freeze only kills the tops, and within nine months after there will be fruit on the stems which will have sprung up from the fleshy base of the old plants. There is a large demand for this fruit, and as we are nearer the chief markets than are Central American or West Indian planters, we can successfully compete with them in production. The Orinoco, Hart's Choice, Red Jamaica, and Cavendish, or Dwarf, are the mostly extensively grown.

Although the Guava receives less attention than it deserves, it is a fruit of great merit, and can be grown easily, in any situation, wet or dry, rich or poor. Its shipping qualities are about the same as strawberries, perhaps some better, and it can be marketed as well. But its chief use is for making jellies and marmalades which find a ready sale everywhere. Both soil and climate are adapted to the growth of all sorts of Guavas, and if grown somewhat over its natural limit it behaves well, springing up into bearing size in one season after being frosted.

The Mango industry has been tried comparatively little. The best groves are on Point Pinellas, where they have been successfully cultivated for fourteen years. Two trees at that place, at eight years of age, were at least twenty-five feet in diameter of crown, carrying 19,000 Mangos on them at the time. Some fruits were one pound in weight. One grower realized $219.00 from the sale of fruit from eleven trees, in their fourth year. Another, $66.00 from one tree at six years. A shipment was made to various northern cities, and sixty cents per dozen was realized at Chicago, the fruit shipping well. The yellow soil of Florida is most eminently adapted to the Mango, and the finest varieties of the East Indies are being planted. These best sorts are destitute of the tough fibre contained in ordinary fruit, and are very superior.

The Sugar-apple is a low-growing tree, bearing in its third year. It is a prolific fruiter, and as the fruit is usually liked very much by those unacquainted with it, it can be readily sold. The usual price in the markets of Key West is from twenty-five to forty cents per dozen. There are many Anonas, very similar to the Sugar-apple, and all desirable fruit trees.

The Avocado or Alligator-pear, sometimes called "Aquacate," or "Midshipman's Butter," is being planted extensively in South Florida. It has fruited for several years in spots, from Tampa round the coast to Merritt's Island. The fruit is very large, stands shipping well, and is

thought much of by all persons from the tropics, and by those who soon acquire a taste for it. Mr. James Collier, of Key Marco, has probably the finest grove in Florida. It is on high, rich shell mounds, which soil agrees with this fruit perfectly, as does any high land, especially where yellow subsoil is near the surface. The business of shipping this fruit north is on a rapid increase. In New York, one firm alone handles from 300 to 500 fruits per week during summer, while ten years ago not over 100 fruits would be sent there through the whole season, from June to November. They are very heavy bearers, and the business proves quite profitable.

In the second class, containing those fruits which are successfully and easily grown with protection in the Lake Region, the following are good subjects for culture under low sheds, constructed cheaply, as the pineries are made. The choicest varieties of Pineapples, Sugar-apples, and other Anonas, Sapodillas, Egg-fruit, Rose-apples, Spanish Limes, Guavas, and a few others in limited quantities.

The third class contains those trees of a hardy nature, and those strictly tropical trees which are vigorous enough to stand occasional frosts unharmed, or to sprout readily from the crown of roots, and form bearing tops in one season or more.

The hardy plants of this class are Dates, Loquats, Cattley and Chinese Guavas, Surinam Cherries, Litchis, Downy Myrtles, and a few others. Also the strictly tropical Bananas, Mangos, Alligator-pears, common Guavas, Tamarinds, Granadillas, Cramda, and other but less known sorts.

The Date Palm is perfectly hardy in nearly all portions of Florida. There are a very few bearing trees. These are at Jacksonville, St. Augustine, Tampa, Key West, Manatee, on Key Largo, and Matacombe, and at perhaps a few other places.

At Key Largo there are half a dozen fine young Date Palms, one of which, now eight years old, has borne fruit since its third year. The tree is usually *diœcious*, but in rare instances perfect flowers are found. I have noticed a tree on the lower coast which produced fruit at five years of age, when there were no blooming palms of any genus within several miles. The trees should always be planted in groups however to insure fruitage. There are many varieties of Dates, and also several species of the genus, producing valuable fruit.

The cultivation of the Loquat should be more general. Our soil suits this Japanese tree well. The climate is always warm enough, and the fruit is ranked with the best plums for flavor, and is always in demand. There are two or more crops annually, but the main part ripens in February and March. An orchard of this tree near Jacksonville is said to have brought in more cash per acre, a few years ago, than any other piece of land used for agricultural purposes in the state.

The hardy Guavas, Cattley, and Chinese Guavas are grown both for fresh fruit and for making into jelly. They are planted extensively around the lakes of Orange, Lake, and Volusia counties, especially, and a large market is being found for this product. The bushes are most easily grown in any soil, either dry or moist, and bear heavily after two years of age.

A few pointers I have here given, facts gathered from all portions of the state, but they are not given in as complete a form as I would like. For some of the above statements, besides the culture of the Pineapple, I am indebted materially to Rev. Jas. H. White, Merritts' Island, Florida.

Varieties of the Sweet Orange.

E. H. HART, FEDERAL POINT, FLA.

Like the Eastern Continent, which is geographically separated into the grand divisions of Europe, Asia, and Africa, the orange (Citrus aurantium of botanists) may, by a similar rule of three, be comprehended under the tripartite classification of Citrus dulcis, or the sweet, Citrus nobilis, or the Mandarin, and Citrus bigaradia, the sour or bitter.

Out of respect to the prejudices of the President of the Florida Horticultural Society, who, anticipating a speedy subversion of foreign languages by the English tongue, wishes to do away with Linnæan Volapuk altogether, classical syn

onyms will be avoided as far as possible in this paper. Leaving all subtile scientific distinctions to be wrangled over by our senior wrangler, and the wranglers of lesser degree, who discuss an orthographical tid-bit with the pertinacity of game cocks, I will merely touch briefly upon the different strains of the sweet orange, and their gustatory, æsthetic, and commercial recommendations.

If wisdom be folly, as the old adage hath it, then the blissful ignorance that pervaded the minds of ante-bellum Floridians, concerning varieties of the orange, must be accepted as evidence of a perfect mental equilibrium. Many believed in the existence of only one kind of sweet orange, and thought variations were but accidental and temporary. Some claimed that oranges would not grow upon pine land, and that the seed of a sweet, budded on a wild stock, would produce a sour.

Therefore, they looked with incredulity and amazement at the first specimens of Citrus nobilis, borne on a tree brought from Louisiana and planted in the grove of Dr. Moragne at Palatka, and as the stock was not open to free distribution, buds were surreptitiously obtained, like the golden fleece, by a colored Jason, and conveyed to Orange Mills in an Argo hollowed from the trunk of a cypress.

The advent of the Navel orange excited still greater curiosity, besides appealing to their sense of humor, but the Blood, with crimson pulp and skin, mottled like a tiger's back, dealt the *coup de grace* that exploded the one variety hypothesis, and consigned it to the gloomy dominions of Pluto.

Still there are many who, with an infatuation worthy of the dark ages, cling to the sweet seedling, and one writer, Billy P. Neeld, of Pinellas, who ought to know better, lately attributed the low prices, gluts and decay of fruit in transit to the propagation, in these latter years, of a legion of suspicious, wild-cat varieties in place of the old reliable seedling. Shall we say to him: "Ephraim is wedded to his idols; let him alone." So surely as the big freeze blasted the mango boom on the Tampa Peninsula, will he find out his mistake when, in deluged markets, only fancy kinds pay a margin. Look at quotations in California, where they claim to know all about oranges—seedlings one dollar per box, and choice Navels $3.75. How is Billy going to raise choice Navels, or Bold Burgess, or Double Imperial or the Melitensis varieties from seed when the supply of seed is insufficient at $25 each, for the very good reason that, like the Frenchman's flea, "when you think you have got him, he is not there"?

Perhaps a sweet seedling raised in Florida electrifies a discriminating palate with more thrilling sensations of delight than the same grown in California soil—without irrigation—at least Floridians like to think so, and in proof of this may be cited that prince of seedlings, the Homosassa, which, raised on the Pacific slope, is pronounced only ordinary. In my own experience the waste in a grove of seedlings on the tree and after shipment is far greater than among budded varieties, selected, of course, as well for keeping and shipping qualities as flavor. The finest eating orange in the world would be comparatively valueless were it too delicate to bear transportation, and that's what is the matter with very many sweet seedlings — they are hard to get to market, and hard to keep after they get there. And again, why this great ado over the inferiority of budded trees, seeing that a good proportion of the choice varieties that we are ready to swear by, and go our bottom dollar on, are but sweet seedlings selected for rare piquancy of flavor combined with durability?

And would not the jewel of consistency receive a double emphasis if, upon investigation, the sweet seedling advocates prove to be also the advocates of scrub bulls, marsh ponies and razor-backs, and those who dote on budded trees the ones who keep up with the procession?

It is claimed that budded trees are short lived, and yet by a strange incongruity, the men who hesitate to plant a fruit tree at all, lest they may not live to see it bear, are the very ones who reject budded trees as short lived. Specimens certainly seventy years old exist in this State, and show no prospect of dying yet. When

they do die, it will probably be, not of old age, but of starvation. The same kind of folks lived twenty-five centuries ago, and Hierocles mentions one, who hearing that ravens lived two hundred years, immediately bought a raven to satisfy himself by trial.

Moreover, also, sweet seedling trees sometimes fall into a bilious state, as evidenced by jaundiced foliage and an intermittent habit of bearing, under the same conditions in which a budded tree settles regularly down to business, and continues "wearing of the green." In Europe, where orange growing is not in its infancy, a demand for the best has led planters to procure improved varieties from English nurserymen. Dr. Bennet speaks of an immense grove in Sardinia, where the seedling trees were attacked, sooner or later, by a fatal blight, of which budding was considered an even more effectual prevention than a shot gun quarantine against yellow fever. After the progressive orange grower has become satiated with the pastime of extracting sweet stumps, in a state of decay from the ravages of foot rot or the aggressions of white ants, he is glad to fill the vacancies with the stocks of sour orange, or rough lemon, budded to approved varieties. And varieties there are, enough to suit the most exacting taste. They may look as much alike to the uneducated eye as a flock of sheep to a swineherd, or a bunch of pigs to a shepherd, but the trained palate can detect differences as nice as those which exist in the fermented juice of the grape. There is the luscious sweetness of the Cunningham and Parson Brown; the rich, vinous flavor of the Homosassa, which lingers long and lovingly upon the tongue like Amontillado sherry; the intense piquancy of the Majorca; the tender, melting Jaffa; the mild neutrality of Early Oblong; the innocuous desuetude of Sweet Seville; the rare blending aromatics in the Maltese Blood; the spicy Citrus Nobilis; the overflowing succulence of the Parson's Navel; and the crisp, honeyed pulp of Washington Riverside, the king of all, worthy of being mentioned last by those who, like the prudent master of the marriage feast, reserved the best for the last and "kept the good wine until now."

The number of varieties in Florida esteemed worthy of a reputation and a name has already mounted into the hundreds, and is rapidly increasing. Like the apple orchardist of more rigorous climates, almost every one of whom has his favorite bantling, warranted to keep "forever and one day longer," so many orange growers worship some private pet with all the enthusiasm of a lover, often calling it by the name of their best girl, or madam somebody else. The late lamented P. W. Reasoner compiled a list of more than 150 varieties of the sweet orange, which, large as it is, would be much larger had he admitted all that are knocking at the door. At the same time it is susceptible of condensation, if some names, inserted as separate varieties, were assigned to their proper places as synonyms.

One of the grave perplexities that harass the orange grower is to decide what varieties to plant for future profit. To a certain extent fashion rules in oranges as well as in ladies' bonnets, and the favorite of to-day may, like the queen of a harem, become an outcast to-morrow, or be strangled by the bowstring of that most relentless of tyrants—popular caprice. Who would have thought a few years ago, when Mandarins and Tangerines were eagerly snapped up at the thrilling price of fifteen dollars the standard box, that the time would soon come when they would melt down in the hands of the commission man for want of purchasers at any price, or be left to decay on the trees like sour oranges? Certainly not those who, in the expectation of speedily rising to the dignity of capitalists, set out acres of them! Certainly not the nurserymen with large stocks upon their hands to be disposed of at a bargain which, however favorable, promises to be a bad bargain for the purchaser. To forecast these things requires a magnifying microscope of greater prophetic power to peer into the depths of futurity than most short sighted mortals possess.

The term "kid-glove" orange, as applied to Citrus nobilis, originally a joke of our facetious countryman, Colonel Dancy, of Orange Mills, was gravely accepted as a synonym by our first nomenclature committee, and, like many an-

other whimsical what-do-you-call-him, it struck, where one more dignified would have glanced off. Luckily that committee did not hear an old darky refer to the rubicund Maltese Blood as the "erysipelas" orange, or another synonym might have been perpetrated to the prejudice of this attractive fruit. And attractive certainly is that section of the family through whose tawny cheek flashes the rich rose, giving promise of deeper ruby tints within, and delighting the eye with the splendor of color while appeasing the craving of the palate.

Of the Sanguinea section, the Maltese Blood is a distinguished scion. A thin, tough, juice-preserving skin enables it to take the front rank as a shipping fruit, and its tendency to crop only in alternate seasons may be corrected by liberal culture and fertilizing. Unlike most oranges, which next the stem have a saline flavor —a bitter farewell as the Crackers say—its sprightly juices are blended with an indescribable intermingling of aromatics clear through to the wood. We have several strains from various sources, showing slight differences, induced perhaps, by long cultivation under diverse conditions of soil and climate. Some are more dwarf than others, and one of the best for flavor, heavy bearing and long keeping, is possibly a case of bud variation from the Jaffa orange, in which the sanguine feature has become fixed.

The Jaffa as well as the Majorca and the Long of Thomas Rivers, give evidence by the same peculiarities of the young foliage, of being remotely allied to the Maltese Blood, which would explain the appearance, though rare indeed, of crimson pulp in the supposed example above cited. I have never observed this characteristic tint in the Long, which in other respects closely resembles its ally, and is, so to speak, like the play of Hamlet with Hamlet left out.

Not always does the much admired sanguine hue appear in the race to which it belongs. It would seem to depend upon certain conditions of soil, season and treatment, and to be, to an appreciable extent, under the control of the skillful cultivator, who studies the secrets of, and lives in happy communion with nature. For only to lovers does the shy dame unbosom herself and reveal her hidden truths, and those who wish to enjoy her rarest favors, must worship at her shrine with unwavering devotion.

Often comes the querulous plaint, "my bloods do not color," and "why are not my bloods like other men's bloods?" With good reason, too, for while a fully developed, richly tinted Maltese Blood holds the same position among oranges as the Tyrian purple among royal dyes, one undersized and pale or rusty is as undesirable and worthless as a knotty Lady apple.

There is an old belief that the blood orange results from grafting a sweet shoot upon the pomegranate. This is one of the stock humbugs with which a certain class of editors delight to beguile their readers, and is worthy of a place alongside of the plan for making a sweet and sour apple by skillfully joining two buds, or grafting top end down; and of curing all manner of arboreal diseases by driving nails into the trunk of a tree.

Another type of bloods, but lately introduced, has the shape and general character of the ordinary round orange, with the addition of tinted pulp. Some are sharply acid, others of exquisite sprightliness, and when in full perfection are mantled with a lovely blush. Many of the trees show a vigor and fruitfulness befitting the parents of a race of which, when elaborated by selection and judicious crossing, Florida may one day be proud.

In order to escape the mid-winter gluts, many are turning their attention to very early or very late sorts. Among the first, several are pleasantly sweet in September, yet all turn yellow about the same time, but to look attractively very early shipments need artificial coloring like lemons. Early shipments, however, promise small relief, for the season always opens with a rush, largely of immature and sour fruit, which paralyzes markets and demoralizes growers like the sweep of a cyclone.

The Centennial, though ripe enough to use in October or November, possess the exceptional advantage of preserving its juices unimpaired on the tree until May or June. Of very late varieties Hart's Tardiff takes the lead for quality and long keeping, being in season from March

to August, and growing sweeter all the while. It can boast of a distinguished list of synonyms, being known in different places under the names Tardiff, Hart's Late, Fleming's Late, St. Michael, Valencia Late, Brown, and Excelsior. On May 10, 1888, I shipped forty boxes of this variety to Philip Ruhlman, of New York. They were good counts and bright, and not venturing to ask the extra price of an X per box, he sold them at $8.50 and $9. In a few days the buyers came back ready for more, and ready to pay the X, but the supply had given out.

Now, fruit growers, I beg of you to go slow and not work the Tardiff vein till it peters out like Mandarins and Tangerines. Our California friends are consoling themselves with the belief that the Florida crop, being all in by the first of March, a fair field and no favor opens up before them. What are they going to do if you flood the markets all summer with an orange that sells as much above their pet Riverside Navel as the Riverside Navel sells above a common seedling?

So much thunder has been expended upon the royal family of Navels that, at its bare mention, like Job's war horse, "we smell the battle from afar." It would be malapropos here, where all meet amicably on middle ground, to renew that fearful, though bloodless contest. The old belief of the one navel has long since exploded, and taking the best for a starting point, let us work on that until the acme of perfection is reached in an orange that will astonish the world. When by skillful breeding we shall have combined the richness, solidity, total absence of seed, and delicate texture of the Washington Navel with the aroma and ruby juice of the blood orange the desired consummation will be achieved.

If the proof of the pudding lies in the eating, then judging from market quotations, the Navel family stands high in the popular estimation. This as regards the consumer, but an often non-productive habit has caused many a grower to look upon it with suspicion and disfavor, and even to cut it down as a cumberer of the ground. The cause of this unfruitfulness is still an unsettled question and a breeder of acrimonious disputations. By some it is attributed to scarcity or impotency of pollen, and granting this hypothesis, the vivifying dust must vary in strength at times as widely as the shorn and unshorn Samson, for where even shy bearing Navel trees have concluded to hump themselves, they have been known, like boon companions, to carry all they could stagger under. Possibly the habit of too profuse blooming, as in the Maltese Oval, may cause a too profuse shedding of the young fruit from temporary exhaustion. We know that to bloom at all is a heavy tax upon the vitality of any plant. Certain it is when the vigor of a *mature* Navel tree has been sustained by liberal fertilizing and a generous soil, or by budding upon the stronger growing rough lemon, there has been either less cause for complaint or no cause at all.

Small wonder is it that over such a superb berry as the original and only genuine Washington Navel enthusiasm should run mad, and the parsimonious buyer become inflated with a disregard of expenditure truly prodigal. Often surpassing a pomelo in size, finer grained, and solid to the very centre, sweet and succulent as a strawberry pine, and ample as the full moon's disc—well, if not quite as expansive as that, they are surely as broad as a knickerbocker buckwheat cake—when once it has graced a dessert, most other oranges seem "flat, stale and unprofitable" in comparison.

The Double Imperial Navel, another candidate for public favor, is a seedling lately procured from Mayor Rountree, of New Orleans. As it is too soon to speak from experience of it in Florida, we must wait patiently until it speaks for itself. So far as may be judged from the few specimens produced here, it appears to be of moderate size, very solid, fine grained and heavy; entirely seedless, and of a sprightly vinous flavor. A thorny tree of vigorous growth, and a somewhat different style of blooming from its relative, it encourages the hope of a new departure in the umbilical family, able to amply fulfill the promises of spring. In this variety the apical mark is less prominent and often blind, but upon dissection, the orange within an orange always appears snugly ensconced beneath

the skin. It is a true Navel, and only lacks the guarantee of fruitfulness which further experience may bring, in order to fill the bill in more ways than one.

Comrades of the Florida Horticultural Society, it is to you that the multitude look for advice and instruction. The appeals from those who are groping in darkness are almost pathetic in their earnestness. The burden of their refrain, like the "what shall we do to be saved?" of the ancient searchers after salvation, is "what kinds shall we plant for a living?" Our early duty is to prepare, as far as the light of experience renders practicable, an authoritative list of market varieties of the orange, combining durability and flavor in the highest degree. The number admitted should be as fine as possible, and only those able to bear the most rigorous tests. The standard market varieties of apples, amid the bewildering number catalogued, may be counted on ten fingers. A prominent orchardist once said that if he were planting a thousand apple trees for profit, 999 should be Baldwins and the remainder other kinds.

Orange growing rests upon a similar basis, and may be whittled down to an equal fine point. Even candidates for the more extensive amateur's list should stand an examination as sincere as the rules of a naval martinet, or the list will soon become like an overloaded ship, that in mid ocean is compelled to jettison half the cargo. We often hear it said that in Florida citrus culture is still in its infancy, and perhaps it is, but during the sessions of the old State Fairs at Jacksonville, when it was, so to speak, a mere suckling at the breast, the judges of fruit were careful to apply strict pomological rules, and taking Old Vini or Beach's two for a departure, or, as algebraists would say, for the known quantity, deemed no sample worthy of consideration that could not stand shoulder to shoulder with it. In our exhibition to-day we are reaping the fruit of what they so well and wisely began, and doing what we can in the interest of the good work. We gladly welcome those who are still with us, and think with regret of others, who have laid down life's burdens, and passed away from mortal ken, leaving behind them cherished memories and an example worthy of imitation.

Orange Growtng in Florida.

Present Methods and Future Probabilitilies.

C. F. A. BIELBY, DE LAND, FLORIDA.

It must be remembered that it is only since the war between the States that oranges have been commercially grown in Florida. Of this period the first ten years were consumed in preparation. The tremendous strides in producing and acclimating the numerous varieties, in spreading the commercial growing of the crop over the whole of Peninsular Florida, in raising the export quantity from nothing to 3,000,000 boxes, has been the work of less than twenty years.

The orange producing section may be designated as lying west and south of a line drawn across the State from Dead Man's Bay to the mouth of St. Mary's River. Precarious as it may be at some points within this line, at others successful orange growing approaches very close to or even crosses it. It may be taken that the farther east you go in the State the farther north you may venture. The isothermal lines entering the State from the Atlantic after crossing the St. John's River, dip suddenly and very considerably to the south; how far south this cultivation may be pursued has never been demonstrated, but I know of no reason, the soil and local conditions being favorable, why the Florida Keys should not be taken as the southern limit. Granting this, you have but to cast your eyes upon the map to see the vast territory where, in the near future, the oranges of the world are to be produced. This territory, for our purpose, may be divided roughly into five varieties of surface and soil. The "hammock," or hard wood country constitutes two of these, the grey and the black hammock. These again, however, should each be subdivided with regard to the subsoil, whether it be sand, limestone, clay, or coquina. The third is the "high pine," meaning the high rolling country covered with stately pines, where, often, it is thirty to sixty feet to water. The fourth is the "medium

pine," meaning the flat pine country, perfectly level, from four to six feet to the water, covered with pine trees, not so tall as on the higher land, but quite as large. Lastly come the "flat woods." Of course, there are also savannahs, reclaimed lands and permanently wet hammocks, but these do not at present concern us. On every one of these five divisions of Florida soil, including each of them over the different subsoils mentioned, it is demonstrated that the orange can be successfully grown, and in each case present peculiarities not found in any of the others.

This being the case, it follows that the possibilities of Florida, as an orange producing country, are practically limitless, bounded only by the demand.

I have alluded in brief to soils suited to the orange. The question may be asked, which is the best? and it is a difficult question to answer. The grove owners on each of the various kinds are, as a rule, best suited with their own, and when this is the case, it may be taken for granted that the advantages and disadvantages of each are quite evenly balanced. The grey hammock with a heavy growth of live oak, hickories, and bays would seem to be the ideal soil. It is usually dry or easily drained; after the land is once cleared it is easily worked, and the trees need little or no fertilizing till the bearing age. To clear this land perfectly is very expensive, but this is wholly unnecessary. To chop down everything, to pile and burn, to grub the stumps and roots, and burn again, is to expend from seventy-five to one hundred and twenty-five dollars per acre, and at the same time to work an injury to the soil which cannot be repaired. There are two plans, either of which is perfectly satisfactory, first, to thoroughly underbrush the land and cut down all the timber less than three inches in diameter, to pile all this in windrows, if possible in a north and south direction, with their centres twenty-five feet apart. Thus far the two plans agree, but in the one have skillful men to cut the standing timber, and as nearly as can be throw it along the windrows. There will be some cutting and rolling to be done, but there should not be much. Then partially grub a strip eight feet wide through the centre of the open space; put in a plow and break this land two or three times; dig holes four feet in diameter, deep and clean, and set the trees fifteen feet apart. This I have done in first class, heavily wooded hammock for thirty-five dollars per acre. In the other plan, after the windrows have been made, deaden the standing timber; grub out four feet holes in the same manner as before, and set trees fifteen feet apart. This I have done for less than twenty dollars per acre. Probably the first method is the best, still I am free to say that the second suits me quite as well, in that the ground is freer to nip in the bud the ambitious shoots that for a year or two fight hard for life, and in the dying and dead tops, unsightly as they may be, the young trees find, for a time, a grateful shade. Of course, the less work put into the first preparation, the more work in the after cultivation, but usually it is most important to save money in the first outlay, especially when a man is poor and intends to do much or all of his own after labor. But the prime question is, which is best? and I contend that either of the latter is better than the first clean sweep with fire, for when the soil emerges from the chaos of decaying vegetable matter, which it will do in five or six years, it is in infinitely better condition to stand the after strain of continuous years of cropping. It is true that in the last method the branches begin to fall in a year, and the trunks of some of the oaks and other trees soon follow, and occasionally an orange tree is injured, but it is wonderful how little damage is done in this way.

The method of preparing the black hammock differs somewhat. Usually it is wet, and if the water stands upon the surface, this, at least, should be drained. The underbrush and small timber, and some of the larger, should be cut, and may all be burned with little or no injury to the soil. Much of the large timber should be left alive, to be gradually thinned out as the orange trees cover the ground. The trees should be set upon mounds, or better still, the whole surface should be alternated in ridges and depressions running with the natural drainage,

twenty to twenty-five feet apart, and the trees set upon the ridges fifteen feet apart. The cost of thus clearing is not often set at less than one hundred and fifty dollars per acre. These lands are, as a rule, located on the borders of lakes or in the river bottoms, sometimes in small bodies, but in several parts of the orange country there are vast tracts containing thousands of acres, notably that which runs along the east coast for nearly a hundred miles, a soil of black mould from two to six feet deep over a stratum of marl. The dense forests that cover these tracts are forbidding in aspect and almost impenetrable, and show by their luxuriant growth the inexhaustible fertility of the soil. Strange as it may seem, though the water is at the surface and often above it, the orange tree takes kindly to these soils and flourishes without signs of decay, or abatement in the production of thin skinned, bright and heavy fruit. I remember a few years ago reading an article in a California paper on the selection of a location for an orange grove, and the writer said that the farther to water the better—one hundred feet was better than less. At about that time I had accepted an invitation to inspect a low hammock grove. The inspection failed, however, for want of a boat. That grove has since been surface drained, but before that time and since it has never failed to produce an abundant crop of oranges, excelled in appearance or quality by nothing grown in the world. I could not but be struck by the different requirements there and here.

And being on the subject of wet, low lands, I shall proceed at once to a consideration of the flat woods; I do this the more willingly because there is an idea that the orange cannot be grown on these lands, while I am perfectly satisfied that in them lies the best hope of the very poor man to its successful culture. I shared in this feeling at one time, but my conversion was as sudden as it has been lasting. I had attempted a short cut, and became entangled in the limitless avenues of the piney woods; in my wanderings I came to a cabin, and, to my surprise, a grove of large thrifty orange trees, nearly thirty years old, bearing abundant and beautiful fruit, and in this grove I found the largest tree I have yet seen, so large that two feet from the ground I could not reach around it with both arms extended full. From this tree eight thousand oranges had been taken as a single crop by actual count, and yet out of a well in the neighboring grove water is dipped sometimes with a gourd. "It never did run over," the owner told me, "but it has been within an inch of the top." These lands, so situated that surface ditches will keep the water from standing on the ground, can be cleared by deadening the timber for five dollars per acre, and they can be bought for from one to five dollars in fairly accessible localities.

Of the two remaining varieties of pine land, the "high" and the "medium," the process of clearing is in both cases the same, generally by burning the trees out under ground. This can be done for from twenty-two to thirty dollars per acre, and leaves the ground perfectly clean. A cheaper method is to deaden the trees by girdling them, and I think if I had it to do over again I should adopt this plan; it probably costs as much in the long run, but it carries the cost over a great many years.

These pine soils, like the hammock soils, vary in quality. I think it may be said of them that none are good, but some are very much poorer than others. In my judgment the question of adaptability to orange growing on any of them is more a question of moisture than of quality of soil. The quality of the soil, as a rule, is determined by the character of the surface and of the subsoil, clay, or sand containing allumina in considerable quantities, as a subsoil is the best indication, especially if the surface be somewhat flat. A subsoil lighter in color and coarser in texture than the top soil, especially if the surface be broken into little hills and corresponding valleys, is the worst, and there are many grades between. These are the soils upon which orange growing has made the most rapid advances in the last few years, and as we learn more of the methods of fertilizing and cultivating every year, I see no reason why the pine lands should lose the prestige they have gained.

I have thus briefly touched upon where our fruit is grown, and the extent and variety of

soils utilized. It remains to set forth our methods of cultivating and fertilizing for the best results upon each. The mere growing of orange trees in Florida is within the capabilities of any man. To grow an orange that will bear transportation to market and sell at a good price, is quite another question; it is possible, however, upon any of our soils, provided the variety is suited to the location, and the method adapted to the soil, with due regard to the subsoil and the supply of moisture throughout the whole year. Varieties should be chosen with respect to time of ripening. The northern portion of the orange belt should take the market for October and November, with the Early Oblong and Sweet Seville, and kindred early sorts, and I believe that if every tree situated north of Lake George, excepting here and there in favored spots, were rebudded to these it would in the near future be gainful to the owners in greater profits, and to the State in an infinitely better, that is to say, a riper orange, for the early market. From Lake George south to 28½ degrees, December is always a perfectly safe month, and should be the great market month for that section. South of 28½ degrees the late varieties may be grown with perfect safety, and the profits would be greater if only such were grown, as is proven by the Indian River country, where the fruit possesses the peculiar quality of ripening late and hanging on the trees in a perfectly sound and sweet condition until March and April. But these are, more properly, market questions, I touch them only in passing.

In speaking of cultivation I shall group the pine lands and the grey hammock together, for the methods essential to success in each are much the same.

It may be premised of an orange tree in Florida that it must be set high, with its crown roots showing well above the ground. No matter how the tree sets in the nursery this rule must be followed. No after cultivation can make up for this defect. It is also taken for granted that the trees are thrifty when set. The object of cultivation is then to induce a moderate, normal and healthy growth, with the ultimate end in view of producing paying quantities of marketable fruit. To this end moisture may be said to be the prime factor, assuming that all the elements of plant food are in the soil, either naturally as in the hammock, or artificially as in the pine soils. The supply of moisture therefore determines the method of cultivation. Where the soil is light and dry, guiltless of a distinct subsoil, with the standing water far below the surface, clean culture is essential, and it is wonderful what this will do to make up for the defect in moisture. By clean culture, I mean a field as free from grass and weeds as a floor, where the harrow passes back and forth at least every ten days from February to November. The above soils are the least desirable for orange culture, and the only ones in my judgment where this method of cultivating is necessary, or produces the best results. For soils darker in color, finer in texture, with a subsoil of clay or yellow sand, the better method is to keep the trees clean at all times and the soil stirred around them as far as the tree produces whole or partial shade to the ground; as for the rest, keep it covered all the year if possible with some form of growth, either alive and growing, or dead and mulching the ground. The usual method, with young groves, is to run a six foot harrow on each side of the tree row, in one direction only, and to give up the rest of the land to the natural growth, or to cultivate thereon the cow pea; with the latter, the general method, though not the best one, is to broad-cast the centres about the first of June, just before the summer rains; some turn them under green in August or September, and others in October; a better method is to drill the pea, and cultivate them till they take the ground, letting them die, and rot upon the surface during the winter months. I am not, however, an advocate of the cow pea for orange groves. It may do well for fields and gardens, but its growth is too rank for the grove. The claim that it is an air feeder is delusive. It has a good healthy appetite for fifty dollar fertilizers, and I have known two centers of cow peas to unite their roots across a clean space of cultivated ground fourteen feet wide, that had been fertilized with high grade manures. In a question of survival of the fittest the young orange

trees stand a poor chance beside the voracious cow pea. The native crab-grass is a good Samaritan compared with it. Where there is sufficient moisture in the soil to bear it, the natural growth, which will in a year or two be crab-grass, should be allowed full swing after the first of June through the centres. It will grow luxuriantly and require constant curbing to keep it from the trees, but this care must be taken, and a space of seven or eight feet be kept clean and constantly cultivated. Never turn this grass under green, indeed, it is better never to turn it under at all. When the Autumn comes on it will die, and immediately begin to rot at the bottom. Allow it to cover the ground all winter, and in the spring run the Acme harrow over it a few times and it is broken to pieces and mixed with the surface soil where it belongs. Turning under green pea vines or green grass injures the tree and destroys the prospect of good fruit. Plowing a grove four years old is, in my judgment, a mistake, and the proper and persistent use of the Acme precludes its necessity.

In the flat wood soils in dry years the culture should be as above; in wet years, neither the plow nor harrow should be used, nothing but the hoe, otherwise the cultivation is the same.

In the black hammock nothing should ever be used but the hoe. The grove should be covered three or four times in the year, cutting down everything to lie on the ground, taking care that young trees are not shut off from sunlight and the free circulation of air. From the bare surface, however, the heat and light should be excluded as much as possible. Where lands of this character have been drained the cultivation should approach more nearly to that of pine land. The point is to conserve moisture for the use of the trees where there is too little or just enough, and to use up the surplus where there is too much, and where this cannot be done, to so cover the ground as to prevent fermentation in the souring of the soil.

Every man must finally be the judge of the method best suited to his particular soil. If it is urged that on the pine lands the grass takes away the food from the orange trees, the answer is: Fertilize heavily enough and in such a manner that there will be plenty for both. If there is moisture enough the food question need not be a grave one. And this brings us face to face with the serious business of the orange grower: how to fertilize, when to fertilize, and what quantities to use? On the alluvial hammocks of the east coast, over marl, groves that have been bearing for twelve or fifteen years, show no difference in brightness, sweetness, fineness of texture, weight or abundance of the crop by the use of any kind of fertilizer. It is evident, therefore, that this class of lands throughout the State do not need help of that kind as yet; of course it is a question of time, but the indications at present are that the evil day is far off. The grey hammock over clay, yellow sand, limestone or coquina, will make trees five or six years of age without fertilizer, but to trespass further than that is to invite a catastrophe. The strong argument for the best pine soils over the hammock is, that the judicious cultivator of the former begins at once to build up his soil, while the injudicious cultivator of the latter begins at once to sap his; in a few years they are on a par, and in a few more years, the pine land is much the better of the two. After a short time then the grey hammock, and from the beginning all pine soils, should be fertilized, and the manner, quality and quantity should always be with reference to the ultimate object, the production of first class marketable fruit, rather than the mere growth of the tree. My own opinion is that on our best pine soils ammonia is used to excess, and that very serious results have followed, in large, coarse fruit on the one hand, and in the impairment of the vitality of the trees on the other. A scientifically constructed manure may not in theory be a stimulant, but in practice it will depend entirely upon the amount of moisture present in the soil whether it shall so act or not.

The whole question is a difficult one, and any decided opinion will cross many theories and conflicting interests. I am, however, firmly convinced that the supply of moisture should be the guide to the manner of fertilizing. On very dry pine lands ammonia may be used in large

quantities; on moister lands greater care must be exercised, and the less soluble forms used. Commercial fertilizers with more than four per cent. of ammonia, are dangerous, especially in the hands of ignorant men. The injunction of the maker to cast it upon the ground outside the circle of feeding roots of young trees, is providential in its nature, as it permits much of it to be dissipated before the eager rootlets are destroyed. It is a wise direction, and one upon which I lay much stress. None of these objections, however, attach to ammonia in its so-called insoluble forms contained in pure raw bone, and the orchardist who uses this makes no mistakes. Attention must, however, be called to the fact that many brands of bone are on the market at this time, which are simply tankage containing large quantities of ammonia in its most active forms; it must be used with caution. I have seen much evil as a result of its contact with trees.

Raw bone is admittedly a slow food for orange trees, but is, it seems, unattended with danger, and I advise its use; it does not waste; it produces a healthy, constant and sober growth, and never fails to make its proper return. If other forms of ammonia are desirable, then cotton seed crushed, or cotton seed meal may be used. The former is less active, and therefore more to be desired than the latter, though on the very light soils cotton seed meal can be used in very large quantities with good results, but only on the light, dry soils; on the moister soils, while it may force the growth of the tree, it shares with stable manure in the fatal objection that it will not make good fruit. Potash in the form of pure sulphate should be used on all groves, young and old; it is impossible to make a healthy tree or sound bright fruit without it. The high grade, containing fifty per cent. of potash, from reliable houses, can be used in any quantity without danger, a pound or two to a tree when young, increasing to three or four hundred pounds to the acre for bearing trees, and will pay its cost over and over again. Sulphate of lime, three or four hundred pounds to the acre, should be used every other year on groves not in clean culture. The use of these four ingredients in proportions suited to the particular soil, will perfectly fertilize orange trees on the pine and light hammock soils of Florida. But to the individual orchardist it must finally be left to determine the proportions, and whether he cannot, with profit, dispense with one or more of them. A grove over limestone does not need lime; one over an inexhaustible bed of phosphate does not need bone; where sufficient ammonia already exists in the soil, cotton seed is of no use, but I have yet to find the soil in Florida that does not need potash, excepting possibly, the coast hammocks.

Drawing marsh grass muck into a pine land grove is a harmless amusement if one can afford it, but I do not believe it of any benefit to the soil. Leaf mould, from a hard wood forest, if it can be had in sufficient quantities, on the other hand, would be a perfect and complete fertilizer.

The next questions of interest are the diseases and insects which vex the soul of the grower and oft times discourage him completely. Of the former, the most serious in its nature, is the foot rot. I have no practical knowledge of its character, and shall pass it over with the congratulatory statement that but few cases have occurred in the State, and these have yielded for the most part to a treatment of sulphurous acid; it is confined entirely to sweet stocks on low lands. Much more serious in their consequences are those forms of malnutrition which evidence themselves in the dying back of the new growth and the gradual decay and death of the tree. Sometimes the cause is apparent; generally, however, it is very obscure. In three several instances I have traced the symptoms each to a separate cause—deep planting, sour soil, and highly ammoniated fertilizers. A merely poor soil will not cause "die back," nor do I believe that hard pan under the trees is of itself sufficient. There is no remedy for deep planting except to raise the tree. A soil naturally sour must be kept covered from the sun in the heat of summer; as a rule recovery will follow. "Die back" from ammonia stimulation is much more difficult to handle, as frequently the first sign of danger occurs after the tree has received a fatal blow, in which event it will vainly struggle for

a year or two and die despite everything that can be done; but I have in milder cases brought about complete recovery by cutting a trench the width of a spade and a foot deep from two to four feet from the tree; in other instances by using ashes for a year or two; and again by the use of hard bone, potash, and sulphate of lime. Salt and sulphate of iron have been recommended. I have tried them both, as also quick lime and powdered charcoal, without apparent beneficial results. I had considerable experience with this form of "die back" some years ago, by the injudicious use of stable manure and cotton seed meal. Three hundred of my trees were attacked, scarcely one on the three acres escaping. I treated them in blocks, and the use of the trench, supplemented when the trench was filled in the following spring by a liberal application of ashes, produced the greatest number of perfect cures and in the least time. I lost only a few of these trees, but those that were not treated died, and those that were treated with a further application of cotton seed meal, and also those treated with ammoniated commercial fertilizer, shared, without exception, the same fate. I am also satisfied that this disease is mildly infectious; that is to say, I have observed greatly modified symptoms on isolated trees in the immediate neighborhood, but too far for actual contact, which symptoms rarely appeared the second year. Other and more obscure forms of "die back" sometimes occur and occasion alarm to the grower, but I believe myself safe in the statement that three-fifths of the cases occurring in the State, and especially upon pine lands, are the result of improper fertilizing. This practically sums up the diseases incident to the orange tree in Florida. Trees die, it is true, from other causes. The environment, temporarily, is not congenial, and like all things on earth, they abandon the contest and fade away; a certain, very small per cent., must, as a matter of course, be given over to this fate.

Of insect pests, treating the various forms of woodlice as one, we have this, and the rust mite. The former is much more dreaded, but the latter is, from a commercial standpoint, of far greater importance.

It cannot be said that in all cases scale insects upon the trees are an indication of careless work, but certainly careless work opens the way to scaly trees. I do not regard this insect, as it appears in Florida, a serious menace to the orange industry, but it behooves every man striving for success to free his trees from them as soon as possible. Scale insects in great numbers do not often appear upon thrifty, sufficiently and properly fertilized and cultivated trees, but sometimes they do, but in all cases the kerosene emulsion thoroughly applied with a cyclone nozzle, is a perfect remedy, care being taken to go over the trees a second or even a third time.

The rust mite, while it cannot be regarded as a menace, is a serious drawback to orange culture, affecting as it does, the commercial value of the crop. I am not prepared at this time to offer any suggestions for its abatement. Experiments are in order, and I do not despair of a sufficient remedy in the course of a few years. The claim that certain fertilizers will remedy either the scale pest or the rust mite pest is absurd, and should not be made or entertained by sensible men.

Upon the soils of Florida, and the methods suited to their culture, I have thus dwelt at great length, much more than I had intended, but it is hard to curb the zeal of the lover, even though he may love unwisely. I have but little more to say.

We, in Florida, divide our future from the past by New Orleans, which marks the completion of one era in our history. There, three premiums were offered to Florida and her competitors. Of these, the Grand Sweepstake Premium was given to Florida; of the other two inferior premiums she was deprived by an unfortunate, though unintentional, mistake of the Judges. Florida entered in each of the other contests twenty varieties, upon the supposition that that was the limit; her competitor entered in one contest fifty-one varieties, and in the other forty-eight, and though the average of Florida's twenty varieties in each case was far higher than the best twenty of her competitor's showing vastly superior fruit—the awards

in both cases went with the aggregate of points, and Florida lost, when, with an even number of varieties she could easily have won. Had it been merely a question of the number of varieties, she could have shown specimens of one hundred and twenty as easily as twenty. At that dividing line the victory over the world was achieved. What we had long believed we found to be the judgment of all, and as we rest satisfied with the possession of the past, so in the possession of the future is Florida secure. All nations have paid toll of their best to her, and she has distilled into the fruit of every clime the sunny fragrance and sweetness of her cloudless skies and inimitable soil. In wealth of variety she is unapproachable, with a climate which, in the greater part of the orange belt, rarely goes below the freezing point, and as rarely reaches 100°, with freedom from the dangerous diseases and even more dangerous insect pests which affect less favored countries, it is difficult to see how she can be outstripped, or even approached, in the race for supremacy. The heavens plenteously irrigate her lands, and her methods are rapidly approaching completeness.

So we bid the man, who, for its own sake, loves to woo the warm earth to yield to him the fruit most perfect in its completeness—and complete in its perfectness—to our sunny land, and assure him, that while the past has been full of hardships, the future shall be full of triumphs; though he has not partaken of the sorrows, he shall be welcome to a full share of the joys which are yet to come.

DISCUSSION.

D. W. Adams, Fla.: It has been my fortune to clear much pine land, and fully endorse the above method. I am opposed to the fashionable folly which will destroy the last vestige of vegetable matter on our pine lands, already so deficient in that particular. It costs $35 an acre to clear the land in that manner, while the trees can be deadened for $2 per acre, and no further expense will be required for three years, and then all the clearing that is necessary can be done for $15 per acre.

J. C. Neal, Fla.: The foot rot is not confined to low land. I have seen it in large orange trees at Bronson or black jack land and elsewhere on high pine land.

J. M. Samuels, Ky.: I wish to warn orange growers against the introduction of the cottony cushion scale insect. When once introduced it is very hard to exterminate. Florida ought to quarantine against trees from California or Australia. The insect thrives best in California near the coast, and it would be therefore especially dangerous if introduced into the moist climate of Florida. One year ago the Chapman grove, the largest in California, yielded between eighty and one hundred thousand boxes. This year owing to the ravages of the cotton scale the yield was only eight thousand boxes. Other losses were equally great.

B. F. Livingston, Fla.: The worst case of foot rot that I have seen is in the Leonardi grove at Pinellas, Hillsboro County, on high dry land.

C. F. A. Bielby, Fla.: I do not believe that all diseases which attack the tree at the crown are true foot rot or *mal de goma*. True foot rot is contagious, and very hard to cure. In all cases where this occurs I believe that the first tree, at least, has had too much water in some way.

H. E. Van Deman, D. C.: Does the scale insect exist in Florida, and if so, when and where was it first introduced?

T. W. Moore, Fla.: On a tree of Theodore Hartridge, in Jacksonville, it has existed for several years, and efforts to exterminate it have been unsuccessful. This is the only place that it is found in Florida so far as I know.

The Orange Industry in the United States, from a Commercial Standpoint.

GEORGE R. FAIRBANKS, FERNANDINA, FLA.

The cultivation of the orange in Florida is by no means a new industry. From the time of the settlement at St. Augustine by the Spaniards under Menendes de Aviles in 1565 it has doubtless been cultivated to some extent. At that early period only the sour and bitter-sweet varieties were in general cultivation in Spain, and the sweet, or China orange, as it was called, came in later, after intercourse had been estab-

lished with the East Indies. The missionaries of the Cross, who accompanied all the early Spanish expeditions to America, it is well known, were accustomed to bring with them and propagate whatever promised to be useful in the new countries where they established their missions. There is no evidence that any species of citrus was indigenous to Florida; on the contrary, there is the strongest negative proof that the French and Spanish explorers found no species of the citrus here. We are accustomed to speak of the wild groves and of the native trees, and it is true that large groves of the sour and bitter-sweet varieties are found amid dense forests in Peninsular Florida, but I think they are never found except in places suitable for human habitation, or without some evidence of former occupation. Early Spanish writers speak of the practice of horse parties visiting the interior stations, carrying with them oranges and planting the seed. There were many Franciscan missions established throughout the peninsula among the native tribes, and doubtless to these early tribes, under the guidance of the worthy Fathers, we owe the general distribution of the sour and bitter-sweet varieties, which are by much the most hardy of the citrus tribe, and our experience informs us how readily the tree is propagated by animals and birds in our rich hammock soil, so well suited to its reception.

In Roman's Natural History of Florida, published in 1775, a very rare and interesting book, enumerating the products that would be valuable for cultivation in Florida, he makes mention of oranges as follows: "Oranges of various kinds are worth notice, as they are on many accounts useful in drinks and sauces, and their leaves furnish a good fodder for some esculent animals, such as sheep, rabbits and goats; they thrive extremely well throughout Florida,"—page 133. Among the exports between 1754 and 1773 from Savannah, Ga., a few hundred gallons of orange juice appear to have been exported each year, but no fruit.

It was impracticable in those days to export oranges from Florida; sailing vessels were the only means of communication with the outside world, and the delay and uncertainty, with the perishable character of the fruit, made the venture an unsafe one. Naturally the orange had no commercial importance and was regarded only as an ornamental and domestic product, to be propagated only so far as it was available for home use.

After the acquisition of Florida by the United States, the American population gave some impetus to the planting of groves along the coast and on the St. John's River. The fruit was purchased by small coasting vessels, which came out from the North with provisions and carried back oranges among other exchanges. This limited export was only available on the coast or navigable streams. A far sighted and enterprising Englishman, Mr. Zephaniah Kingsley, was the most extensive orange grower at that period, having established groves on Drayton Island, Buena Vista, Picolata, Mandarin, Arlington and Fort George Island. It was not for the want of a knowledge of the value of the orange that orange growing made such slow progress in Florida. It was simply the question of transportation. Without the aid of steam vessels and railways an orange grove possessed no commercial value. The rates of freight by ordinary land or water carriage, and the perishable nature of the fruit, forbade the engaging in orange growing as a productive industry. When at length the steamboats came and ascended all navigable streams, and railways began to penetrate the country, orange groves began to be planted. Lands which had once been covered with wild orange groves and cleared up for cotton planting, were re-occupied by groves of this fruit. Nurseries were established, wild groves cleared up and budded, and a wide-spread interest in orange growing pervaded all the central and lower portions of Peninsular Florida. Capital came in from abroad, wealthy men invested for profit and pleasure, and the course of pioneer settlements was reversed; civilization and impromptu improvements preceding the ruder modes of settlement in the West. Handsome residences and elegant houses were scattered through the wilderness, and towns and villages grew up with amazing rapidity.

It is hardly fifteen years since this industry acquired prominence, and all at once, as it were, attracted attention to Florida. Where but a few hundred small groves existed twenty years since, there are now probably over ten thousand. Cotton, corn, sugar, rice, grazing, all require large areas. Orange growing is one of the most compact and productive of all agricultural industries. One acre of land devoted to the culture of cotton will produce perhaps fifty dollars' worth of cotton, or twenty dollars' worth of wheat, corn or other grain. A well established, mature orange grove can be relied upon to produce an orange crop of the value of three hundred dollars to the acre, even at the low price of one dollar per box.

One railway car will carry the product of twenty-five acres of cotton, but can only carry the product of a single acre of oranges. A grove whose product is 10,000 boxes of oranges will furnish freight for a train of thirty-three loaded cars. This illustrates the commercial advantage of orange growing in building and sustaining railways. If we estimate the crop of Florida at present at three million boxes it requires ten thousand carloads of 300 boxes to the car to move the crop, and calculating the average freight at sixty-six cents per box, the crop pays the railways two millions of dollars for freight alone. The value of the box stuff used would be $390,000, the nails $30,000, the paper for wraps $120,000, labor in gathering and packing, $600,000, thus making an output of one million one hundred and forty thousand dollars for simply preparing the fruit for market. If to this large sum we add the cost of cultivation, of fertilizers, of packing houses, teams, tramroads, and the tools and implements of labor, we can begin to realize the commercial value of this industry even at this incipient stage of growth. When we realize that not more than one-fiftieth of the orange trees in Florida are bearing, we are amazed at the possible and probable future development of this industry, peculiar and limited to this single State of Florida and small areas in Louisiana and California.

In view of the future coming into bearing of so many times the number of the present bearing trees, and consequent increase of this crop from its present product to the untold millions of boxes of future years, the question naturally arises: What will be the future of the orange industry as regards profitable returns? Some in a general way say that we cannot overstock the market; others consider that we have already reached the point where the profit is uncertain and the risk considerable. We now import annually about three million boxes of oranges from abroad; Central America and the West Indies and Spain and Italy now export to the United States, and Mexico will no doubt soon increase her exports of fruit. Florida is credited with producing three million boxes, California about seven hundred thousand boxes, and Louisiana two or three hundred thousand, so that the present annual consumption of the United States is about seven million boxes. Within ten years we may anticipate that the increase of production of Florida and California will be very large. If all the trees now planted in the United States were to come into bearing, there is no question but that the supply would exceed the present demand.

It is but proper, therefore, to consider both sides of the question, our advantages and disadvantages in marketing our fruit. The capacity of Florida for producing the citrus fruits does not admit of a question. Two severe and exceptional freezes occurring in Florida within the past one hundred years have tested the ability of the orange to resist a very low temperature.

Our advantages for the culture of citrus fruits may be briefly stated:

Our climate is adapted to the growth and production of oranges in their greatest perfection, being neither too cold nor too warm, too dry or too wet. Nothing, in fact, is lacking to enable us to produce the best of fruit in the greatest abundance, providing we select the lands suited to its cultivation, of which we have far more than the area needed. We have, moreover, great advantages in the location of our orange groves within a thousand miles of the principal markets of the United States, and consequently transportation should be both rapid and cheap.

Our disadvantages are, first, the season of the

year when our fruit matures. Our fruit comes into market in the months of November, December, January and February, a period when the autumn fruits of the North are still abundant, and when the demand for succulent fruits is not so great as in the summer months, and when there is more risk in transportation, from extreme cold and sudden changes of temperature. Secondly, we have the disadvantage of meeting the competition in our markets of inferior West Indian and Mediterranean fruit. Thirdly, we have unsatisfactory and inferior rail and steamship service with higher rates of transportation than those paid on foreign fruit, and higher than the price obtained for Florida fruit justifies. Again, even for the brief period of our shipping season, we are always liable to the risk of the fruit being injured by cold weather in December and January, if allowed to remain on the trees; labor, box stuff, etc., and commissions are comparatively high, so that even at the prices now received, more than half the amount of the gross sales is absorbed in the expenses of placing it in market and selling it.

In view of all these drawbacks it may be thought that there appears to be on the whole very little encouragement for orange growing in the future.

It may be admitted at the outset that lower prices than heretofore obtained are certainly to be anticipated. We believe, nevertheless, that orange growing will, under proper conditions, always afford a fair profit in Florida, and probably in California, for the following reasons: The increase of productive groves will not equal more than twenty-five per cent. of those set out, because a large percentage of groves have been planted in unsuitable localities and will have to be abandoned as the groves grow older, and always with seedling trees there will be an alternation of bearing and fruitless years, which will reduce the average product one-half: the expense of caring for and working groves can be greatly reduced; the cost of preparing fruit for the market will be greatly lessened; transportation will be improved and made less expensive. System and coöperation will be introduced into the methods of marketing oranges and lemons, so that a fairer average market price will be obtained. As the cost decreases the consumption of oranges will increase. Even if eventually the net returns should average as low as fifty cents per hundred to the grower, allowing for an average yield of 40,000 oranges to the acre, on fully matured trees, the returns would give a handsome per cent. upon the outlay.

To bring orange growing to the best condition of success as a profitable industry, the aim of growers must be to produce fruit of the best varieties, and of superior excellence as to quality. The orange growers of this country cannot afford to raise or send to market inferior fruit. It costs as much to produce poor fruit as it does good; it costs as much to gather and prepare for market poor fruit as good, and this inferior fruit depreciates and injures the market for all fruit.

All inferior groves, either in location, soil, or varieties of fruit, had best be abandoned, and only first class groves, producing the highest grade of fruit, maintained. If the problem how to preserve our fruit and extend the marketing season over a larger period can be solved satisfactorily, we shall have an additional guarantee of success.

We sum up the future success in orange growing in two things: Reducing the expenses of growing and marketing, and enhancing the quality of the oranges and lemons grown in the United States. In this industry particularly, as in all others, the best always pays best.

The Lemon in Florida.

H. S. KEDNEY, WINTER PARK, FLA.

The culture of the lemon is yet in its infancy in this State, and it almost seems presumption on my part to undertake a subject of which so little is known.

Until the finer varieties of the lemon were introduced into this State by General H. S. Sanford some fifteen years ago, the lemon, as then known, was considered about worthless for all commercial purposes. In almost every grove in the southern portion of this State you could find one or more trees, either of the native wild

lemon, or of the seedling trees raised from the pips of the imported Sicilian or Italian fruit, both producing large, coarse, thick-skinned lemons, which now and then found their way into the Northern markets, but which generally proved unsaleable. Florida is therefore greatly indebted to General Sanford for introducing the choicer varieties from abroad, and who evinced his faith in the future of the lemon by largely increasing the size of his own grove, from which grove, probably, was marketed the first really profitable crop of lemons of any size ever shipped out of the State. Since that time the culture of the lemon has been attracting wider attention yearly, and is, I feel, destined to be in the future one of the most profitable and staple crops. In the first successful handling of this fruit, and in drawing attention to these finer varieties, the lemon growers of this State are probably more indebted to the Rev. Lyman Phelps, of Sanford, than to any other man. My own attention was first drawn by him some seven years since to this fruit, and at the Belair Grove of General Sanford he showed me the results of his careful experiments with these imported fruits, and from that date my interest in the lemon has grown more and more with each succeeding year.

As to the varieties of the lemon in Florida, they are many, as with the orange. First comes the wild native lemon, a large and handsome tree with vigorous growth and straight tap root, and globular, brilliant orange colored fruit, large and very rough skinned, and with peel sometimes a quarter of an inch in thickness. Its juice is rather sweetish in taste, and is of no value except as a stock for other varieties. Its origin is uncertain, and, like the wild orange, it is found growing in the rich low hammock lands, but is very rarely seen even there. Then comes the so-called Florida Sicily lemon, a seedling tree of any chance seed that may have reached us from abroad, and spreading out into many types, most of them worthless, some bearing fruit at all times of the year, under the general name of ever-bearing. Then come again seedlings from these same trees, among which now and then we find a choice variety, producing a fair fruit, thin skinned and well flavored. From this origin probably come the Bijou, Lamb, August, Waring's Seedless, French's Seedling and others. But with the lemon, as with the orange, we must look to the dollars and cents, and the most profitable varieties must ever take the lead. Of these I should place first and foremost the Villa Franca and the Belair Premium. It is difficult to say which of these is the best. In all points but two I should declare in favor of the latter, but these two are important points. The Villa Franca is the more hardy. According to my observations during the winter of 1886-87, the severest experienced in this State since 1835, my own trees of this variety felt the severe cold much less than any other kind. The second point lies in the *shape* of the Belair Premium, which is much more globular, being nearly round, and is not, on that account, so handsome a fruit as the Villa Franca, and we all know what appearance goes for in the sale of our products. I think it would be safe to say that two-thirds of the lemon groves of the State are composed of these two varieties. Closely following are the Genoa and Eureka, so nearly resembling each other that they seem almost identical, the former imported by General Sanford, and the latter reaching us from California, where it is a favorite kind. Then come the Sicily and the Lisbon, both good varieties, but more susceptible to the cold. We have, besides, the Sicily Ever-bearing, the Bergamot and the Variegated, and, more recently introduced, the Suacco, the Communist, the Malta, the Neapolitan, the Tuberculator, and others. These all are either of no value commercially, or else are unsafe to plant largely until our experience with them is wider than at present.

As to the location of the lemon grove I do not, generally speaking, consider it safe to plant a grove in any portion of North Florida, but it is difficult to say just how far south it is necessary to go, for I know of many fine trees growing much farther north than I should care to plant out my own; but no matter where you put your grove, the more protection of water and of heavy timber to the north and west of you the better, and in choosing a spot for a grove I

should avoid as far as possible the neighborhood of both bays and scrubs, for the cold is apt to be much more severe at such points. At this time, the largest and most profitable lemon, groves in the State are perhaps located in the Lake Weir region of Marion County, and the Apopka section of Orange County, not forgetting the Belair grove near Sanford. Many trees during the past two years have been set out in the extreme southern portion of the State and on the Caloosahatchee River.

The lemon should be carefully budded, and quite low to the ground, on strong and healthy stocks. Until the year 1877 many lemon and orange trees were budded on seedling Sicily lemons, and these were generally killed to the ground during the severe cold of that winter; others were budded on the wild Florida lemon, and part of these passed through this season uninjured, while some were killed; other groves still were put on sweet and soar orange stocks and were injured very much less, and in favored localities were hurt no more than orange trees of the same size. I should therefore certainly advise using the orange, either sweet or sour, as a stock. I have large trees budded on both these stocks and can see no material difference, though I generally favor the sour stock, as being perhaps more hardy, less liable to disease, and better suited for growing on low lands, though I think the sweet will be found preferable for very high and sandy soils.

For the successful growth of the lemon I prefer lands not too high and dry, as this fruit requires more moisture than the orange, and it is a noticeable fact that the rust mite seems to attack the fruit much worse under ordinary cultivation, on the higher lands; still these higher lands, if properly shaded, will, I believe, produce fruit fully as fine and abundant. Lands with clay or hard-pan not nearer the surface than four feet are very desirable, but no water must stand around the roots, and the richer the soil the better.

In setting out the lemon grove, the method is similar to that followed with the orange, except as to the distance apart in placing the trees. This should be much closer, and fifteen by twenty feet on the lower lands, and twenty by twenty-five on the higher will be found preferable, and I am by no means sure but that, on lands sufficiently rich and moist, ten by fifteen feet even would be the better distance, as in parts of Italy and Sicily. The closer the trees are planted, the sooner will the ground be shaded, and there is no longer any doubt but that the lemon needs shade and plenty of it, and the sooner the branches reach out and cover the surface of the ground the better. I might in connection with this mention an illustration that has recently come before me. In planting out a portion of a certain pine land grove some sixteen trees were accidentally put very close together, not more than ten to twelve feet apart. These have been set out some six years now, and produced the past season a much more abundant crop of fruit than any of the surrounding trees. All of this fruit was handsome, sizeable and bright, being entirely free from rust, while the rest of the grove had much less fruit, and a large proportion of it was badly rusted. The branches of these sixteen trees have reached out so far as to be interlocking, so much so that it is impossible to use the plow, and the entire surface of the ground is thrown into shade.

In the cultivation of the lemon, the course pursued is the same as in orange culture for the first five years, and until the tree begins to fruit. At that time trees well cultivated, pruned, and fertilized, should be from ten to fifteen feet high and nearly as broad. After that, I should advise using the plow as little as possible, and to cultivate with the sweep, shallow running cultivator, and hoe, stirring the soil only in the months of November and May. Use as much mulching as possible, and only fertilize once a year, and that in the month of November. Put on a very liberal supply, spreading it over the entire surface. I prefer such fertilizers as are rich in ammonia, since the lemon needs more food than the orange, and is a much more rampant grower under favorable conditions. Prune thoroughly at least once each year, and keep all dead or diseased wood cut away, and the tree should be hollowed out inside and kept free from water sprouts. The lower limbs and those touching

the ground should be pinched back somewhat, wherever they have a tendency to push out long and straggling ends from the main body of the tree.

The lemon tree ought to begin to produce fruit about five years from setting, provided it has been well cared for, and it will average from a quarter to a half box in that year, and should double its yield annually until it will produce from six to eight boxes in the tenth to twelfth year, and this would be a safe number to reckon upon as an average yield of a grove. There are usually two crops of fruit, the first ripening in July and August, and the second in October and November. In some years the summer crop is the heavier and in some the autumnal. There are besides scattering lemons during the entire year, but not in sufficient quantity to be of any great value. In gathering and packing the fruit one cannot be too careful, and our growers are very apt to be careless in the grading and sizing of the same. The lemons should be carefully cut with clippers, put in baskets, and not in sacks as is customary, carried to the packing house, and then graded, rejecting all bruised, scratched, rough and overgrown ones, and all russets, as it will not pay to ship such. Lemons should be sorted into three sizes receiving two hundred, two hundred and fifty and three hundred to the box, the latter size being the most saleable. This operation has to be done by the eye, as no sizer has yet been discovered that will suit the irregular shape of the lemon. It is perhaps well to have a board with holes cut in it of just the proper sizes and placed before the sorter as a guide to the eye; some growers pass all lemons *through* these holes, but this is a slow and costly process, and the skillful sizer will soon learn to guage with his eye the proper sizes. All fruit should be wrapped and placed as tightly in the boxes as possible.

There is much diversity of opinion as to the coloring of lemons, for the summer crop being picked when quite green, requires a curing or ripening process. After trying various methods, such as sweating, drying, exposing to the weather, and subjecting to the fumes of sulphur, I have concluded that the better plan is to pack as soon as possible and ship at once only to such dealers as have curing rooms. The fruit ripens somewhat in transit, and after arrival can soon be cured and to much better advantage at its destination than it can be here. There is also a divergence of opinion as to when to pick the lemon. Some prefer to pick when the fruit reaches a diameter of from two to three inches, without regard to ripeness; others wait until it is fully grown and partially colored, but I prefer to gather whenever the peel has a smooth and shiny appearance, but do not always wait for this, and generally gather every lemon that reaches a diameter of two and a half inches by the fifteenth of July or before, so as to reach the usually very high markets of that period.

I have found the lemon tree much freer from diseases and insect pests than the orange, and it seems rarely troubled with "blight" or "die back" under conditions where the orange tree would be sure to have one or the other disease. It also seems to be rarely troubled with scale. But its greatest enemy is the rust mite. A russet orange is saleable at a reduced price, but a russet lemon has thus far proved unsaleable, though really just as good, and it is probable that in the future there will be found a use for them, for there is nothing against them except their appearance.

There are several preparations of sulphur, lime, carbolic acid and other chemicals, that will certainly kill the rust mite, but I question much whether they are practically available in a large lemon grove on account of the cost and labor of applying them; and I am of the opinion that these preparations are not healthful for the tree. Whenever I have used them myself I have found a following evil of scale. Shade, and plenty of it, and absence of all animal fertilizers during the growth of the fruit, are, I think, much better preventives.

As to the profits of lemon culture I am very hopeful. Up to the present time the prices obtained for Florida lemons have been very high whenever the growers have taken pains in packing carefully, sorting properly, and shipping at the right time. Our first crop, ripening generally in midsummer, brings high prices,

and I have known eleven and twelve dollars per box being realized about the Fourth of July, though this is a very exceptional case. At this season of the year the old Sicilian crop is about used up, and the new one not yet ready for market, and the average prices for choice Florida lemons will run from two and a half to four dollars per box and higher, and they will bring almost as good figures in October and November.

We have much yet to learn in all that relates to the culture of the lemon in Florida, but I feel confident that in the future it will prove more profitable than the orange. It requires more care and closer attention than the orange, but will pay well for this extra trouble, and in the years to come, I hope to see the lemons of Florida and California supply the entire markets of our country.

The Minor Citrus Fruits.

T. W. MOORE, FRUIT COVE, FLORIDA.

Geology testifies that up to a short time before man appeared on the earth no sweet scented plants had been produced. Plant life was in abundance, but there was no plant then in existence of the order of those now prized for their fragrance. Animal life was abundant, but up to this period there was no animal with sufficiently highly organized olfactories to appreciate æsthetic fragrance. The dog was here with his keen scent for prey, a scent not only useful in guiding him to his food, but which, under the education of domestic training, was to become sufficiently elevated to enable him to delight in the odor of his master for a nosegay, but not delicate enough to appreciate, even after six thousand years of training, the delicate fragrance of sweet scented flowers and fruits.

Geology further testifies that shortly before the appearance of man in the order of creation, these fragrant plants, flowers, and fruits began to appear in wonderful proportion — as high as nineteen per cent. of the flora in some sections. There was to be a new creation. There was to be a bridal. At the bridal the "US" of the Trinity was to preside. Sweet scented herbs and flowers and fruits were to be furnished and woven into garlands. Hence before the new creation of man, came the older creation of conditions essential to higher æsthetic qualities. In a word, a new creation was to appear of a race full of the poetry of taste and sight and scent, of such æsthetic possibilities as would not be satisfied with simple eating and drinking, living and dying; a race capable of pleasures of which the lower creation knew nothing. And hence, among the gifts to be specially prepared and given to man "of herb bearing seed, and of trees in which is the fruit of a tree yielding seed," the Lord God gave for meat, and for beauty and for fragrance the Golden Apple of the ancients, or the Citron of the moderns, or the *Citrus Medica* of the Latins.

The Citron was the first of the family introduced into Europe more than a thousand years prior to the bringing of the orange. It was brought from Media, hence its name, Medica. Palladius, a Roman writer on agriculture, a son of a Gaulish præfect, born about 405, tells of its cultivation. Bentham tells us that the citron is the parent of the family citrus. But it is certainly so ancient in origin, so royal in race, so devoted to man, that it must have delighted him in Eden, as in one form or another, it has followed him in all his civilizations. The ancient Israelites offered the Citron to, and laid it upon the altar of Jehovah as the fairest and best fruit that could be gathered from earth as a tribute of thanks to the Creator. What Du Tour has said in his Dictionary of Natural History concerning the orange is especially applicable to the Citron: "The scent of the flower is regarded as a standard of perfection of its kind. It is not, like that of many flowers, a deceitful sweetness which pleases only to injure. It is not like that of the jasmine and rosida; it does not affect the heart like the narcissus or tube rose; it does not weaken the nerves, but rather strengthens them; it is a salutary odor which refreshes the senses and enlivens the brain. In fine it has no rival, and is as salutary as it is delicate." The fragrance of the fruit excels all its race; a single specimen will fill a room with pleasant fragrance for weeks.

It is singular that the citron is so much neg-

lected by Florida growers. Tens of thousands of pounds of the dried citron are annually imported into the United States, selling for tens of thousands of dollars, and retailing to Florida orange growers at 35 cents per pound, and yet the citron has been so much neglected as to have almost entirely dropped out of the catalogues of nurserymen. Instead of importing we ought to export citron in vast quantities. It is easily grown, it is easily prepared. When carefully and skilfully handled, our home product is equal in quality to the imported. With fruit and sugar for preserving, growing side by side, Florida has no excuse for such neglect.

Shaddock or Pomelo (*Citrus decumana*).—"Fruit eight inches in diameter, yellowish green, even surfaced, twelve-celled or more, containing some a red, others a white pulp; the juice in some sweet, in others acid; rind thick, of a disagreeable bitter flavor, not esculent (except one known variety, the grape fruit); seeds egg-shaped, somewhat acute, two or three in each cell. A native of China, Cochin-China, Japan and the Friendly Islands. It derives its vulgar name from a Captain Shaddock, who first brought it from the East to the West Indies. In England it was cultivated by Miller in 1739." R. C.

The one exception as an esculent is the variety known as the Grape Fruit, fruiting in clusters like the grape, becoming favorably known and a marketable fruit, making a fine dessert eaten with sugar. It is more prized when gathered late in the season when fully ripe. It is then more prized by some than the orange. Skin smooth, pale yellow, sub-acid. Several varieties.

The Lime (*Limeta*).—The lime is thought to have originated in the West Indies, where it is more highly prized for its citric acid and as a cooling and pleasant drink than the lemon. It has never been properly appreciated in the United States, but it is becoming more popular as it is becoming better known. It does not keep as well as the lemon, but Florida's proximity to Northern cities would enable shipment in good condition if the fruit were wrapped or closely packed. The plant is more easily damaged by frost than the orange or lemon, and needs to be better protected. Some varieties are quite as large as a medium lemon. When the lime becomes better known it will be more largely cultivated.

The Kumquat (*Citrus Japonica.*)—"A small species, much cultivated in China and Japan. The plant is a shrub, sometimes six feet high, but in cultivation is not allowed to exceed the height of a gooseberry bush. The fruit is oval, about the size of a large gooseberry. The rind is sweet and the juice acid. The fruit is delicious and refreshing. The Chinese make an excellent sweetmeat of it by preserving it in sugar." —Reasoner Bros.

For their beauty, for perfume, for their home and marketable value in the raw and in the preserved state, for the sake of variety, these minor varieties of the citrus should be more generally planted and cultivated by growers in Florida, Louisiana and California.

DISCUSSION.

H. E. Van Deman: I hope this Society will adopt the name Pomelo in place of Grape Fruit. Pomelo is the popular name in India, from which the fruit was introduced. The fruit is distinct from the Shaddock, though much like it.

Lyman Phelps: There are several varieties of Pomelo, differing in hardiness and seediness. At the last South Florida fair a very fine seedless variety was shown which graded 97.

The Fig Industry in Florida.

HARRISON REED, JACKSONVILLE, FLA.

It is with some hesitation that I appear before this association of learned, scientific pomologists, to meet the duty assigned me by your Secretary, and tell what I know about fig culture, as I must confine myself to lessons of practical experience, without knowledge of theories or the subtle scientific causes of visible effects.

In reading the learned dissertations of French culturists, I had been led to regard fig culture as an intricate business, requiring too great care and too much expense to render it desirable for general adoption. It requires caprification to induce fruiting, and other curious methods, appliances appalling to the plain, practical

mind uneducated in the characteristics and habits of this fruit.

In 1866 I purchased a little farm on the St. Johns, opposite the city of Jacksonville, to which I retired after a few years of official duty in restoring the mail service in the South, and in the less successful and less appreciated efforts to establish a civil government uniting inharmonious and uncongenial elements and reconciling intelligence with ignorance in a common system of equal laws, upon the ruins of an intelligent, refined, and fascinating aristocracy.

Here I found a few fig trees, long neglected, but bearing fruit without care or special attention, and with no necessity of caprification. From these trees I have learned all I know, and which, without detail, I will briefly recapitulate.

The fig will grow in the South and produce fruit on any thoroughly cultivated land, from the highest and poorest blackjack ridge to lowest and richest lands not submerged with water, and the character or quality of the fruit, and the amount of the product, will be in proportion to the amount of the food and protection given. There are no insect enemies, and few considerations are necessary to success.

1st. It must be constantly borne in mind that the roots of the fig tree are soft and spongy and will not bear exposure to the sun and wind; therefore, in transferring a care must be exercised that is not necessary in the orange or other fruits with hardened roots.

2d. The roots near the surface, therefore, will not tolerate ordinary cultivation with the plow, and require mulching, especially on high and dry lands, and after continuous rains have induced roots near the surface.

3d. Plenty of fertilizing, not so much with the chemical stimulants as with the coarser manure of the barnyard, the fowl house, the hog pen, and the swamp.

In propagating from the cuttings, anything from the shortest and smallest branch to the largest limb will surely take root and grow if kept supplied with proper moisture and protected against disturbance of its position. In my experience I have found the old wood preferable to the new for cuttings. I have put out sections of limbs two inches in diameter, two feet long, inserted one half in rich, mucky soil not two feet above standing water and had them invariably take root and form trees for transplanting the next year.

By profuse fertilization I have induced, in one variety which answers to the California nomenclature of Brunswick, a continuous bearing during warm weather and up to the winter frosts, and increased the size of the fruit from that of a pullet's egg to that of a coffee cup, and improved the size and quality of all the fruit of the four varieties with which I started and which I have found adequate to all demands of taste and of market.

I have removed trees and put out cuttings successfully at all seasons of the year, only being particular to remove all foliage and cut away all branches and head back the main body so that the tree would be a mere skeleton. The winter and spring before the leaves start, is however, the most propitious time.

I have one old tree standing near the kitchen of the old domicile which has received the slops from the not over neat handmaids of the back entrance, from which I have gathered annually for the last ten years an average of ten bushels of marketable fruit, besides the ordinary waste from storms and blight. In that period I have removed more wood to keep the tree in comely shape than there is left remaining.

The fig industry in Florida labors under one difficulty not incident to California. Our frequent rains in the fruiting season preclude the open air drying and packing for distant markets, and we must therefore devise for that purpose a means of artificial evaporation, which if not already provided will soon be supplied by the fertile inventive genius of the country.

Our contiguity to markets, and the rapidly increasing facilities for transportation furnished by the enterprising capitalists who are seeking our commerce, will soon render the fig industry of Florida an important factor in its productive industries.

For years I have found market for fresh figs in the cities of Jacksonville and St. Augustine for from 40 to 60 bushels each season at from

$2 to $4 per bushel. When we can place fresh fruit daily on the tables of Northern cities, the consumption will be enormous and the demand constantly keep ahead of the supply.

A few years ago, through the agency and interest of Col. Elliot, the enterprising pioneer transportation agent of the Savannah & Florida Railway Co., fresh figs were successfully transported from Thomasville and from Jacksonville to New York, but the want of adequate agencies to undertake the handling of the delicate and tender fruit did not encourage its continuance, although a bushel crate, forwarded by me as an experiment, netted from the disgusted agent a return of over $3.

Every household and every garden in Florida should have its vine and fig tree, and every farm and fruit orchard should be provided with this luscious health giving fruit, and the markets of the North should be supplied with the fruit fresh, as well as in the different forms in which it may be preserved for indefinite periods.

In conclusion, I remark for the information and encouragement of the novice in the culture, that cuttings put out in January, February and March will, in one year from the next summer, produce fruit in quantity from a quart to a peck, and will increase in yield as time elapses. Its fruiting is sure and unattended by any contingencies of failure, save from neglect or carelessness.

DISCUSSION.

JAS. L. MOTT, Florida: Many varieties which will fruit in the northern part of the State are valueless with us at Orlando.

H. H. CARY, Georgia: Have tried several varieties at Lake Worth, Florida, but have succeeded with none yet.

H. S. WILLIAMS, Florida: I have tried at Rock Ledge several kinds from Southern Alabama and have yet to obtain the first ripe fig.

J. H. WHITE, Florida: I live near Mr. Williams, and have a few trees which have fruited well. They are on poor pine land about twenty feet above the Indian River.

T. W. MOORE, Florida: I have failed with the fig on high dry land, while not 300 yards away on low muck land I have been successful. The fig requires moisture. Gov. Reed's place is moist, and so is Mr. Steele's, who has grown it successfully.

H. S. WHEATLEY, Florida: I have grown figs on heavy bottom lands in Louisiana, where they made ten feet of wood one year and bore heavily the next. I have tried to grow them in Florida and failed. The soil here is too poor, except on the moist hammock lands.

R. W. PIERCE, Florida: I am on high pine land eighty feet above water, and were it not for the mocking birds I would have plenty of figs.

E. H. HART, Florida: Figs grow all along the east coast as far south as Oak Hill. Along the banks of the river considerable oyster shell land is found and the best trees grow on this soil a few feet above the salt water. They succeed on the high shell mounds also, but fail on high pine lands. They grow rapidly and bear abundantly on hammock lands, if not too low.

WM. CALLAHAN, Florida: I am in the west part of Clay County near Santa Fe Lake, on high pine land, forty feet above the lake. The subsoil three feet below the surface is clay. I fertilize with salt and wood ashes, and my trees bear every year.

H. REED, Florida: My trees bear every year, and were planted before the war. No other plant is so easily propagated. Failures are generally the fault of cultivation. On dry land they require to be mulched and well fertilized.

The Fig and the Pomegranate.

D. REDMOND, JACKSONVILLE, FLA.

In an essay read before the Florida Nurserymen's Association, at Palatka, Aug. 9th, 1887, the writer attempted to describe the Fig, its history, propagation, uses, etc., at some length; but as he does not wish, now, to travel over precisely the same ground, he will endeavor more briefly to set forth and emphasize a few points in regard to this valuable fruit, which he deems of practical interest:

The fig tree grows luxuriantly and bears regular crops of delicious and wholesome fruit, in nearly every part of the Southern, and especially in the Gulf States; and neither the tree nor the

fruit is liable to any serious disease or drawback, so far as my information extends.

In Florida, the fig is readily propagated by cuttings ten or twelve inches long, planted either in the fall (November) or early spring (March); but fall planted cuttings, in the open ground, should be made only from terminal shoots, and should always be heavily mulched, as a protection against frost.

The fig tree grows most rapidly, and bears more regularly and heavily, if planted on a deep, rich moist soil, not wet, but retentive of moisture. The tree is a voracious and gross feeder, requiring constant moisture within easy reach of the roots, liberal manuring, and a thick coat of some coarse vegetable matter, as a mulch during the summer.

In setting out a fig orchard, it is well to give the trees a distance each way of not less than twenty-five feet. Either rooted trees of one year old or cuttings may be used. On planting the latter in orchard, just where they are to remain, I have found it a good plan to dig a deep and broad hole—say three feet deep, and two feet broad—putting eighteen inches of well rotted manure or good compost in the bottom of the hole, filling to the surface with good soil, and then planting two cuttings ten or twelve inches long, about three inches apart, near the middle of the hole. When the cuttings start, the manure in the bottom of the hole will stimulate a vigorous growth, and if both grow, one can be carefully removed and transplanted to some other place.

The fig tree should always be trained to single stem or trunk, and not allowed to throw out suckers and form a bush. It is very easy to shape the young tree properly, by rubbing off the misplaced shoots and buds as soon as perceived.

Do not encourage a late fall growth on your one or two year old trees. If these are overluxuriant and sappy, check their growth in August by nipping out the terminal buds. Many rank growing young fig trees are killed to the ground by the freezes and cold winds of even our Florida winters; and choice kinds if exposed, should be wrapped in straw, or otherwise protected.

It is probable that many of our people have been deterred from engaging in fig culture extensively, by the fear that there would not be a remunerative demand for the fruit; and there is, doubtless, a general impression that figs dried and packed in drums, are the only form in which they will be sought after by dealers and the public. This idea is altogether erroneous. We have, probably, no fruit in cultivation which can be put upon the market in so many attractive forms, as the fig. For, in addition to the well known dried figs of commerce, now successfully produced in California, we have the fruit preserved in syrup; crystallized or encrusted with sugar; made into sweet and luscious cakes, to be eaten from the hand; canned as a marmalade; put up as a sweet pickle, and susceptible of many other uses in the family and for market. No words are needed to describe the delicious flavor and wholesomeness of figs ripe from the tree —so well known to all Southern people—nor need there be any fear that in some or all of these various forms alluded to, they will meet with the fullest favor from the public.

We have no treatise on the fig which can be considered satisfactory or exhaustive. The most elaborate essay I have seen is that of Dr. Gustav Eisen, of California, which shows broad investigation, and contains a great deal of valuable matter, with not a little that is merely speculative and conjectural. Dr. Eisen's list of names and varieties is quite bewildering; but very few of the sorts mentioned are yet known in this country. Our California neighbors are planting the fig quite extensively, and are said to have produced the dried fruit in great perfection. It is, of course, very gratifying to be able to compete successfully with foreign growers of fruit in putting such articles on the market; but, as I have already suggested, there are many other palatable, attractive, and profitable forms in which this fine fruit may be prepared, not only for domestic, but also for commercial purposes, without coming into competition with the cheap labor of other countries. Most of these modes, other than sun drying, or evaporating, are inexpensive, and may readily be en-

gaged in by painstaking and industrious people of small means, who thus have it in their power to increase their income and add to the list of human luxuries and comforts.

Little progress has yet been made by any of our Pomological associations in classifying and properly naming and describing the figs generally cultivated in this country. Downing's great work contains a list of more than forty varieties, as catalogued by the London Horticultural Society, and a recent Bulletin (No. 1) from our national Department of Agriculture, embraces a very full "Report on the Condition of Tropical and Semi-Tropical Fruits in the United States," in which our gifted and much lamented friend and associate, the late P. W. Reasoner, contributes a very valuable article on the Fig—(pp. 89-95)—containing a list of many varieties not yet known or cultivated in the South. Of the sorts now best known and tested here, I will mention only a few, as the nomenclature of even these is yet somewhat confused and uncertain. I give the names in common use only: Brown Turkey, Brunswick, Celeste, Lemon, White Smyrna, White Marseilles, White Genoa, Green Ischia, Black Naples, White Adriatic, and San Pedro. Both the last are of recent introduction; and while the White Adriatic is very promising, the San Pedro has, thus far, generally proved a disappointment—its great defect being the premature dropping of its fruit—for which we have, thus far, found no remedy.

In the great necessity for diversifying our fruit products, and availing ourselves of our varied pomological resources, I doubt not that, ere long, the extensive culture of figs, for home use and the market, will rank among our most prosperous industries, and I trust that it may not lack the fostering aid of this influential and powerful Association.

The Pomegranate, like the fig, is readily propagated by layers, cuttings, and seed. It is generally quite hardy in all of the Gulf States, and even farther north; it is an early and prolific bearer, a large shrub or tree, very graceful in form and foliage, and produces a great profusion of strikingly brilliant and lovely scarlet flowers.

The pomegranate is well known to most residents of Florida and the South, and very highly admired and esteemed by many, and yet it must be classed with the fig among the too much neglected fruits. A few words as to its uses and prospective value may therefore be appropriate.

The sweet pomegranate, when in perfection, possesses a fresh crispness, delicacy, and sprightliness of flavor almost unrivaled among fruits, and is considered a great luxury by all who obtain it; but with us, unfortunately, the season is very short, and the fruit very perishable. In Rhind's Vegetable Kingdom we are told that the ripe fruit of the pomegranate is in great abundance in August at Apello, and that it is then "laid up for the winter stock." (I must remark here that, so far as I know, this art of keeping the ripe pomegranate a considerable length of time does not seem to be known among us, though such knowledge is very desirable). In Syria the sweet pomegranate is cut open, the seed taken out, stewed with sugar, sprinkled with rose water, and served on little plates. An infusion of the crushed seeds in cool sweetened water is often used in the sick room; and a very delicate wine was extracted from these fruits by the ancient Jews, as may be inferred from the words "Grath Rimmon," signifying the press of pomegranates. The pulp-enveloped seeds are often used in the manufacture of jellies, preserves, and syrups; the rind of the fruit is used in medicine as a tonic and an astringent, and the bark of the tree produces the dye which imparts its peculiar color to the Morocco leathers of commerce. The pomegranate thus combines the *utile cum dulce* in a very great degree, and has no rival whatever as an ornamental and decorative fruit.

Downing said of the pomegranate, more than thirty years ago, that "it deserves to be much more popular than it now is in every Southern garden; and if raised in large quantities here it would become a valuable fruit for sending to Northern cities, as it is now constantly sent from the south of Europe to Paris and London."

Only a few varieties of the pomegranate are known or cultivated by our fruit growers; but it is beginning to attract the attention of some

progressive pomologists in different parts of the South. Within the past two years, several new and valuable varieties have been introduced, and I think this fruit is destined to grow rapidly in popularity. The Department Report (Bulletin No. 1), before alluded to, contains an article of some length on the pomegranate, in which the writer (P. W. Reasoner) gives a list of about twenty varieties. And taking into consideration the attractiveness and beauty of the tree, the ease with which it may be propagated, its habit of early and profuse bearing, and the economic value and varied uses of both tree and fruit, as above set forth, it certainly merits far greater attention than it has thus far received.

The Pineapple.

JAS. H. WHITE, MERRITT'S ISLAND, INDIAN RIVER, FLORIDA.

Mr. President and Members of the American Pomological Society:

The successful cultivation of the Pineapple depends upon several well known conditions. The first of these is exemption from frost. The plant is strictly tropical, and just to the extent that it is frozen just to that extent it is killed, and because of this, the area in the United States where it can be cultivated is quite limited. Florida is the only State in the American Union where it can be grown as a field crop, and only in a small part of Florida. Southern California has about the same immunity from frost as that part of Florida lying between the 29th and 30th parallels, and Southeastern Texas about the same as Southern Georgia. It is probable that no part of our national domain is absolutely exempt from frost, but for all practical purposes that part of Florida lying south of a line from Cape Romano to Jupiter Inlet may be regarded as tropical.

But absolute exemption from frost is not necessary to pineapple culture. South of 28° on the Atlantic coast and 27° on the Gulf coast, I believe a pineapple crop is in no more danger from frost than the corn crop of Ohio or the wheat crop of Virginia.

North of this line there are some localities where the fruit can be successfully grown without protection. Here on Merritt's Island, in latitude 28° 18', it has been injured but twice in fourteen years, slightly in 1876, and very badly in 1886.

In this climatic problem there is a positive as well as a negative factor. Heat is necessary. A region may be sufficiently exempt from frost, and yet too cold to grow pineapples.

The best pineapple districts of the world have an annual mean temperature of 75° to 78°, while that of Key West is 78°. Indian River Inlet and Punta Rassa are 74°, Merritt's Island and Tampa 71°, St. Augustine and Jacksonville 70°.

The Bermudas, with an annual mean of 67°, produce some pineapples, and coffee has been grown there. From these facts I conclude that most of the State of Florida has sufficient heat to grow good pineapples—hence, frost is the only barrier to its general cultivation.

As to suitable soils for this fruit, opinions have been very diverse. One writer says, "new rich land underlaid with clay;" another, "the soil should be very rich, and if possible it ought to be clay," while a very intelligent English cultivator says, "The fact that sand is its native choice would of itself serve to teach the cultivator that heavy clay soil is not likely to be the most suitable for the healthy growth of pineapples."

At first, low rich land was the fashion here. Rich shell land has also had its advocates.

Upon many points we yet need the verdict of extended experience, but upon two I think all intelligent planters are agreed.

1. The soil must be dry—either from natural or artificial drainage.

2. The soil must be fine—both in its material constituents and its mechanical condition.

As long ago as 1879 I wrote in the *Florida Agriculturist*, "The soil must be dry and fine;" and if our neighbor at Eden had heeded the admonition he could have saved the money he wasted by planting on both shell and coarse sand.

I think there is a growing conviction that our lighter soils, with suitable additions, will give better results than the heavier grades, however rich; but of whatever grade, it must be "dry and

fine." There are no exceptions to this rule, and an experience of thirteen years has served only to make it more emphatic.

So far as it relates to mechanical condition, the ground should be prepared much after the fashion of a well cultivated garden, and, to give the best results, it should be well fertilized with some highly nitrogenous manure. No fertilizer has given so uniform and satisfactory results in this region as cotton seed meal, or rather the meal of cotton seed cake.

During these years we have learned something of the wants of the plant. It is a great lover of ammonia, demanding less phosphoric acid and least potash. Plenty of ammonia, with abundance of rain and a high temperature, develops a remarkably vigorous growth.

In this vicinity and further south the time of planting is to a great extent controlled by the convenience of getting plants. When suitable plants can be obtained, there is no better time than the last half of February and March.

As to varieties, the common red or Spanish pine "holds the fort," because of its superior shipping qualities. Some other sorts sell for more money, partly because of their rarity, but chiefly because of superior size and appearance. "Fancy fruit brings fancy prices" is true, but the popular taste is not educated so as to recognize other than the outward qualities of the fruit. Hence, the only "fancy" there is in the pineapple market is large size and fine appearance. Practically there is no choice as to varieties. Only the Spanish is here in quantity, and only plants of this sort are within the planter's reach. Besides the Spanish, the two varieties most abundant are the Sugar-Loaf and Gypsy, or Egyptian Queen, but these are not sufficiently abundant to be an exception to the rule.

Of the several kinds of offsets, suckers are the most valuable, because they fruit soonest. I think their superior value is in their size. They are largest at a given age, and therefore the most valuable. The largest suckers, the largest crowns, and the largest slips are each the best of their kind. To this there is one exception. A sucker may be so old as to fruit prematurely, *i. e.*, before it gets sufficiently established in its new home to produce a fruit of marketable size.

How to plant? relates both to depth and distance. Plants should be set deep enough to keep them in place until they become rooted. On the Bahamas and Florida Keys they plant very close, and from fifteen to twenty thousand to the acre, provided they can find that number of holes in the rocks large enough to receive a plant. Along Indian river 2x2 feet is a common distance. Most of mine are planted 2x3 feet, and some 3x3, and my judgment inclines to the greater distance. Plants, like animals, must have sufficient food as a necessary condition of thrift. Close planting gives too many mouths for the supply of food.

Many plants half fed will not give as good results as half the number well fed. Large and fine appearing is the "fancy" of the pineapple market of to-day, and only stocky, vigorous plants will produce such fruit, and such plants cannot be grown without sufficient room for their development.

English planters constantly insist upon the production of strong, stocky plants, as opposed to slim, spindling ones. They uniformly give fruiting plants two feet each way, and less than that is what they call "over crowding."

Theirs is the verdict of long experience, under circumstances that constantly urge close planting. Their fruiting area costs not less than fifty thousand dollars per acre, while that of many Florida planters has cost them only one dollar and twenty-five cents per acre.

If intelligent English cultivators, at a cost of six dollars, gives each plant an area of four square feet, I think the height of absurdity is reached when a Florida planter can afford his plants but three square feet each, when that area has cost him less than .08 of a mill.

It is well known that close planting of cabbages gives slim, spindling plants, and small worthless heads; corn planted too close gives similar results, and so do other crops.

Neither close planting, nor mulching as a substitute for cultivation, will be practiced by the future planter. Mulching has already been dis-

carded and close planting is doomed to a like destiny.

I was the first advocate of cultivation on Indian River, having practiced it from the beginning, and now, after the experience of thirteen years, I have the satisfaction of seeing my judgment vindicated by the practice of the best planters along the river.

And now a few words about *irrigation*. It is an error of the ignorant to fancy that the little they know of a subject is all there is of it.

Measured by this standard, the irrigation of the pineapple is a small affair. We yet have most of it to learn. Testimony upon this point is very conflicting.

The Rock Ledge correspondent of the *Florida New Yorker* some years ago said: "The thirstier the soil, and the hotter and dryer the season, the better they do." More recently the same writer in the *Florida Dispatch* said: "They need water and plenty of it at all stages of growth to do their best. Here is quite a change of opinion, and the drift of popular thought is in the same direction. My own opinion has changed but little. Several years ago I wrote in the *Florida Dispatch*: "We know that they can grow and bear nice fruit with very little water, but we don't know how much water they can use to advantage." Most plants need quantities of moisture to supply the waste of evaporation through their leaves, and this supply must be kept up, or they wither and die.

This plant can maintain a healthy condition for a long time with very little moisture in the soil. But in another direction its need of moisture is probably as great as that of other plants Like other plants, its roots can receive nourishment from the soil only in liquid form. It therefore follows that moisture is a necessity of growth, and the greater the amount of plant food in the soil, the greater must be the amount of water to prepare it for the use of the plants. Highly fertilized areas need much more water than those only moderately fertilized. What the writer above quoted understands by "plenty of water" is indicated by the following: He says: "If the summer is hot and dry, we would advise frequent watering, pouring a half pint of water in the bud of the plant." If plants are set 2x2 feet, this would give .02 of an inch to the area of each plant. This amount would be of no value as a solvent of the plant food in the soil. Our average rainfall for June and July is about seven inches to the month, which is equal to 350 such waterings per month, or eleven times a day for half the month and twelve times a day for the other half. A single application should at least be equal to a fair shower, or one-half inch to an inch of rain. This would require one to two gallons per plant, or 250 to 500 barrels per acre.

By some *shade* is regarded as an important factor in this industry. I think it is mostly a question of moisture. Shade prevents evaporation, and thereby promotes moisture, and moisture promotes growth by furnishing plant food in solution. This increased nutrition will give larger plants and larger fruit, but at a sacrifice of quality. Both light and heat are necessary to enable it to attain that degree of perfection of which it is capable under the best conditions. This is true of all fruits, and especially true of high-flavored fruits like the pineapple.

DISCUSSION.

At the close of the paper Mr. White called attention to some Guavas upon exhibition. They bloom in March and April and the main crop is gathered in July and August, though ripe fruits may be obtained the year round. The fruit is as perishable as the strawberry, so that with present shipping facilities it cannot be sent to Northern markets in the fresh state. Considerable is sold however, in the form of jelly.

H. H. CARY, Ga.: Do the varieties come true from seed?

J. H. WHITE, Fla.: Not under present conditions. If a variety were grown remote from all others I think it would reproduce itself from seed. At present there are two methods of propagation used. The first is to layer a branch and the second is to cut off a root and turn up the end, when it will throw out branches. Ultimately I think the guava will be propagated by budding.

LYMAN PHELPS, Fla.: The guava requires high fertilization and needs more ammonia than other

plants. The orange fertilizer with six per cent more ammonia is good.

E. T. FIELD, N. J.: Have you propagated the guava from cuttings?

LYMAN PHELPS: Yes, but it is difficult. Propagation by severing a root is easiest. I would rather dispense with the peach than the guava.

J. H. WHITE: I have had moderate success with cuttings.

Pineapple Culture in Florida.

G. LOUTREL LUCAS, EDEN, FLORIDA.

Pineapple culture in Florida is in its infancy, and is certainly worthy of more attention than it now receives.

The growing of this delicious fruit in the open air is limited to the extreme southern portion of the Peninsula, and even there damaging frosts are liable to occur.

There are thousands grown on the "Florida Keys," which the planters depend upon exclusively as their living. Being better protected there than on the main land, makes this industry a certainty.

Pine culture can be made a success on a large scale in South Florida, by the selection of proper land and location.

The pineapple plant bears the second year from the time of planting, and continues fruiting each succeeding year, usually giving five crops, the plants occupying the ground seven years; at the end of that time the field is plowed up, the land allowed one year's rest, then well fertilized and replanted. The pineapple plant bears fruit but once, then dies, suckers sprouting from the base of the old plant, usually one, sometimes two, three, and four; when there is more than one the others are cut off and planted the same as slips, leaving the remaining sucker to do the fruiting the next year.

Suckers are sometimes expected to fruit in one year from the time they are planted, but it is uncertain to expect any, and when fruit does show, it is usually small and unmarketable. Slips which grow from the stalk at the base of the apple, are the favorite for propagation, requiring less labor to prepare for planting, and producing a field of plants, which at bearing age, are regular in size.

The usual method of preparing the soil is to grub the land and free the same of all stumps, burn the brush in small piles, and scatter the ashes well over the ground; after smoothing the land, mark it off in squares, and we are ready to plant. There is more or less difference of opinion as to the proper distance apart for planting; at one time eighteen inches each way was thought sufficient; now, twenty-two by twenty-four inches is the favorite distance.

I favor planting 3x3 feet, firmly believing that the result will be a better yield, and apples of larger size. Some claim that by setting plants more than two feet, the weight of the apple is liable to topple the plant, thereby causing sun scald on the fruit, but, I argue, why not take some trouble to prevent it by staking the plant, when the extra labor will be amply paid for by the superior fruit which will be produced?

The pineapple plant and the air plant seem to bear some relation, but at the same time the pineapple plant needs a rich, high, dry soil, and like any crop amply repays the owner for fertilizing and thorough cultivation, keeping the weeds down and the ground mellow at all times. The principal fertilizer used in this section is cotton seed meal, although ground bone, commercial manures and chemicals have been experimented with; but more time is needed to note results. Cotton-seed meal shows a greater improvement than anything else that has been used up to the present time.

I have never noted any benefits from mulching, and think the plants are better off without it, as neither wet or dry weather seems to affect them, and in fact, I know of no enemy except frost.

Pineapple shipments generally begin in this section about June 1st and extend until September sometimes later, as the crop does not all perfect at the same time.

We ship in slatted boxes (having partition in center) usually holding seventy-five pines.

About August we begin gathering "slips" from the old plants, so as to get new fields growing before cold weather.

There are quite a number of varieties of pineapples, and nearly all can be readily distinguished, either by their foliage or fruit.

The variety usually cultivated is the "Scarlet" or Red Spanish, and I believe that called the "West India" is the same. The fruit is of quite good size, plump, sweet, juicy, of good flavor. It is the finest shipper we have. The plant propagates slips and suckers freely, is of vigorous growth, having leaves which are somewhat thorny.

Of the fancy varieties, the Egyptian Queen stands at the head, it being truly the queen of pineapples; fruit of more slender shape than the "Scarlet," but of good size, apple of a deep golden yellow both inside and out, of an exquisite strawberry flavor, flesh very tender, including core, extremely juicy; the eyes are small and deeply set, differing from those of any other pineapple that I am acquainted with; foliage very attractive, and plant vigorous—the best variety we have for propagating slips and suckers.

The Sugar-Loaf is another superior pineapple, of sugary sweetness, pleasant flavor, flesh very tender, fruit quite juicy, plants not so vigorous as others, but in every way a desirable acquisition.

The "Trinidad" and Egyptian Queen, many mistakenly say, are the same—no mistake could be more apparent; while the "Trinidad" grows to an enormous size, the Egyptian Queen is small beside it; both fruit and foliage are distinct.

The Trinidad is not of fine quality, but rather coarse in texture, and juice with little or no flavor, fruit quite attractive and selling mostly on account of its size.

The Ripley Queen is, strictly speaking, a fancy variety of little value for field culture, but for the green house it is truly an acquisition, being handsome both in foliage and fruit, apple somewhat small, eyes curiously marked with bright red, plant equally as curious.

The varieties untested in this section are Charlotte Rothchild, Lady Beatrice, Lambton, and Montserrat, all distributed by the Department of Agriculture.

Pineapple culture in this section has proved highly remunerative, and as I have previously mentioned, this industry is young, and we have considerable knowledge yet to gain concerning the raising of this desirable fruit.

There are now under cultivation, at Eden, some 300,000 plants, and every year new fields being planted swells the amount considerably.

The shipments are beginning to assume vast proportions, and at no distant date Eden will be known as one of the largest pineapple producing sections in the United States.

Ornamental Palms.

THEO. L. MEAD, OVEIDO, FLA.

The family of Palms, well called the princes of the vegetable kingdom, is always recognized as specially characteristic of tropical regions, and the few species native of our warm temperate climate, perhaps more than any other feature of the landscape, persuade us that though we may not really have reached the tropics, that fabled region of perpetual bloom and growth cannot be far away. And yet in point of fact the climate in upper South Florida, say between the 28th and 29th degrees, is far from tropical; frosts, light indeed, but still frosts, may occur at any time during five months of every year, and the wonder is rather that so many tender plants should flourish here, than that we cannot persuade the equatorial species to endure our climate. But as the most enduring and persistent weeds of temperate latitudes are almost always tropical species, or species of tropical origin, which in some way are constitutionally able to endure frost, so we should not despair of naturalizing even equatorial palms until the experiment has been faithfully tried with each species in varied aspects and exposures; the failures must be put on record as well as the successes, and enough in this way has already been done, during the past twenty years, to serve as an important guide to the cultivator. Some noble and striking species have been found to be thoroughly at home with us, and others are shown to be available for more or less sheltered spots, while, of course,

for the lower extremity of the Peninsula the list might be almost indefinitely extended.

From a horticultural point of view we may divide the palms into two great divisions, the palmetto or fan palms, and the pinnate or feathery palms, the first division being familiar to us in our palmettos, the second as represented by the date palm.

The fan palms are the first to leave their traces in the geographical record of the trees, and seem to be a more primitive type than the others, which at the present time far outnumber them in species.

While the northern continent of America is characterized by fan palms of several species extending beyond the tropics, both on the Atlantic and Pacific coasts, the continent of South America shows a great variety of pinnate or feathery leaved palms extending southward far into the temperate zone, and it is from this region that we may look for our richest treasures in time to come.

The genus Cocos, best known by its tropical representative, the cocoanut, has its home in South America, and presents with its near allies an endless variety of species and forms, from humble stemless plants to monarchs of the forest and mountains. It has been, and still is, difficult to obtain many of these plants, as there are few botanists or collectors in those regions; our main reliance for seeds is on one or two European seed dealers who have correspondents there, and there is never any certainty that the species are actually what they purport to be. Hence, our observations will need careful revision ten or twenty years from now, when the plants now growing here have flowered and can be authoritatively identified.

Of old world palms, the genus Phœnix, of which the date is the most familiar representative, offers a great number of species, most of them hardy or nearly so in this latitude; and among fan palms there are many fine garden varieties of *Chamærops humilis*, a native of southernmost Europe, and some desirable Livistonas, among them the very popular greenhouse palms commonly known as *Latina Borbonica* and *Corypha Australis*.

So far as I know, no species of the great group of palms known as Arecas, or of their close allies, will endure the extremes of our winters and summers. Most of them flourish during the hot months, but are so crippled by light frosts that they pine away and die, while the New Zealand species (*Arica sapida*) is not hurt by severe frosts, but does not endure our summer heats, even when shaded from the direct rays of the sun. I have more hopes of the various species of Kentia from the South Sea Islands, but they have not yet been properly tested here.

Many palms which we cannot well grow in our gardens would probably live, and might even flourish in shady moist hammocks, especially if they could be placed in the edge of a running stream. Probably the Caryotas or fish-tail palms, with fronds like giant maidenhair ferns, would do well in such a situation, and I believe that our Royal Palm could be coaxed to grow far north of its natural range in Florida if such favorable spots were picked out for the experiments.

Some years ago a magnificent palm, with feathery leaves, and armed in trunk and leaf-stalks with serried ranks of formidable spines, adorned the grounds of Col. Coogler, at Brooksville, in Hernando county. The seed had been brought by a transient sea captain, probably from the West Indies. It was planted and grew with astonishing rapidity, so that at the time of its destruction by the great freeze of 1886 it had attained a height of something like forty-five feet, an average growth of five feet a year. This palm flowered and produced a seed, which I believe was sent to England for identification, but in the absence of pressed flowers the species of the tree was never certainly recognized, but it was thought to be an Acrocomia, and would have been put down as *A. sclerocarpa*, were it not that this species has always been considered a slow grower, as indeed it is when grown in pots. A plant of this species on my place, however, is rapidly outstripping all other palms in growth. I feel quite sure that this is the species which made such wonderful growth at Brooksville. This winter a cold of twenty-seven or twenty-eight degrees did not injure it. A year ago it

was two feet high, and now it is over six, and its rate of growth would indicate eleven or twelve feet for another year.

A. sclerocarpa is quite a common species in Cuba and the West Indies, but the seeds are so tough and hard that they take a long time, often five or six years, to germinate after they are planted. My friend, Mr. Reasoner, planted thirty pounds of the fresh seeds, and obtained me one plant by the end of twelve months.

I will briefly recapitulate the general groups of palms most available to us here in Florida, and give a list of twelve kinds which, upon the whole, have given most promise of success.

First come our own native palms, the cabbage, dwarf and saw palmettos, all of which are highly decorative and perfectly hardy. To these must be added the rarer needle palmetto of our swamps, which is the most easily transplanted of all, does well in higher land, and is distinct and beautiful. In this category we must include also the fan palms of the Pacific coast, the two Washingtonias, which do fairly well in some moist locations in Florida, and the Erytheas, which are hardy, but grow slowly.

Second, the Cocos and its allies of South America, from the little *Cocos Idertheri* of St. Catherine's Island, with its plum-like berries, to the lofty *Cocos regia*, with its five-sided spiral trunk, or the giant Ceroxylon, rearing its crest two hundred feet in the air beside the eternal snows and glaciers of the Andes.

Third, the hardier Old World feathery palms, represented chiefly by the many allies of the date and the Old World fan palms, including Chemærops and Livistona.

It may be of interest to mention that in my place at Lake Charm I had over eighty species of palms growing out of doors without artificial protection this winter. A thermometer at the house has registered 26 to 28 two or three times at intervals during the winter, yet I find but one or two individuals killed outright, and ten species more or less severely burned in leaf, while seventy species are uninjured. Most of these were fully exposed. A few, believed to be somewhat tender, were planted in shady, moist forest land near a running stream.

From my experience so far, I would select as the best twelve nearly frost-proof palms for decorative gardens for this region, the following: Acrocomia sclerocarpa, Cocos, Alphonsii, Cocos Goertneri, Cocos Romanzoffiana, Chamærops humilis, Livistona Sinensis (*Latania Borbonica*), Livistona Australis (*Corypha*), Phœnix dactylifera, Phœnix Canariensis, Phœnix sylvestris, Phœnix farinifera and Washingtonia robusta.

The Diospyros Kaki.

B. F. LIVINGSTON, WALDO, FLA.

The Kaki, commonly called the Japan Persimmon (*Diospyros kaki*), belongs to a genus of hard wooded, thick leaved trees of the natural order Ebenaceæ. In the East Indies and Ceylon, the most important species are those producing ebony.

In China, Japan and America, the most important species are those producing fruit.

The *Diospyros kaki* or "Chinese date plum," introduced into the United States from Japan, is the subject of our present essay.

After several unsuccessful attempts to introduce this fruit in the high latitudes of the United States, some enterprising nurserymen of the South, among them the Honorable P. J. Berckmans, of Augusta, Ga., and the late lamented A. J. Bidwell, then of Arlington, Duval Co., Fla., succeeded in establishing this most valuable and nutritious fruit in the states of Georgia and Florida.

The earnest solicitation for its success has stimulated an indefatigable effort on the part of our Southern nurserymen, who have found a healthy auxiliary in our amateur growers all over Florida and Georgia, each and all having solved some problem touching its propagation, until the present is an era of kaki culture, and we are sanguine in the hope that it will mark an epoch of prosperity for the growers.

My knowledge of the growth of this fruit tree being confined to Florida, enables me to speak with certainty as to this state alone; and I expect to be verified by our growers when I say that there is no fruit tree in the state that grows more thriftily and vigorously, with so little man-

ure and cultivation, as the kaki, especially when grafted or budded on our wild native stock, the *Diospyros Virginiana*. But this native stock is best when grown from seed, as the old field root-sprouts are barren and less thrifty, besides being predisposed to harbor the eggs and larvæ of the root sawyer* which is the principal enemy of our kaki. The damage is done by the larva from the time of hatching, until it enters the chrysalis state. The deadly work is done by cutting into the heart of the tree, and down the heart-pith to and through all the large roots.

The tree usually dies, but in my experience a few have survived. There are but two other enemies, to my knowledge, except perhaps the caterpillar, which a few years ago attacked one of my Zingi trees, but this one instance is all, out of thousands of trees, (but the caterpillars do damage our wild persimmons to a considerable extent). The two other enemies referred to above, are, a little worm that eats round the young bud, causing it to die, and the mealy louse or aphis that sometimes infests the young tender leaves in midsummer. Neither are serious, as the former is rare, and can be avoided by root-grafting (the proper way of propagating these trees), and the latter can be destroyed by the whale-oil solution. I have six hundred trees, grafted on one year old seedling stocks last February, that will average in height six feet, some specimens being eight feet high and two inches in diameter above the stock.

These trees were never fertilized. In fact I am sanguine in my opinion that these trees can be successfully grown without fertilization. What the fruit would be under such treatment I am unable to say, but from the experience of my neighbor, T. K. Gobby, an intelligent and very observing nurseryman, who is cultivating the kaki, fertilization further than common muck is unnecessary.

His fruit last year, without further fertilization, was equal to mine in size and flavor, many specimens weighing a pound, and some over that weight.

The trees fruit very young, many at two years from the bud or graft, and some of my last February grafts set fruit in the nursery rows last summer.

But a great and fatal mistake is made in letting such young trees fruit. I lost many young trees by making this mistake. One thrifty young tree bore 250 fruits and carried them bravely until they commenced to mature the seed, when in one day all its beautiful, vigorous green leaves wilted and died. These fruit trees seem to do well on almost any kind of Florida soil. They do fairly well on our clay subsoil, flat woods, on the high dry ridges, and also on wet bottom lands. Along the margins of the Santa Fe river I find the wild varieties growing from the seeds and from the suckers of old roots. Those growing from seeds produce fruit, while the others are barren. There are many varieties of these wild persimmons; some are oblong pointed, and some flat and depressed at the stem end. All are quite edible after frost, and some are really good; some are quite large, the largest of these wild varieties being frequently fully as large and quite as good as some of the smallest of the Japan varieties.

I may be here permitted to suggest without egotistic disparagement to the merits of the *Diospyros kaki* of our neighbors on the other side of the planet, that the *Diospyros Virginiana* may, by careful selection and cultivation, prove a successful rival of this most beautiful and most delicious fruit. The growing of the kaki is no longer problematic, but a fact *per se*.

But the problem of marketing is yet unsolved. Picking, packing and shipping this tender fruit must only be entrusted to skilled labor and artistic tastes.

Skill is required in the picking, packing and shipping, in order to insure its safe transportation, and the "artistic taste" is requisite, in order to make it attractive to the wealthy consumer, for at present we cannot hope to place it within the reach of the masses, not until the transportation lines can be induced to adopt a regular schedule of time, and tariff rates that are uniform over all lines, and to and from all points, which can only be accomplished by Federal legislation. The fruit should be clipped from the tree and wrapped in tissue paper, and

*A beetle of the genus Elaphidion.

packed in trays of one layer of equal size. The fruit should not be gathered until mature, but after maturity the sooner it is taken from the tree and shipped the better, as many varieties become soft very soon after maturity, after which they will not bear transportation.*

The Bangor sides, well seasoned, is the best material for trays; heavy heads like orange boxes, ripped to widths corresponding to size of fruit, give sufficient strength to the trays. Several of these trays can be strapped together with common orange box hoops, so as to make a package corresponding in size and weight to orange boxes.

Like most fruits the kaki is not true to the seed. Infinite variety seems to be the order of nature, we revere and bow with humble submission to this wisdom in nature, for it is only through this law that higher and better varieties are possible. The Japanese have cultivated the kaki for over five hundred years, during which time they have selected over forty varieties, which they are only able to propagate by grafts and buds.

These forty varieties are the best selection from millions of seedling trees grown during this long period of time. I find that owing to some hereditary environments (unknown) these forty varieties, although coming from the different provinces of Japan, and each one from different seed, have grouped themselves into families of very similar characteristics. Such, for instance, is the "Zingi" family, which embraces five varieties, each originating from different seeds, raised and propagated in widely different localities, and at different times.

They are all round, apple-shaped, medium sized, skin dark red, flesh hard, crisp, rusty-brown or black, with purplish dots, and seedy. Of the small, oblong pointed varieties, I find the Hya-ashi, Nitari, Tsuru and Tsuru-Magari, astringent and worthless.

There are fifteen varieties of the medium, and two small, classified as oblong and pointed, of which the following: Mazelli, Go, Tsuru, Shimno, Maru, Yama and Dyura, are yellow fleshed and more or less seedy. The Tankin, Dyura, Goshio, Gaki-Higaki, and Kintoka, have red flesh, and the Tengue, Masugata, Natura, Giboshiu, Abura, Tsuro-Gaihio, Hira, Goshio, Maru, Tsuro-no-ko, are more or less similarly characterized with flesh having dark rusty spots, or purplish dots, or reddish brown flecks, or black dots. I notice that these peculiar marks are not stable, but change in different seasons; that fruit from the same tree presents different marking on different seasons, and that the shape of the fruit changes on different years, and one of my best varieties that was entirely seedless two years ago had more or less seeds last fall.

These fifteen small "oblates" are closely allied to each other, and are all fairly good to eat in a raw state. But, I would not advise their propagation, by the novice, for the reason that the larger and better varieties are more profitable.

Of the large four-sided oblongs, there are, 1st. Diadia-Maru, which has a yellowish orange skin, and pale yellow flesh, with a juicy and sweet flavor. It ripens in October, and the tree is a good grower.

2nd. Okame, which has a bright red skin, with dark streaked flesh, with few seeds, and a very pleasant flavor.

3rd. Yama Dzura, oblong and very pointed, very large, weighing from twelve to twenty ounces, color of skin yellowish red, flesh yellowish red, also sweet, juicy, and rich. Matures first of October. Tree an excellent grower.

4th. Hyakume. A roundish oblate or blunt pointed oblong, very large, vermillion red skin, usually a black mark on the end when quite ripe. Flesh, rusty-brown with many purplish dots, fleshy, with few seeds; matures October to November; tree a good grower.

5th. Acro-cuka. A long slim acorn-shaped fruit, in length four and a half inches, in thickness two and a half inches. Color of skin, orange, flesh orange, and very soft and stringy, a few seeds at extreme apex. Flavor delicious, and peculiar; ripens in October. Tree a slow grower.

*Mr. H. E. Van Deman, U. S. Pomologist, says on this point, "I think Mr. Livingston is mistaken as to it being hard to send to market, as the fruit will ripen up very nicely off the tree and is a *remarkably good* shipper." SECRETARY.

6th. Last and best of all is my Minno-Kaki, oblong, acutely pointed, very large, weighing from twelve to twenty ounces. Color of skin, yellow, flesh the same, almost perfectly transparent, perfectly seedless, and as free from membranous tissue as a glass of jelly. Ripens in September. Tree an excellent grower. This is evidently an improvement on its Japan antecedents, owing to climatic conditions.

There is another variety that I will describe and let him name it who will. It is nearly round, a little depressed at the calyx, very large, color of skin dull red, flesh crisp as an apple and full of dark hair lines. No persimmon flavor even when quite hard, sweet and delicious; ripens in November and hangs on the tree until February. Tree a good grower.

The large tomato shaped, deeply ribbed one, with bright red skin and yellowish red flesh, I am also unable to name. It ripens in October, and is highly esteemed at Waldo. It is sweet and delicious, but like all soft varieties, is a prey of the mocking birds.* All of the Kaki fruits are handsome when fully ripe, but the large varieties are very handsome and even gorgeous. They attract the attention of every one, and all seem to gaze on them with amazement.

In conclusion let me say that while I look on the kaki as established as a useful, nutritious, healthy fruit, yet the many varieties, some good, some bad, and some indifferent, must continue to cause much confusion, disappointment, and disaster to those who rush into their cultivation without mature deliberation, and the counsel and advice of reliable nurserymen.

I am only assured in recommending the four last varieties for general culture, particularly those of hard meaty nature, as they are good keepers and not much bothered by the birds.

The Grape in Florida.

E. M. DUBOIS, TALLAHASSEE, FLA.

In coming to this meeting you were prepared to hear a great deal about oranges, but few of you were aware that, besides orange culture, there is in Florida another industry which just begins to attract the attention of our people, but which bids fair to become, if properly and intelligently pursued, a source of wealth for our beloved State. I refer to the culture of the grape for Northern markets and for the manufacture of wine. Hundreds of acres of vineyard in bearing, in all sections of Florida, prove that not only the clay hills of our northern counties, but also the sandy pine land of South Florida are well adapted to grape culture. Nearly all varieties of grapes, both native and foreign, have been tried, but of course some do well in one place that fail in another. This is the case with Duchess, which is reported by Mr. Norton, of Eustis, Lake County, as one of his best varieties, while in my Andalusia and San Luis vineyards, in Leon County, the same variety proves entirely worthless, being attacked by mildew, anthracnose and blackrot, whose combined action ruins the whole crop and often kills the vine, notwithstanding the frequent application of sulphate of copper.

In the spring of 1887, in company with Mr. A. H. Manville, the able editor of the *Florida Dispatch Farmer and Fruit Grower*, I made a short trip through South Florida, with the object of ascertaining what faith could be placed in the reports of the wonderful success of new varieties of grapes in the Lake Weir region.

On our way we stopped at Waldo to visit the experimental vineyard of Baron Von Luttichau on the beautiful shores of Lake Santa Fe. There I saw fine Chasselas grown in the open air without protection, and fine specimens of Black Hamburg grown also in the open air, but with the fruit protected by paper bags. We admired some Goethe (Rogers' No. 1), which would have astonished Mr. Rogers himself by their immense size and compactness—in fact such grapes as the originator has never seen on the mother vine.

Rogers' hybrids seem to be at home, even better than at home, on the Baron's place, and some Herbert (Rogers' No. 44) rivaled Goethe for size and beauty. Lindley was not as fine; there were some imperfect bunches, and too much difference in the size of berries. Herbe-

*Mr. H. E. Van Deman names this variety the Yemon.—Secretary.

mont was not ripe yet, but promising. A white grape struck me by its delicate Muscat flavor and high quality. I identified it easily as Peter Wylie. We left Baron Von Luttichau's place satisfied that a great many varieties of grapes could be raised there to perfection.

The second vineyard we visited was that of Messrs. Lehman and Hostetter, on South Lake Weir, the proprietors of which claimed to be the originators of three new varieties, called by them Rock, Silence and Prince. Their vineyard is on common pine land, lightly fertilized and kept in perfect order. As soon as I saw the supposed new varieties I called them by their old names. Rock was simply Lindley, Prince has heretofore been know as Goethe, and as to Silence, it embraced all the black varieties in the vineyard: Wilder, Ives, etc., etc. But as Rock, Silence and Prince were fine grapes anyway, doing finely on their ground, Messrs. L. and H., sold a good many cuttings to their neighbors, and at paying prices to. After all, in changing the names of good tried varieties they did not do worse than the party who claims to have originated a wonder and sells us at $2.00 apiece some abomination not worth a Concord vine.

Since I have touched that question of new varieties, I want to say a few words about the facility with which some of our prominent pomologists are often led to exageration when praising the merits of some of these new varieties of grapes. Solicited by the originator to give their opinion on a basket of grapes interestedly offered, they cannot help paying a compliment in return, and in that case it costs so little to pay liberally. But the grape grower has just what he wanted, the testimonial of a competent man and well known authority, whose words he will have printed in large type in his prospectus of introduction, and thus it is that the biggest humbugs have often been endorsed by well meaning, but too enthusiastic horticulturists.

I want also to speak a little of the scientist (by vocation) and nurseryman (by chance) who has originated lots of new varieties of grapes which, "*when given to the world*" (!!!) will cause a revolution in the horticultural kingdom. He has had them for years—the world is waiting—but he is not ready to introduce them, and does not want anybody to help him. He will sell you the entire control of one or two of his marvels for a thousand dollars a piece (because it is you!), but if you ask him to permit you to try one or two of these varieties, with all due guarantee, in order to see whether they will thrive outside of his yard, he will tell you that all the eminent pomologists of this country are acquainted with the merits of his crosses and seedlings. As you and all others will not care to buy anything of that sort blindly, the great man will be left with all his inappreciable treasures. One by one the oldest novelties will die, perfectly unknown except by their originator, and will be replaced by others which will in their turn meet the same fate. How much more practical and useful to their fellow men have been Rogers, Campbell, Ricketts, Rommel and others, whose labor and efforts have materialized into fine grapes which we admire and enjoy, and with which the names of the originators will be forever connected, while that of the "scientist" will only serve to designate, and that for a short period, one of our numerous classes of "*Vitis*," which he claims to have discovered. Before long another scientist will appear who will change the whole system of classification and discover numerous other classes, groups and families upon which he will bestow his name and those of his friends. But let us return to the vineyards of Florida. In that of Messrs. Lehman and Hostetter, I found some trace of anthracnose and mildew on European varieties, but none on the native vines.

A little further south, near Eustis, I visited Mr. Norton's place and convinced myself that European grapes can be raised with profit in our southern counties. In Mr. Norton's vineyard there was no sign of mildew or anthracnose, and the vines looked remarkably healthy. As I have seen on the programme of this meeting that Mr. Norton will read a paper on *Vitis vinifera* in Florida, I will abstain from entering into details about the different varieties of this class cultivated by him.

From reports I have had from various sources,

I infer that Black Hamburg and Chasselas will succeed in Florida over a larger range than any other foreign varieties. Both are profitable to raise for shipping North, where they command high prices, ripening as they do here in the latter part of May or the first part of June, at a date when there are no other grapes on the Northern markets. Where European varieties do not thrive, Delaware, Niagara and Ives have proved the most profitable to raise for market. In our San Luis and Andalusia vineyards we cultivate about sixty varieties of grapes, after having experimented with over one hundred and fifty, including nearly all the foreign sorts received direct from their respective native countries.

Among the best wine grapes of Florida I will mention Cynthiana and Norton as marvelously adapted to our soil and climate. Owing probably to the high degree of moisture in our atmosphere, these two grapes attain a larger size of bunch and berry than anywhere else that I have seen them grown. They make here as fine claret and port as can be made from the best Bordeaux and Oporto varieties respectively, and which are free from that earthy taste so objectionable in most of our domestic wines.

Elvira and Missouri Riesling produce fine Sauterne and Hock, fully up to the standard of French and German wines of the same denomination.

By this succinct *exposé* you may see, gentlemen, that Florida can boast of her viticultural capabilities, and invite all to come and help in their development.

Vitis Vinifera in Florida.

H. VON LUTTICHAU, EARLTON, FLORIDA.

In 1880 I planted the first vines of my vineyard, which at present contains about 2,000 vines. It is located on an eminence, overlooking Lake Santa Fe, with a southeastern exposure. I consider the situation very favorable. At that time I did not hear of much grape planting in Florida. That many portions of this state are suited to the successful culture of the grape is abundantly shown by vineyards already established. Like almost all other fruits which can be successfully grown in Florida, we find only those varieties remunerative which we can bring to market early. June is the best season for grapes. In June they are regarded as a luxury. Therefore, our aim should be to offer grapes which have large, compact bunches, brilliantly colored, and of the best quality. A vineyard which will produce such fruit at that time of the year, will no doubt prove one of the most profitable investments that it is possible to make in this state.

From the planting of my first vines, my aim has been to find such fruit. I have planted nearly every native variety of good repute, and although there are many claimants, I have not yet discovered such perfection among the purely native American varieties, nor among the hybrids. The grape which I sought, if found at all, had to come from among the varieties of foreign grapes, *Vitis vinifera*. With some of these European varieties I have certainly been very successful. I have no proof to offer that they will do as well in all parts of the state. But I believe that those varieties of *Vitis vinifera* which succeed with me, will do even better farther south, and will prove unsatisfactory in those northern portions of the state where the American varieties thrive better than with me.

All reports of previous attempts to grow *Vitis vinifera* in Florida were discouraging, but there was little evidence that native varieties had done any better. The Black Hamburg seemed to be the best known and most extensively tested representative of the foreign grapes. I will say right here that, although I have grown excellent fruit of that variety, I would not plant Black Hamburg to any great extent for profit, even if grafted upon native stocks. Its time of ripening is not early enough to escape serious damage to the fruit if the rainy season comes early. If there is little rain at the time of maturity, by the help of paper bags and the thinning out of the berries the black Hamburg will prove valuable to the amateur. The same directions will be equally applicable to other varieties of *Vitis vinifera* which ripen late in the season.

The grapes most commonly grown in France

and Germany for market are the Chasselas. The Chasselas varieties are among the healthiest and hardiest, well adapted to field culture, and, with few exceptions, very early.

Possessing great beauty of form and bunch, they comprise all colors, except black, in great brilliancy—blue, red, rose, golden and white. In quality they are of the best. They will stand the transportation adversities even from Florida.

I procured a large collection of varieties of Chasselas, some in this country, but mainly from Europe, and now I have grapes that come up to my standard.

I wish to note that I can count with more certainty on those vines to bring me splendid fruit in June, than on any of American origin without exception. If, to-day, I wished to set out a vineyard, no matter how extensive, I should plant no others, but principally certain kinds of Chasselas, grafted upon *Vitis æstivalis*, or upon the Taylor. I am convinced that such a vineyard would be in a flourishing condition when all varieties of *Vitis Labrusca* and hybrids would have exhausted themselves several times. Almost all of my vines are now grafted on different varieties of *æstivalis* or on Taylor, and my experience leads me to believe that grafted vines are much to be preferred to those grown on their own roots. I do not mean to say that such vines would prove a failure; in fact I know that Col. Norton, of Eustis, who is, perhaps, more successful with foreign varieties than I am, grows all of his vines on their own roots. But with grafted vines we are prepared for the phylloxera, and secure a stronger growth and durability, which means long life. Also better resistance to any diseases that now attack, or may attack, our vines in time to come. For the roots of *Vitis æstivalis* are best adapted to our soil, and if I wished to plant some of the *Labrusca*, or hybrids, I would also graft them upon such stocks.

In 1887 anthracnose made its appearance. By acting upon the advice of Prof. Dubois I succeeded in checking the disease, and had hardly any of it the last season. My Chasselas kept free; Malaga, Malvoise and Flame Tokay suffered most. Grafted vines kept their vigor; those on their own roots showed a marked decline; some even declined to live any longer. Varieties of *Vitis vinifera* which have proved a perfect success with me are of the Chasselas—Royal Red, Violet, Bulbery Blanc, Fontainebleau, Jalabert, Rose, and a Chasselas seedling which is the earliest of all, also Early Malinzer. Those doing well under favorable conditions are Black Hamburg, White Fontignan and Tokay from Hungary.

I have some twenty more varieties of Chasselas, as well as other kinds, which promise well, and I hope that I shall be able, after this coming season, to add a black grape to my first list; as yet I have none to offer. I need hardly say that I have failed with many varieties, but will mention only the Malaga or Muscat of Alexandria, a variety almost universally known.

Strawberry Growing In Florida.

STEPHEN POWERS, LAWTEY, FLA.

Strawberries grown for the Northern markets must have speedy and sure transportation; hence we find the important points in this industry all grouped along the two great traffic lines of the Peninsula—the F., R. & N. railroad on the Gulf slope, and the J., T. & K. W. railroad on the Atlantic slope.

Beginning at the north, we find on the F., R. & N. line, Lawtey, Starke, Gainesville, Hammock Ridge, Ocala, and Panasoffkee. On the J., T. & K. W. line, Jacksonville, Orange Park, Mandarin and Federal Point. Strawberries are successfully grown in most parts of the State, but the district which raises them for northern shipment, embracing the above named places, is only about one hundred and fifty miles long, north and south, and fifty miles wide. In this district, Bradford is the leading county, Lawtey having about one hundred and fifty-five acres and Starke about fifty. The northern part of this district has some advantages for this industry and some disadvantages, as compared with the southern, but the advantages rather predominate. Frosts occur here two or three weeks later in February or March than in the south,

but on the other hand the southern section is generally more dry and sandy, which fact curtails the yield in the customary spring drouth, and also causes heavy losses of plants through the summer, often destroying the entire stand of old plants.

As between the Atlantic and Gulf slopes, berries begin to ripen a few weeks earlier on the Atlantic slope than they do on the Gulf slope. These slight differences in ripening do not amount to much. The Northern demand is not of much magnitude before March 1st, and last spring there were at Lawtey light frosts until March 24th, yet the season was one of more than average success and profit. The best growers in Bradford County care very little for February berries, and the January blossoms they would rather see frozen off than not.

The birds harvest, or at least mutilate, most of these early scattering berries, and even at $2.00 a quart, these berries are a nuisance rather than otherwise, as they entail an amount of tramping on the beds which the careful grower regards as of more injury than the fruit is worth. The heavy sandy soil, containing a high percentage of vegetable matter, which alone will retain sufficient moisture to make strawberry growing successful in this climate, becomes very hard under the constant tramping of a two months' picking season. The judicious grower, after having got his beds into a light and mellow condition, and applied the mulching, would rather lock up his patch and let the birds have all they can find until there are berries enough to amount to something. The main picking in March and April is of infinitely more importance, though it may bring only twenty-five to fifty cents a quart, than a few "shipments" at fancy prices to be telegraphed over the country in January and February.

It goes without saying, that strawberries destined to be shipped a thousand miles must be good travelers. The elements of the successful strawberry in Florida are few and plain, and the business of growing it must be conducted with Spartan simplicity.

The berry must be, first of all, hard; second, fresh; third, dry. It must be, like a good soldier, trained to endure the privations of a long march with light baggage. We fear that our Northern visitors, accustomed as they are to the gorgeous and luscious berries of the rich soils of their section, will not be greatly impressed by the little, hard, canister-shot specimens which we grow on our Florida sand. Even the best of them are not much bigger than a Minnie ball, but, like that famous projectile, they carry well, and they fetch the money, which is the root of the matter.

Florida growers have had such excellent success with two varieties, that they have little inducement to try any others, especially since nearly all other varieties, imported from the North, have been pronounced failures. The standard shipping berry of the State is the Neuman Improved, which is said to be the old Wilson's Seedling acclimated, though I cannot vouch for this. It is a self-fertilizing plant; the berries are irregular in shape, but nearly round, coloring first at the tip or on the upper side, very firm, and tolerably acid.

Its only competitor worth mentioning is the Hoffman, which is a less firm berry, darker colored, much prettier, and more uniform, being sharply conical. Both varieties are prolific, the Hoffman being a very little the earlier of the two, though it does not hold out so well in the spring drouth, and the plants are less hardy to withstand the summer "rainy season;" yet, strange to say, the Hoffman is almost exempt from rust, while the Neuman often suffers severely from it. This fact is thought by some to be due to the thicker leaf of the Neuman, offering a more attractive lodgment for the rust fungus. Growers sometimes grow a few Hoffmans for "toppers," and they generally command from five to ten cents per quart more than Neumans in the Northern markets. Yet, such are the homely, sturdy virtues of this old Florida seedling, small, hard, and acid as it is, that it continues to furnish more than four-fifths of all the berries shipped to the North.

The matted row system of cultivation is followed only by negligent growers, and that to a limited extent. All the best growers of the State seek to keep their plants isolated in hills.

That great enemy of the Southern cultivator, the crab-grass, would in my opinion render the matted row system unprofitable. Owing to the expense of horse keep in most places, and the necessity for a close hand to hand fight with the crab-grass, nearly all the cultivation is done with wheel hoes or hand cultivators, supplemented by the common hand and prong hoes. This hand cultivation permits very close setting of the plants; 20,000 to the acre is the ordinary allowance in Bradford County.

The writer is better acquainted with the soil in Bradford County than anywhere else in the State. Here it is generally the "flat-woods," which is a low and nearly level piney woods, with a clay subsoil about two feet below the surface, and a surface soil of sand containing a high percentage of vegetable matter. This soil is very retentive of moisture, and requires to be bedded up, with frequent surface drains or ditches. The same character of the soil causes it also to retain fertilizers well, and renders it excellently adapted to the strawberry. It is found in practice here that a bed three feet wide, containing two rows of plants, will give about the best results. But this causes so much waste of land that the beds are made wider, ranging from six to eighteen feet. In other parts of the State the "flat-woods" soil is not so prevalent. There the dry and sandy nature of the ground is less adapted to bedding up. Beds with frequent ditches between would dry up the plants and curtail the yield in the spring drouth, so growers more generally set their plants on a level surface.

Planting is generally done in the latter part of August and through September and October. The heavy beating rains of the midsummer rainy season, alternating with the hot sunshine, render earlier setting impracticable, unless earth is taken up with the plants, which is a slow process. The customary fall drouth makes it necessary that the plants should be got into the ground as soon as possible after the rainy season ends, in order that they may become well rooted. Holes are punched with a utensil having one or more sharp points. The roots of the plant are placed against one side of the hole, which should remain unbroken to retain moisture, and the earth is pressed about the roots with the other hand. In this sandy soil it is very desirable to have the bed firm. It should be rolled, or else made up some time beforehand, in order that it may become somewhat compacted by the rains.

The supply of manure in Florida is scarce; cow chips are about the only available source, and these are full of weed seeds and breed vermin. Hence the best growers depend almost entirely on commercial fertilizers. Cotton seed meal is found to stimulate the growth of foliage, but needs supplementing with potash and phosphoric acid to produce the best results in fruit. As a source of phosphoric acid, pure, raw, ground bone is a lasting fertilizer, and is thought to give firmness to the fruit. Potash promotes fruitfulness and imparts sweetness to the berries. Plants fed on cotton seed meal seem to be somewhat more exempt from rust than those treated with commercial fertilizers. This fact, together with the cheapness of the meal, proves delusive to some growers, and leads to a sacrifice of fruit, for foliage. The same result happens with horse manure, unless it is thoroughly rotted. In this stimulating climate it is necessary to be careful in the employment of nitrogenous manures in fruit growing.

It is found to be best to apply half or more of the fertilizer broadcast and harrow it in before planting. The rest of it is given in two or three applications, either scattered on the surface or in a slight furrow, and worked in with the wheel-cultivator or prong hoe. The amount given during the growing season, varies from a half ton to a ton and a half per acre. It is found that the larger application if given judiciously, coupled with good management otherwise, is the more profitable in proportion to the expense.

Mulching is more generally employed in Bradford and Duval counties than in the southern sections. The growers in the latter assert that mulching harbors vermin, and thus works an injury greater than the compensating benefit. Another point is that in the dry and sandy lands of the south, mulching material is less abundant.

In Bradford County it is found that an acre

of good native wire-grass in the more open piney woods, if well mown and raked clean, will mulch an acre of plants; but in practice this is seldom accomplished, since mowing and raking with machinery in the woods are necessarily difficult. It would be hard to find anything better for mulching than wire-grass; it is free from seed, fine, tough, flexible, very lasting, and yields an excellent fertilizer when it finally rots, supplying vegetable matter, which is much needed in this sandy soil. It is frequently raked off at the end of the picking season, stored up, and used again the next year. It is generally applied about the end of December, scattered evenly over the ground, covering the plants out of sight. In a few days it settles, showing the outlines of the plants, and these are then rapidly pulled through by expert workmen.

A good share of the picking is done by native women and children, somewhat less by the colored people. Both races are good natured, but rather indolent and shiftless, and require strict supervision. Two cents per quart is paid for picking, yet the berries have to be sorted in the packing house before they are fit to be shipped.

The length of the Florida picking season is a phenomenon which very few Northern people fully comprehend. Last year the writer sold a few quarts February 10th, but did not begin his regular shipments to the North until February 22d. He made his last shipment May 8th, but kept on picking for a month longer for canning, wine making, etc., and his children managed to collect enough berries out of the patch to make a final shortcake July 4th. Thus a single variety, the Neunan, yielded berries for five months, and in sufficient quantities to supply the table for over four months.

Within the writer's personal knowledge, plants have yielded a paying crop for four years. But most growers consider that it is best to plow them under after the second crop has been gathered. Plants set in September yield the finest, largest berries the following spring. But the second crop will generally exceed the first in total bulk by one third or one half.

Some claim to have the best success with new plants, others hold their old ones as long as possible. Cutworms are often very hard on young plants in the fall and early winter. On the other hand, old plants, which are overgrown with trash through the summer, are frequently injured or destroyed by the white or "cotton" cricket. It is found that cutworms and crickets prevail under opposite conditions. Clean culture during the spring and summer, leaving the surface exposed, affords ready access to the earth and invites the cutworm moth to deposit its eggs in the soil. But this same cultivation uproots and disturbs the young crickets. If cultivation is remitted, the resultant trash excludes the cutworm moths but fosters the crickets.

The title of this paper allows only a brief mention of the shipping department of the strawberry industry. Most of the berries are forwarded to the North in refrigerators, either cars or boxes; but if they are carefully grown and properly picked they may be shipped up to the middle of April, by ordinary express without ice. Berries for express shipment must be picked before they have attained their full size, and when they are only about half colored up. What is gained by the cheapness of express shipment is probably lost by the failure of the berries to reach full size, and by their immature flavor. It requires careful attention to details, and rigid sorting, to ship so far without ice successfully.

The average crop in Florida may perhaps be set down at seventy bushels per acre for the shipping season, say two months. Last year the writer shipped in February, March and April, 205 bushels from 37,000 plants, or about two acres. If the picking had been continued through May the total would probably have reached 275 bushels, or even more. Accurate statistics are lacking, but I would roughly estimate last year's shipment from the State at from 15,000 to 20,000 bushels. Bradford County shipped in the neighborhood of 5,500 bushels. Lawtey station about 4,000 bushels, though even here perfectly accurate figures are not attainable. This brought a return of about $32,600 net cash.

Peach Growing in Florida.

GEORGE L. TABER, GLEN ST. MARY, FLA.

Mr. President: The task you have assigned me in allotting to me an article on "Peach Growing in Florida," would have been an arduous one, even had the whole of this vast body of land, which comprises the largest State east of the Mississippi river, been located in a climate more nearly approaching the average of that from which the members of this Society are here assembled. Had that been the case it would have been necessary then, as now, to recognize the diversity of soil, difference in climate and telluric conditions, as they existed in different portions of the State; but in that case the valuable experience of a large number of prominent horticulturists, who have for many years, and in many States, been at work under similar climatic conditions, could have been made at least partially available; while as it is, with Florida not only one of the largest, but also the most southern of the States, we have to meet not only the varied demands of its different sections, but also to recognize the fact that the climatic demands of the State are to a large extent dissimilar from those that obtain in any of the peach growing States to the north of us, and call most emphatically for different varieties from those that constitute the bulk of more northern orchards.

Recognizing then this influence of climate, and the difference that exists between Florida and most of the other States in this respect, it is easy to see how for a long time peach culture in this State naturally came to fall into disrepute with all that class of settlers, who in coming to Florida from more northern States, have confined their attention to such varieties as were held in high esteem in the sections from which they came.

Many of these settlers have believed most sincerely that no reason existed, or could exist, why these varieties should not establish claims for recognition here as they had done elsewhere; and the failure in almost every instance of their doing what was expected of them, has served in the past to make it an open question with many (and by many others it was at one time settled in the negative) whether peach culture in Florida would ever prove a pronounced success.

Add to this, the fact that the orange seemed for a long time to be the *ne plus ultra* of everything to be desired in Florida, and it will be readily seen how, with the majority, the peach tree soon came to be looked upon as a usurper, and an encumberer of the ground, possessing no just claims for recognition, and how, after suffering a few ignominious removes to out of the way fence corners, it finally went over the fence to the brush pile. For a long time the golden hued orange was at a decided premium over her silver tinted neighbor, and the majority of Florida horticulturists did not look with favor upon a double standard.

The above statement of the case applies more particularly, however, to South Florida than to more northern portions of the State, and this for two distinct and separate reasons, the first of which is, that the influx of Northern settlers who have come to Florida with pomological pursuits in view, has always been more largely towards that southern section of the State which has been considered as possessing the greatest advantages in the growing of the citrus fruits, and hence the more radical climatic change that the removal of any varieties from their more northern habitat entailed; and in the second place, the disgust caused by the failure of the Northern varieties of peaches which have been introduced into South Florida has not had to offset it, until of comparatively recent date, the amount of modifying influences that have obtained in the more northern sections of the State, where other varieties than those brought by the Northern settlers have for many years set up a claim for recognition.

Before entering, however, upon the conditions that prevail in the more northern sections of the State, and while still upon South Florida, I wish to call attention to a change of feeling in that section within the last few years, amounting almost to a revolution, which was brought about by the introduction into Florida of the Peen-to type of peaches by the worthy President of this Society.

This introduction, although representing the

first of this type that we have any knowledge of in Florida, was really a reintroduction through seeds obtained by Mr. P. J. Berckmans, from Australia, in 1869, of the same or a very similar variety, as first introduced into this country from China many years before, and mentioned by Downing in his "Fruits and Fruit Trees of America," but of which first introduction all traces seem to have been subsequently lost.

The parent Peen-to is a flat peach of medium size, excellent quality, an annual and abundant bearer (unless caught by frosts while in bloom), and the earliest known variety to ripen in the open air in America. Its season of maturity in Florida ranges from April 15th to June 1st, varying as to season and locality. In South Florida it blossoms in December, and even in the northern portions of the State the fruit is generally well set by the last of January or early in February. The tree is an open, strong grower, uniformly well balanced and symmetrical. The fruit ships well, and when allowed to reach a proper stage of maturity before being picked it meets with favor in Northern markets. It commences coloring up a long time before maturity, however, and care should be exercised that it is not shipped too green.

Although I am personally situated in a section of the State where the Peen-to is apt to be caught with frosts while in bloom, I have shipped as many as four hundred bushels of this variety in a single season, and have had no trouble in getting them to market in good condition. My own shipments have been mostly made to such distant markets as New York, Boston, Philadelphia, Chicago, and Cincinnati.

Within the past few years the advent of a large number of new varieties from Peen-to seed, in which the form of the peach has changed to that of the common peach, and in which the time of ripening has also changed considerably, thus lengthening the shipping season, has served to still further awaken an interest in peach culture in South Florida, and indeed, for that matter, throughout the State.

As the known varieties of this type already introduced number upward of twenty, and as new varieties of them are being constantly brought out in all parts of the State, it is probable that the nomenclature committee of the Florida Horticultural Society will, in the near future, have to materially reduce the number of these varieties by classing as synonymous those that shall eventually prove to be such, in the same way as many varieties of the Alexander class as grown to the north of us are now classed as being practically the same. But care will have to be exercised in this direction, as not only the time of fruiting but the time of blooming has to be taken into account, and as we approach the more northern sections of the State this becomes an important consideration, for the parent Peen-to cannot be wholly depended on there, on account of its habit of too early blooming.

In connection with the Peen-to and its seedlings, the subjects of both bud and seed variation present themselves in a most forcible manner, for perhaps in no other type of the Prunus family do we see it more forcibly demonstrated.

The first variations from the parent, as obtained from seed of the Peen-to by the late Mr. A. H. Bidwell, were claimed by him to be sports and not the results of crosses in any way, and a few of our horticulturists go still further and claim that all the seedlings of the Peen-to that vary from the parent have been sports.

This latter view, however, cannot be entertained, as some of these varieties are the well authenticated results of artificial fertilization of the pistils, but their tendency to sport in the most unaccountable manner is a matter of record. It is alluded to by De Candolle, and in some of the seedlings as produced in this State the verifications of his statements seem to be apparent, while the "bud variation" above alluded to has given us in a large number of authentic cases, perfectly round peaches with the typical Peen-to both above and below it on the same limb.

I have myself picked several such specimens from different trees in my own orchards, but as this subject more nearly approaches the "Unsolved Problems in Pomology," which are to be treated of by Mr. E. S. Goff, of Geneva, N. Y.,*

*Now of Madison, Wis. SECRETARY.

during the present session of this Society, I leave it for his and your consideration.

Before leaving the Peen-to type of peaches, however, I must say that too much stress cannot be laid upon the value of this type for Southern Florida, and indeed, for Middle and Northern Florida also. For market purposes their extreme earliness recommends them, and for adaptability they have no equal in many sections. Many valuable orchards of them already exist, and many more are being planted.

A desideratum in connection with this type is to secure, if possible, varieties that will bloom about three weeks later than the parent, and yet ripen their fruit as early as the Peen-to.

But leaving the Peen-to and South Florida for the present, and coming farther North, we find growing in the corn and cotton fields of the older settlers, in the central and northern portions of the State, in some places scattering trees, and in others orchards of them, varieties the adaptability of which to these sections, is so pronounced as to have never been disputed, and some of which possess an enviable local reputation. These are the so-called native peaches of Florida, many of which are seedlings from seedlings, dating back many generations at least.

As to what their origin may have been it is often hard to determine; the close resemblance of some of them to well known northern varieties, is in some cases so marked as to indicate direct descent, and yet the fact confronts us that many of the true varieties which these seedlings so closely resemble, are almost entirely worthless in sections where their representatives are very valuable.

Our worthy President will remember a collection of specimens sent him by myself, in 1885, which represented the fruit from fifteen different seedling trees, and the close resemblance that he noted to such well known kinds as Late Crawford, Old Mixon Cling, Pavie de Pompone, Orange Cling, White Pineapple Cling, Thurber, and Lemon Cling, and yet, with the exception of two of these varieties, one of which (Pavie de Pompone) is now generally grown in the North, and the other (Thurber), which is of the Chinese type and will be referred to later, the true varieties of these kinds are nearly valueless in sections where their southern forms or representatives are valuable.

The fact is indisputable that if these varieties are descendants of the true varieties named, the acclimatization which cannot be properly effected with the parent, may become perfectly accomplished in its descendants through successive generations from the seed; while on the other hand if these varieties of native seedlings are not descendants from the true varieties above named, the similarity to them in some instances is wonderful, and in that case the question readily presents itself, to what type do they belong? If we permit ourselves to call them descendants of the Spanish type, what do we mean by this expression, and what distinguishes the Spanish type from the Persian? And if, as generally understood, the old Indian peaches are taken as the basis of the Spanish type, what is the most probable origin of such varieties as those above mentioned, which, while showing equal adaptability with the Indian peaches, more closely resemble the Persian, both in wood, foliage and leaf?

I have spoken of these native peaches more particularly in connection with North Florida, but it is not wholly there that they are confined; excellent varieties of them are found in South Florida, but perhaps can hardly be deemed as reliable there as the same varieties in the central and northern portions of the State.

Extending on to the westward, however, through the Gulf coast region of Alabama, Mississippi, Louisiana and Texas, the existing conditions are believed to be nearly identical with Northern Florida as regards adaptability of varieties.

Another type of peaches, suitable for at least many sections of Florida, is to be found in the Honey and its seedlings. This variety was originated about 1854, by Mr. Chas. Downing, from pits sent from China. It is the very opposite of the Peen-to as regards shape, being very long, with a peculiar recurved point. It is a freestone, of good quality, very sweet, but lacks tone. It is quite an early variety, following the Peen-to in maturity.

In the northern and central sections of Florida, this variety has generally done well, and fairly so in South Florida, but it is not believed to be as valuable for that section as for the middle and northern sections.

Several fine varieties of this type have lately been introduced, the most of which are about two weeks later than the parent in ripening, and nearly all of them are considered to be improvements on the parent, both in size and quality.

Another type of some value for North and Central Florida is the Chinese type proper, of which the Chinese Cling and its seedlings are the representatives in this country. Many fine varieties of them have originated in Georgia and other states to the north of us, but their adaptability to Florida, while better than that of the Persian type, is generally inferior to that of the so-called natives. Some of them do fairly well in sections of Northern Florida, but they are by no means equal to the Peen-to and its seedlings, farther south.

Still another type, and one which can perhaps be traced farther back into the history of the state than any other, is the Indiana type before alluded to. There is no question as to the adaptability of these peaches, but their value is believed to be more for the transmission of their fruitfulness to the crosses that have been, and will continue to be produced from them, than for any inherent value of their own.

Added to the types above named there are several varieties, of more recent introduction, one or more of which may possibly resolve into a distinct type from any of the above named. Among these are the Chinese Blood, Red Ceylon, and Japan Dwarf Blood, the first two of which have been fruited here, are abundantly prolific, and may very likely prove valuable.

It has not, however, been the purpose of this article to name varieties so much as to call attention to the types, or sources, from which the varieties that have proved the best suited to Florida have been obtained, and a summary of the above shows that the Peen-to type, Honey type, native peaches and Chinese type, comprise the bulk of the varieties that have so far proved the most valuable in this state.

In South Florida the Peen-to type is a long way ahead in popular favor, and justly so. In Central Florida the honors are more evenly divided between the Peen-to and the Honey types, with considerable favor shown to select varieties of the native peaches for later fruit, while in Northern Florida still more favor is shown to the native peaches, but with the Peen-to and Honey types still holding ascendancy for early fruit, while all through the state abundant experiments are being carried on with many varieties of all the types that have been named.

With the valuable varieties that we already have of these different types, and with the further crosses that will be the natural result of a more extended cultivation of those that now exist, and with additional definite results being sought for, and obtained by artificial crossing, it is believed that Florida will in the near future take a high rank among the peach producing states.

A unity of purpose in any given direction will often accomplish wonderful results, and while we cannot alter the laws of nature, we can, by taking advantage of them as they exist, often subserve them to our use to the accomplishment of equally valuable results; and the difference between achievement and defeat, between success and failure, is often only the difference between united efforts intelligently directed, and the apathy and inactivity consequent upon an entire lack of faith.

DISCUSSION.

MR. TRUEBLOOD, Florida: The Peen-to blooms too early, so that it is in danger from frost. It is also a cling, otherwise it has no fault in tree or fruit. There are several native varieties doing well, Onderdonk's Favorite, which originated with Mr. Onderdonk of Texas, succeeds well with me.

MR. PEARSON, Florida: I have on my place at Archer a Peen-to seedling which ripens two weeks later than that variety and blooms with Bidwell's late.

L. J. DOLLINS, Florida: A neighbor of mine at Orlando retards blooming by late cultivation in the fall. The trees enter the domant state later, and so do not start into growth so early.

MR. TRUEBLOOD, Florida: I have tried that method and failed.

MR. CALLAHAN, Florida: I tried the same method last season. A part of my trees were cultivated until cold weather, and the remainder were not cultivated after August. All bloomed about the first of January, with hardly a day's difference.

MR. WALKER, Florida: That is my experience at Waldo. I cultivate all winter and find when the time comes that the trees will bloom.

The Apple and Pear in Florida.

J. H. GIRARDEAU, MONTICELLO, FLORIDA.

When Florida was first settled by planters from Virginia, the Carolinas, and Georgia, they brought with them fruit trees that had succeeded at home, and transferred them to the virgin soil of their new homes.

These after succeeding, and yielding fair crops of fruit for a few years, finally succumbed to the general neglect of everything, except cotton, incident to those days, and with a few exceptions—such as the fig, the peach, and the pomegranate, that flourished in spite of the neglect– they perished.

Among the latter were the Apples and Pears. In a few isolated cases—the result most likely of more care, or some adaptability of variety or soil—fair apples were raised of the earlier varieties, and a few pears, but these only served to accentuate the general verdict that these fruits could not be grown successfully in Florida.

With the introduction of the Oriental strain of pears into the state, about ten years ago, came a new era in fruit growing.

Encouraged by the success with the LeConte pear in the adjoining counties of Georgia, a few orchards were planted in Middle Florida; here every condition favorable to its growth seemed to have been met, and from thence they have spread over the whole state, until now they are becoming as much a feature in Florida scenery as the orange tree.

The success of the LeConte pear in Florida has been truly phenomenal; in Jefferson County, where it was early introduced—say ten years ago—there are orchards that will yield eight hundred bushels per acre (forty-nine trees). The demand for the trees has induced the planting of cuttings in large quantities, and hundreds of thousands of trees are annually shipped to distant points.

Not only so, but the ease with which pear cuttings, and in fact all cuttings, take root under the combined influence of our soil and climate, has led nurserymen, in sections where this cannot be done, to avail themselves of this fact; and already this season, one hundred and twenty thousand Kieffer cuttings have been received in Monticello from New Jersey, to be grown on shares.

The Kieffer does as well as the LeConte, comparatively; it is a vigorous, healthy, showy tree, and if on its own roots, will begin bearing when three years old. The tree, however, will not compare in size or in yield of fruit with the LeConte, and is a month later in fruiting.

All varieties of pears when budded or grafted on LeConte roots, undergo a great change for the better, if size, appearance, and freedom from disease are indications. To distinguish such trees from standards or dwarfs, I call them Giants, a name that their size suggests.

A veteran nurseryman of New Jersey, while agreeing that the Oriental varieties succeeded best on LeConte stocks, argued that the old varieties did not. An order from him this winter for twenty thousand small LeContes for stocks, indicates a change of opinion on his part.

The success of the Oriental varieties of pears and their hybrids, in our state, and the failure of those varieties that were at home further north, suggests the reason.

In Florida the climatic conditions are almost identical with those of the southeast coast of China, and any fruits from that section of the Orient, find a congenial home here.

The success of the Peen-to, the Chinese quince, the kakis, and the plums and pears from Eastern Asia, bear out this theory.

Whether apples can be successfully grown in Florida or not, is still an unsettled question, that awaits the result of experiments.

I have advocated the feasibility of growing them upon LeConte stocks, and this experiment

has met with some degree of success in the western portion of the state, but I must admit that I am not as enthusiastic an advocate of this plan as I have been.

A surer plan for some of our enterprising pomologists, who have laid tribute upon all lands, of their best fruits, and are not discouraged by distance or difficulties, is to find an apple that succeeds in the sea-coast region of Southern Asia. With such a strain, if it exists, success in growing apples will be an assured fact in our state.

DISCUSSION OF NEW FRUITS.

[Owing to the number of papers presented, only a brief time at the closing session remained for the discussion of new fruits. The citrus fruits were omitted in the discussion, as they had already occupied a large portion of the time of the convention.]

APPLES.

Yellow Transparent.

CHAS. PARRY, N. J.: How does it do in the South?

H. E. VAN DEMAN, D. C.: I have received good specimens from Southern Illinois, and have reliable information from Missouri and Northwestern Arkansas that it is doing the best there of any of the Russians.

Murphy.

W. C. STRONG, Mass.: It is the most beautiful apple we have, and as good as the Baldwin. It has been exhibited during the last two years as a new apple, under the name Barnes' Stripe. It is a uniform bearer. The variety is an old one which had nearly gone out of cultivation, but is now coming forward.

F. M. MARBLE, Mass.: It is nearly as large as the King, and much resembles it in form and color, but is handsomer.

BLACKBERRIES.

WM. CALLAHAN, Fla.: I have a wild seedling, intermediate between the high and low bush, which I am growing for my own use. I have never eaten a better variety.

Lucrelia.

W. C. STEELE, Fla.: I have never found any native variety worth cultivating, but I have grown Lucretia to perfection. It produces the largest berry I have ever seen. On moist lands in Florida it is a success. There is a native variety, found at Manatee by the late P. W. Reasoner, which is said to be equal to Lucretia and earlier.

PRESIDENT BERCKMANS: Its habit of growth makes Lucretia of little value.

GEO. W. CAMPBELL, Ohio: Mr. A. J. Caywood, of New York, says that it is best grown trained upon stakes.

H. E. VAN DEMAN, D. C.: I move that Lucretia be added to the Catalogue. [Carried].

W. C. STRONG: I would give it one star for Massachusetts.

GEO. W. CAMPBELL: One star for Ohio.

C. L. WATROUS: One star for Iowa.

W. C. STEELE: Two stars for Florida on moist land. It should be allowed to run during the growing season, and then trained up on stakes to bear.

Minnewaska.

H. E. VAN DEMAN: One of Mr. Caywood's seedlings. I have had specimens from him as fine as any Kittatinny. It is very productive.

F. M. MARBLE, Mass.: I saw it growing on the grounds of Mr. Caywood. He shipped last year 10,000 boxes to New York.

Erie.

E. WILLIAMS, N. J.: Very nearly identical with the Lawton.

CURRANTS.

Crandall.

GEO. W. TROWBRIDGE, Ohio: I am not satisfied with it as a dessert fruit.

G. B. BRACKETT, Iowa: It is a western variety, originating in Kansas, and but little tried at the East.

E. Y. TEAS, Ind.: It is one of the black currants, but less disagreeable in smell and flavor

than any other sort. I consider it very valuable for cooking, and fairly good for dessert. It has been considered a hybrid, but that is doubtful.

GOOSEBERRIES.

Triumph.

E. WILLIAMS, N. J.: A great improvement over any other variety that will grow in our climate.

GEO. W. TROWBRIDGE, Ohio: I have fruited it one year on clay soil, and never before had such fine gooseberries. Its size and quality are all right, but it bears too heavily.

G. B. BRACKETT, Iowa: We cannot grow it in Iowa.

GRAPES.

Lutie.

PRESIDENT BERCKMANS: Originated at Nashville, Tennessee.

J. VAN LINDLEY, N. C.: When I read the unfavorable report made at the last meeting, I had a dozen vines, and thought of pulling them up, but did not. They have now fruited two years, and I never saw finer vines or fruit. They have had no mildew or rot. At our fair at Raleigh the past season, they were the equal of any kind on exhibition. They are foxy when first colored, but very fine in flavor when fully ripe. I consider it one of the most valuable grapes we have; it ripens with the Delaware.

H. E. VAN DEMAN, D. C.: I received samples at two different times from Nashville, and they were the worst flavored and smelling grapes I ever tasted.

CHAS. PARRY, N. J.: I am fruiting the Lutie, and find it no more foxy or offensive than Berkett's Amber, and that is a very profitable grape.

GEO. W. CAMPBELL, Ohio: I made the report at the last meeting, which has been alluded to. It was based on specimens sent me from Nashville, at the same time they were sent to Mr. Van Deman. I supposed that the originators would not send poor specimens, but these were certainly the foxiest and poorest grapes I ever saw in my life. Specimens were sent at the same time to Mr. Wilder and others. Mr. Wilder wrote me saying that they were so offensive that he had to send them out of the house.

J. S. NEWMAN, Ala.: It was on exhibition at the last meeting of the Georgia State Horticultural Society, where I was chairman of the grape committee. All the members of the committee pronounced it unworthy of cultivation.

Jewell.

GEO. W. CAMPBELL, Ohio: I have fruited it for three years. It is a small black grape, of good quality, said by some to equal the Delaware. It has a pleasant flavor, but is more pulpy, and hardly equal to that variety. It is healthier than Delaware—but no stronger grower. The berries are rather larger than that variety, but the clusters not. Its habit is much like that of Early Victor.

Berckmans.

J. S. NEWMAN, Ala.: I fruited it for the first time last year, and find it about equal to the Delaware. It is a vigorous grower.

SAMUEL HAPE, Ga.: Have fruited it several years. The berry is larger, the bunches less compact than Delaware, and the vine more vigorous.

F. M. HEXAMER, N. Y.: In New Jersey it is considered equal to the Delaware. The looseness of the bunch is its only objectionable feature.

W. C. STRONG: I find it very healthy in Massachusetts.

PRESIDENT BERCKMANS: It is a cross between Clinton and Delaware, produced by Dr. Wiley of Charleston, S. C. There is an account of it in the proceedings of this Society for 1871. Dr. Wiley sent me his seedlings from time to time. I selected this one as the best, and he gave it my name.

On motion of Mr. Hape the variety was added to the Catalogue.

Green Mountain.

J. W. MANNING, Mass.: A very sweet grape, ripening August 20th, last year, in Connecticut. It is a strong grower, and resembles the foreign sorts in foliage.

PEACHES.

Peen-to.

MR. TRUEBLOOD: It was first introduced into Florida near my place. Its only serious fault is that it blooms too early. There are many

seedlings of it which are more valuable, but we do not yet know which of them is the best. Some of them are fully as hardy as the parent, and bloom later. (The Honey blooms late enough to escape frost, and has never failed, except partially last year on account of drought.)

MR. CALLAHAN: At Melrose, in Clay County, I have fruited the Peen-to for six or seven years and have never lost a crop from too early blooming.

H. H. CARY, Ga.: We fail with it at Lake Worth, Florida. It blooms there in the fall and is nearly evergreen.

MR. KECK: I have seen it bearing well in latitude 27 .

MR. TROWBRIDGE: I have grown the Peen-to ever since it was introduced, and consider it a great acquisition, especially for the central and northern parts of this state. I move that it be added to the Catalogue, with one star for Florida.

MR. TRUEBLOOD: I know of at least fifteen seedlings of the Peen-to that are better than that variety, so that it seems to me too late now for the Society to put that one on the list. [The motion prevailed.]

For further notes on the peach, see the discussion following the paper by G. L. Taber.

PEARS.

Idaho.

F. M. HEXAMER: I consider it one of the most valuable fruits that has been introduced for many years, especially for the North.

PRESIDENT BERCKMANS: It originated in Idaho. Its quality is of the very best. There are a few trees growing near Mobile, Alabama.

H. E. VAN DEMAN: It is much like Duchess in shape. [Exhibits an illustration.]

PLUMS.

Kelsie.

MR. CALLAHAN: I have fruited it for two years in Clay County, and am well pleased with it. Have 6,000 trees growing, and expect to set out more. I grow it on native plum stock. It does not do well on the peach. It it is a good grower without fertilizers, makes excellent prunes, and I think will ship well.

Satsuma.

H. E. VAN DEMAN: Equal to Kelsie in size and quality. It is as red as blood inside. A month earlier than Kelsie, and probably more hardy. It may thus prove more valuable for the North, where the Kelsie will not succeed.

STATE FRUIT REPORTS.

Report of the General Fruit Committee.

To the President and Members of the American Pomological Society:

GENTLEMEN: In presenting the following report on behalf of the General Fruit Committee, the Chairman desires to ask the indulgence of the State Committees and of the Society for any faults in his part of the task.

Having been appointed to carry on the work commenced by Mr. Fuller, the undersigned can only plead that he has done his best, in the intervals snatched from his business, to carry out the instructions of the Executive Committee.

C. L. WATROUS, Chairman.

California.

Reported by Dr. J. Strentzel, of Martinez, Chairman of the State Fruit Committee.

The abnormal time of the present meeting, and my failing health during the winter months, make it impracticable for me to prepare an extended report from California, which, in the nature of the case, would only be a repetition of that submitted at former meetings.

To substantiate California's claims, many of our most active pomologists agreed upon a plan for a traveling show, which was most liberally carried into effect through the far seeing generosity of the Central Pacific Railroad Company, by providing a costly and uniquely appointed car for the triumphal tour, containing an endless variety of California grown flowers, fruits, wine, woods, manufactured specimens of the arts and industries, and descriptive pamphlets of the several sections, for free distribution.

Agent McDonald, of the State Board of Trade, in charge of the exhibit, estimates that nearly 95,000 persons passed through the car after leaving Sacramento and before arriving at Chicago. The same system will be further carried out, until Boston and the entire eastern section of the continent has had a chance to see our products.

The impetus given to fruit culture in the state remains unabated; in fact, is spreading over every valley and hill side. Good discrimination is exercised in selecting marketable varieties, adapted to the soil. The local markets are abundantly supplied, and the ways of commerce are crowded by applicants for its favors. The most prominent fruit product at present, that of raisins, approximated 1,000,000 boxes for the past year, with considerable increase in store for the present year. The orange crop of nearly one million boxes last year will reach one million two hundred thousand the present season. Many new trees are coming into bearing in the central part of the state.

That emblem of peace, the olive, is in full favor; large plantations are being set out, and the supply of the pure article will close up the fraudulent use of cotton seed oil.

From small beginnings, the fig industry is becoming immense.

Nuts of the choicest varieties are abundant.

The estimates for the coming season are for the shipping of 60,000,000 pounds of green fruit to our eastern neighbors and an abundance of the pure juice of the grape.

Colorado.

Reported by D. S. Grimes, of Denver, Chairman of the State Fruit Committee.

Notwithstanding the many obstacles to contend with in the culture of fruit in Colorado, we are making creditable progress.

In regard to the effects of climate on fruit trees, Prof. James Cassidy of our State Agricultural College, says:

"The winter of 1887-8 has been a test one for the varieties of orchard fruits grown in Northern Colorado. The thermometer indicated on two occasions a drop to 28° below zero. The highest temperature during the winter was 72° above zero. These variations are wonderfully trying to tree and plant growth of all kinds out of doors. Added to this low temperature we had a very dry winter and spring, with but little water for irrigation until our trees were well advanced in leaf. It is not to be wondered at then that some varieties of orchard fruits succumbed.

"Trees not deeply rooted, and without sufficient moisture in the soil to supply the drain upon their stems and branches by frost and warm, dry winds, are sure to go under, regardless of the question of constitutional hardiness. The lesson to the tree grower is this, that all young, and hence necessarily imperfectly rooted trees, should receive careful attention in regard to irrigation to enable them to winter safely. The use of a mulch for young trees is also to be commended, in that it conserves such moisture as falls, or which we may apply to their roots. To keep a mulch in place, a little earth is a necessity in this climate."

These variations of winter temperature, referred to by Prof. Cassidy, are met by an extreme equally disastrous, in excessive summer irrigation. The effect of water, applied through our system of irrigation, does not, as a rule, receive the consideration its importance demands. Irrigation is too often made to take the place of cultivation. People who buy water from ditch companies seem to think that unless the water is running about their crops nearly all the time, they do not get full value for the money paid. This excessive use of water through surface irrigation, applies more forcibly to tree growing in our towns and cities than to general crops in the country. It induces a porous, sappy, tender growth of wood fiber, unfitting the tree to withstand the extremes of heat and cold that sometimes sweep along the base of the Rocky Mountains.

The greatest obstacle in the way of progressive fruit culture is the defective horticultural or pomological education prevailing with the general public.

[A useful list of suggested changes in the Catalogue accompanied this report.]

Connecticut.

Reported by P. M. Augur, of Middlefield, Vice President for the State.

The report last made represents the essential points with reference to varieties of fruits.

Continued experience still shows that culture, good pruning, and the timely use of insecticides are essential to the highest success of the orchardist.

This last point is no less important for the plum, quince, and cherry, than for the apple.

The use of fungicides in grape culture is hardly less important, especially with some of the finer varieties.

Intelligence, skill, and industry, are important factors for success in any line of fruit culture.

[A carefully prepared list of suggested changes in starring, which formed the principal part of this report, has been used in the revision of the Catalogue.]

Iowa.

Reported by C. L. Watrous, of Des Moines.

The seasons lately passed having proved disastrous to large fruits in Iowa, notably the apple, pear and cherry, have seemed to turn public interest towards small fruits. All these give favorable results in all parts of the state, by adapting cultivation and winter protection to the special conditions of the place.

Strawberries. The markets and homes of the whole state are well supplied; medium sized fruit and strong deep rooting plants taking the lead. Crescent leads everywhere, with Charles Downing, Capt. Jack, Manchester, Downer's Prolific and Windsor Chief following. Jessie and Bubach's No. 5 are considered very promising; while Jewell, which was at first received with favor, is now generally discarded, because of inability to endure hot suns and make growth. It is too feeble here. Strawberries are everywhere covered with litter in the winter for best results.

Raspberries. Of low caned varieties, Tyler, Ohio, Gregg and Shaffer take the lead, Tyler being earliest and Shaffer hardier against cold. This last is giving universal satisfaction and is steadily growing in favor.

Of upright canes, Turner, Cuthbert, and Marlboro are most grown. The latter, though comparatively new, is considered very promising, the fruit being large and fine and the foliage exceptionally vigorous and healthy. Clean culture is imperative.

Blackberries. Snyder still holds the lead for hardiness and fruitfulness, with Stone's Hardy and Ancient Briton doing well in many localities.

A strong sentiment is growing in favor of laying down all blackberries and covering with earth for winter protection. Statistics point to the conclusion that covering not only pays but is necessary for uniform and profitable results.

Currants and Gooseberries. All the well known varieties of strictly American parentage are everywhere successful, but more so in the eastern and northern portions of the state. Hot summer suns are their only enemy. An effort is being made to grow from seed, varieties more especially adapted to the climate and soil of this region.

Grapes. Everywhere in Iowa the leading varieties of the Labrusca type are profitably and satisfactorily grown. Each year emphasizes the necessity of thorough winter protection for all varieties, no matter how hardy, by laying down and covering with soil before severe freezing in autumn. Concord is everywhere grown more than any other, ripening perfectly in all parts of the state.

For early use, Moore's Early, Worden, Lady, Cottage and Telegraph succeed well, Worden being most extensively grown. For later use, Concord, Pocklington, Martha, Agawam are most extensively planted.

The markets for small fruits and grapes are usually well supplied at prices within reach of all. In spite of the sad reputation of Iowa as a fruit growing state, there is probably no state in the union where fruit is any more abundant and universal on the tables of all classes, rich and not rich.

The difficulty of fruit growing in Iowa is with the larger, or tree fruits. The universal plan has been to plant the favorites of other regions —our Atlantic States, north and south, Western Europe, and lately of Russia.

None have proven able to endure our extreme seasons. It is very doubtful whether any Russians will fare any better than the others.

With plums, the problem is already happily solved, native varieties having been discovered of great excellence, and many seedlings of these being found equally hardy and productive and of superior quality. No plum of European parentage succeeds in any part of the state.

Cherries. No seedlings have been brought out, except a supposed seedling of English Morello, named the Wragg. This gives excellent promise as a late fruit for canning, closely resembling its supposed parent, but appearing better able to endure our conditions of soil and climate. This was at first supposed by some to be of Russian origin, but as it has not proven hardy in the north part of the state, that is extremely doubtful. The old varieties of our cherries succeed well in the south half of the state, but no sweet cherry succeeds in any part. Twenty or thirty varieties from Poland and Russia are on trial that have not yet shown what the result will be; many of them have proven unable to live as far south as Des Moines, but some may yet prove of value.

Pears. Very little grown, though a few commercial orchards in the southern and eastern parts of the state have been remunerative. Of dwarfs, Louise Bonne de Jersey and Angouleme are best, and of standards, Sheldon, Howell, Buffum, Flemish Beauty and Lawrence are preferred. Several Russians are on trial, but, as they have not yet fruited they may be left out of the account.

Apples. It is with the apple that Iowa, in common with the whole northern "Mississippi Region," has suffered greatest disappointment.

In all the state, except the southwestern part, where the soil is largely of bluff deposit, the destruction of apple orchards has been disastrous to that interest. It is to be said, however, that in all the south half of the state every living tree has tried to do its best the past season, so that our markets have been better supplied with home grown apples than for many years past. There is reason to hope that the cycle of severe seasons has passed, and that the orchardist may be entering upon an era of profit.

In the southern portion of the state, Oldenburg, Lowell, Wealthy, Jonathan, Grimes Golden, Willow Twig, Ben Davis and Iowa Blush, are most grown. The preponderance of experience is in favor of clean culture while young, and clover afterwards. Trees should be headed three to four feet high, it having been found that very short bodied trees are apt to break apart at the forks.

In the northern half of the state, the list would be Tetofsky, Oldenburg, Wealthy, McMahon's White and Talman Sweet. Many crabs are grown, Soulard, Brier's Sweet, Whitney's No. 20 and Virginia, leading.

Of the Russians, Striped Anis, Bergamot and Anisovka, are on trial, and promise better than others.

Several seedlings, native to the region, are giving much promise for local use. Among the most promising is Patten's Greening, a seedling of Oldenburg, by C. G. Patten, Charles City, Iowa. It is nineteen years from seed, is hardy, productive, with fruit equal to Oldenburg, and keeping from November to January, or later. Very promising. Mr. Patten has also a Soulard Hybrid, showing the effect of crossing our native crab, *Pirus coronaria*, with the European *P. Malus*. The fruit is of fair size and handsome, the quality showing unmistakably the union of the two species. This fruit is not valuable as a finality, but is of the very greatest interest as forming a starting point and foundation upon which to build up, by cross fertilization and seedling selection, a race of apples for the prairies, having a basis of extreme hardiness, with fruit whose quality shall finally be made to equal that of our favorite descendants from *P. Malus* of Europe.

Mr. N. K. Fluke, of Davenport, Iowa, has also a native crab, not showing in tree or fruit any trace of *P. Malus*. Specimens of this apple are often as much as two and a half inches in diameter, while the tree is very handsome, and, of course, entirely hardy and adapted to all the climatic extremes peculiar to this region. This apple Mr. Fluke is using most skillfully and earnestly as a basis for crossing with the best old sorts of *P. Malus*.

B. A. Mathews, Esq., of Knoxville, Iowa, has also an extremely large and fine variety of our native crab, which is likewise doing service in the process of cross fertilization with apples of the finest quality.

The hopeful phase of Iowa horticulturists is that all horticulturists, not excepting the most enthusiastic believers in the new Russians, are convinced that the future apples of Iowa are to be seedlings grown upon Iowa soil and tested by Iowa seasons.

All of our past losses may not have been too great for the lesson needed—the lesson that for full success in fruit growing, the course of nature, which is to adapt trees and plants to changed or changing environments through a re-creating process by seedling production and survival of those best adapted to the conditions surrounding them, must not be entirely neglected.

No Russian fruit has thus far shown itself worthy of general cultivation in any part of the state, while scores have entirely failed in all parts. Blight, winter killing, unfruitfulness, and extremely low quality of fruit when secured, are the objections urged against most of the Russians. Nevertheless, a few are still hopefully tried, and may yet prove of great value. Time must be the winnowing mill.

Kansas.

Reported by G. C. Brackett, of Lawrence, Chairman of the State Fruit Committee.

The resources of this state are remarkable, and no more so in any line of soil productions than in that of all classes of fruit. As in all fruit growing regions, there is a variableness in results, owing to the difference in composition of soils, character of locations, and management, but more largely to the latter than any other cause.

In regard to this matter permit me, under the head of progress made in the state, to report to your Society what has been done by the Kansas State Horticultural Society for the people of the state.

The members resolved themselves into a committee of the whole, and after careful deliberation decided to publish for the people a *Fruit Manual*, which, in a concise and practical form, should convey to its readers a clearly defined presentation of successful methods. This manual covers all general principles as applied to practice. It has been well named a book of "Kansas Horticulture in a Nutshell." Is it not desirable that other state societies should adopt a similar plan, and as organizations assert truths in regard to varieties and methods of practice, thereby relieving the public from the uncertainty of individual opinions and recommendations?

Some varieties of all classes of fruits are successfully grown throughout the state, while others are of a local character. The apple, cherry and plum have a general adaptation and can be found succeeding in almost every county where the plantations have had sufficient time to grow to a fruitful age, while the other classes of orchard fruits are found to be successful only in certain localities. There are sections where the pear thrives in constant health and fruitfulness, promising as great success as in the most favored sections of the United States; and the same may be said of the peach and the grape.

Small fruits cannot be classed as having a general adaption. They are generally successful in the eastern third of the state, but beyond that, westward, one enters an area of local success only, where treatment is required materially differing from that in the eastern portion.

I cannot see any cause for changing the present rating of varieties in our fruit list.

New Native Varieties.—Numerous seedlings originating in the state are reported to this office* each year, and numbers have been placed on exhibition at our meetings which possess points of merit entitling them to further attention.

The main obstacle to successful fruit culture is injurious insects. As a remedy, spraying with London purple and Paris green have been adapted. and when intelligently followed affords satisfactory results.

Culture.—In this, as well as in other newly settled states, while the land possessed virgin

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*Secretary State Horticultural Society.

fertility the planters of orchards as well as the general farmer became neglectful, and later on reaped the reward of their folly.

The importance of thorough care and cultivation is now fully recognized. The simple fact has been learned that the richest prairie land may, by continuous cropping, become exhausted of its elements of nutrition; and, that thorough and constant striving is essential to the healthy maintainance of plant and product.

Nomenclature.—This subject has been given careful and constant attention by the members of our State Society. The recommendations of your Society have been rigidly observed. The greatest hindrance to complete success is found among nurserymen, whose catalogues abound in synonyms and incorrect names. Nor is this confined to our state; it is a noticeable fact that nurserymen of marked intelligence and high standing as members of the American Pomological Society, and who are regarded as authority, both by the Society and the public, show a disregard of the adopted rules of your eminent body. Such being a fact, what can be expected of the lesser lights under such examples?

The nurserymen, through their widely disseminated catalogues, could if they would, quickly complete the desired reform in nomenclature, for which your organization and others are laboring. Crops in this state the last season were generally heavy. Prices ruled quite low, but the demand for number one shipping fruit exceeded that of any previous year. In size and quality the product was highly satisfactory, and the future seems full of promise.

STATISTICS FOR THE YEAR 1888.

Number of bearing fruit trees:		
Apple	4,819,903	
Cherry	1,057,803	
Pear	117,226	
Peach	4,766,609	
Plum	191,932	
Total		11,286,473
Number not in bearing:		
Apple	6,146,920	
Cherry	718,056	
Pear	250,426	
Peach	2,853,333	
Plum	520,323	
Total		10,519,058
Grand total		21,805,531
Acres of small fruits:		
Blackberry	3,755	
Raspberry	4,009	
Strawberry	2,399	
Total		10,143
Grape, acres		8,392
Nurseries, acres		26,657

In this state the following varieties have proved most hardy in tree and good in quality:

Apple. Winesap, Rawle's Genet, Rome Beauty, Gilpin, Jonathan, Minkler, Missouri Pippin.

Pear. Seckel, Anjou, Angouleme, Malines, White Doyenne, Lawrence.

Plum. Wild Goose, Miner, Emigrant, (a seedling of the Lombard), Bluemont.

Cherry. Early Richmond, English Morello.

All of the above are hardy, and we see no occasion to cross with any others to secure greater hardness. But to increase the size of some of them, there has been some attempt; especially with the Winesap and Gilpin apples, and the Seckel and White Doyenne pears.

The Winesap has been crossed with the York Imperial and the Seckel with the Anjou.

The sorts of trees that succumb, are oftener those which cannot endure extreme heat, and not those effected by cold. In fact, the extremes of cold are not the causes of injury to our trees, but the opposite. Hence we are looking to a southern latitude for additional varieties to those already established as hardy. There are no hardier trees in this state than the Baldwin, Newtown Pippin and Northern Spy, but they are not fruitful, while the varieties given above are immensely productive.

Louisiana.

Reported by E. M. Hudson, of New Orleans, Chairman of the State Fruit Committee.

Herewith I present a report, on behalf of the Fruit Committee for Louisiana, based on such information as has been obtainable. The comparative meagerness of sources of information is easily understood when it is borne in mind that,

except in isolated and individual cases, until within the last decade, or less, no attention has been given in this state to the cultivation of fruit for commercial purposes; and, in such exceptional cases, the commerce in fruits has been restricted to home or local markets. This, in the nature of things, was attributable to the fact that "planting," or farming on a large scale the production of staple agricultural crops, cotton, sugar and corn—almost exclusively engaged the attention of the rural population.

But it is most noteworthy that since the exhibition of fruits in New Orleans, during the winter of 1884–5, at the World's Industrial and Cotton Exposition, a general impetus has been given and an earnest interest created in the direction of growing fruits. Unto the present moment, however, these attempts have been mostly tentative and experimental; but each year indicates a decided progress, as individuals, acting independently, acquire personal experience. The diversity of soil, climate, and circumstances existing in different parts of the state is such, that necessarily, patient and repeated trials must be made to ascertain not only what species, but what special varieties of such species, may be best adapted to each locality; and, as in all new undertakings everywhere, the pioneers in this enterprise are few. But the good results of their efforts must surely be felt at no distant day throughout the state.

The interest thus aroused in fruit growing, has been further stimulated by the accession to our population of a very considerable number of citizens of other states, who, after visiting and examining the various portions of the state, have left their homes in the Western and Northwestern states and become settlers here. To many such, fruit culture was familiar, and in almost all cases such new settlers have commenced experimental fruit culture at the very outset of their establishment here.

From the foregoing considerations it will become manifest that a report covering the whole subject matter is not only impossible, but that it is entirely impracticable to get more than a limited idea of the varieties of fruit adapted from a commercial standpoint to profitable culture here. While Dr. G. Derron of the Sub-tropical Fruit Committee, also a member of this committee, has furnished interesting statements on orange culture, it is deemed proper not to trespass upon the domain of the former committee; but it is to be observed that his experience coincides with that of a number of interested observers, in establishing the fact that the Loquat, which grows vigorously in the southern portion of the state, can be easily improved by grafting the finer varieties on seedling stocks, which grow as readily as pears from seed.

The results of the experiments made in all directions show generally that varying with climate and location, pears, grapes, peaches, plums, pomegranates, apples, strawberries, figs and oranges may be successfully produced in this state, the nearer the Gulf of Mexico and in the south, the sub-tropical kinds, of course finding their more proper home. Especially has the growth of the pecan, and the propagation of the best varieties by grafting or budding, (by the annular process) attracted a number of experimenters; and numbers of more or less extensive orchards of young pecan trees are now existing in various portions of the state, the trees having been mostly set within the last seven or eight years. When the permanency of pecan groves, the prolific crops on well grown trees, the facility of their propagation, the inexpensiveness of their cultivation, and the great commercial value of the best kinds,—varying from five cents to fifty cents per pound, according to the quality and variety—are considered, it may well be conceded that the future of growing this nut for market, promises results most hopeful from every point of view. Probably more attention has been bestowed on the propagation of the best varieties of pecans by Mr. Wm. Nelson, of the parish of Jefferson than by any other person in this state.

In the northern portion of the state, approaching Arkansas, fine apples and Persian peaches do well; but owing to the want of technical acquaintance with varieties, and their accepted nomenclature, the growers are unable to give the proper names of the same. The central and southern portions of the state produce most

successfully the choice type of peach; and in the south particularly the Spanish type is admittedly the best and hardiest. This is known generally as the St. John type or family, of which there are several well known varieties, as the Fleitas, Masicot and others, which succeed in bottoms or on alluvial lands where no others do so well. Although a free-stone, this peach has a tough skin, which seems to give it partial immunity from the curculio. The early Spanish inhabitants propagated it by layers, to free it from tap-roots, to which the subjacent soil-water is inimical.

It is not in any manner to be inferred from the limited list of varieties noted below, that only these can be successfully grown; on the contrary, everything indicates that, restricting apples to the northern, and subtropical fruits to the southern portions of the state, most of the other large fruits may be grown generally throughout the state with abundant prospects of success and profit.

I. SPECIES.

Apples, Pears, Peaches, Figs, Oranges, Loquats, Persimmons, Pomegranates, Strawberries, Grapes, Pecans, Walnuts.

II. VARIETIES.

Apples. ———

Pears. Bartlett, Howell, Duchess, Lawrence, Clapp's Favorite, LeConte, Kieffer, Chinese Sand.

Peaches. Early Louise, Early Crawford, Fleitas, Masicot, Elberta, Honey, Alexander, Rivers, Chinese Cling, Crawford's Late, Indian Blood.

Plums. Kelsey, Goose, Caddo Chief, Mariana. European varieties not successful.

Figs. Celestial, Green Ischia, Lemon.

Oranges. See report Sub-tropical Committee.

Loquat. Mammoth.

Persimmons. Native, all varieties of Japan.

Pomegranates. Early Red (acid), Sweet.

Strawberries. Cresent, Sucker State, Neuman, Wilson, Miner's Prolific, Sharpless, Triumph.

Grapes. Herbemont, Concord, Ives, Hartford, Champion, Empire State, Delaware (best of all).

Pecans. Centennial, Round Papershell.

Walnuts. Native black.

III. OBSTACLES TO SUCCESSFUL CULTURE.

Apples do well in central and northern parts of the state *only*, except some native summer varieties of no fixed names. Oranges and Loquats flourish in the southern part. The peach borer, curculios, apple borer and grape-leaf roller are prevalent, and near New Orleans there is some mildew and anthracnose in grapes. Few remedies have been tried. Blight exists to some extent in Bartlett pears, and occasionally in other varieties. Oriental pears are so far free from blight.

IV. CULTURE AND PRUNING.

No fixed or accepted methods have been adopted; all is purely experimental. Grapes are chiefly trained on stakes; trees, (peach, pear and plum) generally low to protect the roots and bud stock from the hot sun. Strawberries are grown in matted rows after first year.

V. EXTENT OF CULTURE.

No statistics are available. In general, it may be safely stated that to-day there is at least ten times as much fruit growing as there was ten years ago.

Minnesota.

Reported by S. D. Hillman, of Minneapolis, Chairman of the State Fruit Committee.

The climate of Minnesota is somewhat variable, and at times somewhat phenomenal. Although we have pleasant, sunshiny weather, as a rule, our climate is subject to great extremes of temperature at all seasons of the year, and these marked and sudden changes, especially of the winter months, are often quite trying to fruit trees of various kinds. We have an excellent soil, well adapted naturally to fruit growing, but these extremes make the successful growth of the apple, peach and pear, at least to any considerable extent, more or less problematical.

The temperature at St. Paul during the winter months, is practically the same as at Quebec, being 15.8 degrees, mean temperature, as shown by sixteen years' observations. The normal

summer temperature, during a like period, was 69.4 degrees. The range of temperature is great at times, but as a rule, the climate may be said to be remarkably agreeable and pleasant.

Among our native fruits are the plum, huckleberry, strawberry, raspberry, cranberry, blackberry, dewberry, gooseberry, black haw, thornapple, wild crabapple, juneberry, choke cherry, dwarf black cherry, sand cherry and the wild grape.

According to the assessor's returns, there were 189,955 apple trees in bearing in 1886, producing 123,000 bushels of apples. The number of trees in bearing the following year, as shown by the same report, was 160,926. These returns are of course, only approximately correct.

The fruit season of 1887 was not a favorable one, and a short yield was reported. The shortage in the apple crop was due, in part, to the severity of the two or three previous winters, unfavorable conditions of weather in the blossoming season, and the prevalence of drought during the summer months. Very few apples were raised in the state; one orchard, however, in Nobles County, produced between two and three hundred bushels of fruit, largely of seedling varieties.

Under the auspices of the State Horticultural Society a very fair exhibit of fruit was made in the fall at the State Fair, of apples, grapes and native plums. Oldenburg and Wealthy took the lead in the list of varieties of apples shown.

The season of 1888 was a favorable one for fruit. Some serious losses were, however, experienced from late spring frosts, as well as from early frosts of autumn, the crop of plums being cut short by the former, and grapes by the latter. The crop of apples was unusually large, and the fruit of remarkably fine appearance and excellent quality.

The display of fruit at the State Fair in September, was one of the largest and finest ever made in this state, comprising over one thousand plates.

Mr. William Somerville, of Olmsted County, made a fine exhibit, including some twenty-five new Russian varieties from his orchard. He has about forty varieties in orchard, a number of which were fruited for the first time this last year. He is very sanguine of success in growing these new fruits in this state, and believes that when the list is sifted down to some twenty-five or thirty varieties, it will meet the requirements of fruit raisers and afford an abundance of choice apples, of summer, fall and winter varieties. He has experimented largely with apples during the past twenty-nine years in Minnesota, and has raised in some years several hundred bushels of fruit.

At the State Experiment Station, a large number of Russian varieties have been planted with a view of determining their value. During the past year considerable additions were made to this list. The number of Russian apple trees now on trial at the station is about 1,300, including some 260 varieties. Prof. S. B. Green, in charge of the horticultural department, reports a "strong, firm and healthy growth" made during the season. The original Russian orchard was planted in a very exposed position, on rich soil. None of the trees have yet fruited. He says: "I believe there is much to hope for from our Russian apples, and that many of them will be found adapted to the wants of Minnesota." The Russian pears, Bessemianka and Waxen, which stood the winter of 1887 with little, if any, winter killing, made a fine growth, and appear to be as hardy as the Russian apples. Arrangements have been made at the station to plant during the coming season a large assortment of Russian pears, as well as an orchard of Russian cherries and plums.

Mr. Andrew Peterson, of Carver County, who has grown Russian apples for several years past, has a number of varieties in bearing which he reports as being much hardier than Oldenburg. One Lieby tree last year bore two barrels of fruit, and several other kinds also produced heavy crops. He recently imported sixty varieties of apples from Sweden. He reports only one variety of the lot sufficiently hardy for this climate, or at least for his location.

Mr. A. W. Sias, of Rochester, in this State, who has been growing Russian apples to some extent for several years, is well pleased with the results thus far obtained.

Considerable interest is being manifested in the matter of originating new varieties of seedling apples, with a view of obtaining choice winter varieties of good size, and sufficient hardiness to endure the trying climate of Minnesota, of good quality and fine appearance. These experiments so far have not proved entirely satisfactory. No long keeping seedling variety has yet been originated of even medium quality, at least that has met with public favor. Wealthy is perhaps the best variety yet originated, everything considered, but in most localities it is not sufficiently hardy for propagation. It is not much, if any, hardier than Fameuse, but is a showy and very good dessert apple.

Mr. Peter M. Gideon has originated a number of hybrid varieties, but the trees seem to be predisposed to blight, and have not been sufficiently tested to commend them to public favor.

Considerable attention is being given in Minnesota to the propagation of the native plum. Among the favorite varieties are DeSoto, Weaver, Forest Garden, Rollingstone and Cheney. More attention is being given of late to the growing of grapes and small fruits, which can be produced in this state in large quantities and of excellent quality.

Among the varieties of fruit recommended at the last annual meeting of the State Horticultural Society were the following: Apples for general cultivation: Duchess, Hibernal, Autumn Streak. Russian varieties, for trial: White Russet, Garden, Lieby, General Greig, Red Anis, Antonovka, Titovka. Seedlings, for trial: Okabena, Peerless, Victor, McMahon. Hybrids: Whitney, Beech's Sweet, Early Strawberry, Orange, Martha, Transcendent, Florence, Powers, Sweet Russet. Grapes: Moore's Early, Concord, Delaware, Worden, Brighton, Wilder, Janesville. For trial: Niagara, Woodruff Red, Victor, Bacchus and Wyoming Red.

Missouri.

Reported by W. G. Gano, of Olden, Chairman of the State Fruit Committee.

1. The report for the southern part of the State of Missouri, will vary somewhat from other parts. Here we find the peach in its prime: the soil and climate seem well adapted to its production, and the southern slope of Ozarks appears destined to become the future home of this fruit.

The apple seems also at home here on top of the moutains, and it is grown in beautiful colors. The pear also flourishes well. The plum, apricot and nectarine, are not grown in amount, and do not succeed as well.

The berries are all a grand success, especially the raspberry. The currant and quince are not profitable.

The grape grows well and bears well in all parts of the state, but in many places it is troubled with the rot.

2. Every year we are finding new varieties of apples, and we hope some day, to show the Eastern people an apple equal in value and quality to the Baldwin and R. I. Greening. Nearly all of our best new varieties are red in color.

The Gano, Shackleford, Howell, Ozark, Babbitt and Cocca, are all promising new varieties, originating here in the West, and we hope they will prove of very much value to us.

3. The apple known as McAfee's Nonsuch, is in many places wrongly called Stephenson Pippin, and I know of many others wrongly named. To give a list of them would require too much space, and we can only correct them when we find them.

4. The greatest obstacle to grape growing is the rot. The preventative recommended by the U. S. Commissioner of Agriculture has been successfully used by many.

The canker worm and codling moth have been a serious drawback to the apple grower, but we do not fear them. The arsenites furnish a complete remedy.

Blight ruins our pear orchards, and we can do nothing for it. The only success I find with pears is on the new timber lands, where the timber has all been burned on the ground; how long success will last here I cannot say.

The curculio on the plum seals their fate, and spraying with arsenites, is only a partial remedy.

The twig blight on the apple is only occasionally of much damage.

5. We have become entirely satisfied that good culture, judicious pruning and careful manage-

ment, are necessary to the success of the orchard. Cultivate well and do not rob the ground of all its substance; plant no crops after the trees are four or five years old, but keep up the cultivation just the same, until August. Prune the pear and apple as little as possible.

6. The planting of fruit trees has kept pace with the growth of this western country, and we see every year hundreds of thousands of acres newly planted.

Our fruit report shows that the value of the fruit crop of the state has grown, in the last few years, from one million dollars to over six millions.

The number of acres in apples, pears, berries and peaches, I could not even approximate. It is sufficient to say that our surplus is increasing very rapidly, and is proving the peculiar adaptability of our state for producing fruits of nearly all kinds to supply a vast western territory which will never grow enough fruit for its own use.

7. As to the rules of pomology, our State Society has adopted the same rules as are printed in your Proceedings, and when any new fruit comes out we invariably require the adoption of some simple name. The revision of the old names we very much like, and the revised names are now being adopted by many of our fruit and commission men, as well as nurserymen.

S. Miller, of Bluffton, reports: "Nearly all apples succeed well here.

"Of new plums, Golden Beauty, De Soto, Deep Creek, and Louisa, promise well.

"Of pears, Kieffer, Garber, and Vicar, succeed well. Blight on pear trees is kept in check by keeping trees in sod, washing the limbs with sulphur whitewash, and oiling with linseed oil. Codling moth is checked by poultry and hogs in the orchards, and the curculio by smoking the trees with coal tar, green cedar branches, or mouldy hay. Good culture is best for all fruits except the pear."

N. F. Murray, of Elm Grove, reports for North Missouri:

"North Missouri is not a peach or raspberry country, but most fruits succeed well.

"The whole business of fruit growing is changing. While nearly every one seeks to grow enough fruit for home use, only a few are trying to grow fruit in a commercial way, and these are seeking to place their business on a higher plane by growing better fruit, in larger quantities, using more care and skill, which in every instance is giving satisfactory results.

"The obstacles to successful fruit culture in North Missouri are, extreme cold, sudden changes, drouth, a hard pan soil (in many places holding water, and damaging the roots), rabbits and borers (prevented by screens of wire), codling moth. A solution of white arsenic, two ounces to one hundred gallons of water, sprayed on the trees by a force pump and hose, three times, at intervals of a week, when the apples are small, has been found a success in saving the apples from the codling moth. Jarring upon white canvas is practiced with success for the plum curculio."

Mississippi.

Reported by J. J. Colmant, of Columbus, Chairman of the State Fruit Committee.

The state, from the Gulf to the Tennessee line, has elevations varying from a few feet to 1,500 feet above the tide water of the Gulf of Mexico, the latter elevations occurring in latitude 33° 30'. Fruits have been cultivated with varying success in locations where apparently the same results should have been produced. Thus, while in Winston County, at an elevation of 600 to 800 feet, and in the same latitude in Noxubee County, at an elevation of only 300 feet, the Concord grape has been and is now successfully cultivated, the vines yielding heavily, and the fruit of very good quality. In the counties north and south of Noxubee the Concord has been a complete failure during the last four years. Mr. D. E. Holt, a fruit grower at Terry, has given the following valuable information for the part of the state in which he lives. Mr. Holt says: "Apples are not much grown for market; Red Astrachan, Early Harvest and Early Strawberry are the principal varieties. There are some young orchards of LeConte pears, but other pears are not much grown for market. The most profitable peaches

for market are Amsden, Early Rivers, Tillotson, Yellow St. John, Crawford and Foster; of plums, Chickasaw, Wild Goose and some young orchards of Mariana are planted for market. Some Concord grapes are planted for market, but no wine is made. The Japan persimmon is successfully grown, but not to any extent. Of the Japan plums, Kelsey has fruited in several localities and seems to do well. The Wilson, Crescent, Neunan and Sucker State are the principal strawberries raised in the western part of Mississippi for northern markets. Mr. Holt also mentions a new strawberry, Warrior, an accidental seedling of great promise, purely southern. The obstacles to successful fruit culture are curculio, codling moth, and sometimes late spring frosts. The first two can be overcome by spraying with the usual mixture; and with a Paris green wash, frequently applied, the borer is kept in check.

Mr. W. H. Cassell, of Canton, in his report of January 2, 1889, says: "Mention the fact that the LeConte pear has blighted in several places the past season on its own roots, and that its being used as a stock for other pears, gives them no protection whatever against blight. I had Bartletts in nursery rows, side by side, some on French pear and some on LeConte. Both were attacked to some extent by blight, and about an equal number of each were affected."

This, with Mr. Cassell's former reports, covers the ground for West Mississippi.

The eastern part of Mississippi, has not many orchards of large size, hence very little shipping of fruits is done. The peach crops in the middle and southern parts of the state have more or less failed during the last decade, and especially have the earlier varieties, like Alexander and its synonyms proven very unprofitable. Peaches that ripen after the middle of June have brought the best prices in northern markets.

Apples and pears produce very well in the eastern parts of the state, and especially so in soils containing lime. On our prairie lands, and on the undulating clay lands which are rich in mineral matter, such apples as Buncombe, Equinetelee, Taunton, Ben Davis, Etowah, Shockley, Stevenson's, etc., grow to perfection. I have kept Hall until March; though small, it is of very good quality.

We can count on a pear crop four times in five years. Pears seem to do better here than elsewhere in the state. We have not had any blight worth mentioning during the last twelve years.

I raise the very best of LeConte pears on trees grafted on Belgian stocks in 1877. The trees are more thrifty than those grown from cuttings. Nearly all pears of the catalogues do well in this part of the state, and they do better as standards than as dwarfs.

Plums are not much cultivated here. Of the lately introduced plums, P. Pissardi bore some palatable fruit. Kelsey, Simoni and Ogon promise well.

The Labrusca family of grapes has failed completely in many parts of the state, while in a few other parts even Concords are grown with success. Black rot is the principal cause of failure. In lands containing much mineral matter the Concord does well in some seasons; also in newly cleared sandy lands it will produce four or five good crops. Ives and Delaware are not much affected with black rot, if a hundred yards or more distant from Concords or other grapes easily affected with the rot.

The pecan (*Carya olivæformis*) will become the most important fruit for the Gulf coast. Though it grows well in all parts of Mississippi, it is on the Gulf coast and in river bottoms that it attains its perfection. Large orchards are in bearing on the coast, and more are planted every year. By selecting the largest thin shelled nuts, similar fruit is produced. On the coast the apple, pear and peach are not as successfully grown as farther north in the state, and even the orange has failed in many localities on account of the severity of the winters a few years ago. The pecan, however, the Scuppernong, Thomas and Tenderpulp grapes, of the *Vitis vulpina* type, the fig, and the Everbearing mulberries, can be grown with almost neverfailing success, if properly cared for.

In the northern part of this state, fruit growing is also on the increase, especially peaches and strawberries. As a summary of my observa-

tions I would say that the Alexander peach, and all other peaches ripening within two weeks of Alexander, should not be planted for Northern markets, for even if they should ripen to perfection, they will not ship well nor sell well.

Clingstone peaches, though the most salable in the South, will bring from ten to fifteen per cent. less in Northern markets than freestone peaches.

The Early Harvest, and especially Carolina June, are the most profitable apples for Northern markets.

The LeConte pear is overrated. The market will be overstocked, and other pears sell at a profit, when LeConte will be selling at a loss to the shipper. In localities where late spring frosts occur, blight will prevail. Blight has not increased in my orchard of over six hundred standard pear trees. The profitable pears for East Mississippi are Bartlett, Angoulème, Anjou and Kieffer. I have had large crops of LeConte during the last six years; but the above named pears brought better prices when the LeConte novelty was over with my customers.

In localities where the Concord grape has become unprofitable on account of black rot, dig the vines and burn them. Plant Ives and Delaware in fresh soil, far removed from the former Concord plantings, and grape growing will become profitable again.

New York.

Reported by Charles A. Green, of Rochester, Chairman of the State Fruit Committee.

Fruit growing as a business pursuit is prosperous. The fabulous expectations of earlier days have given way to the more reasonable hope of securing such profits as would be satisfactory in other lines of business equally safe, healthy and enjoyable. We have learned the folly of expecting any line of industry, open to all competition, to yield extravagant profits during a long term of years. In the natural order of things this is impossible, for competition steps in, and turns the tide the other way for a season. Then comes a healthy reaction, leading to close business methods, such as are now being pursued.

I regard the present a good time for engaging in fruit culture, for the reason that expectations will not now be pitched too high. If we begin operations with hopes of enormous profits, and rapid increase of wealth, our expenditures are liable to be correspondingly lavish, and disappointment is apt to result. But now economy will prevail.

Will the fruit markets be glutted? This has been the nightmare that has hovered over the fruit grower's pillow for twenty years. The markets have not been glutted where proper distribution has been secured, but the fear for next year's glut continues. Of inferior fruit, fruit of poor quality, or poorly packed, or not well sorted, there is apt always to be a glut. But of fine fruit, well packed, there is but little danger of a glut. Production is increasing rapidly, more especially of grapes and apples, but new markets are being found, car load lots going to Denver Colorado, to Minnesota, Kansas, etc., and as prices are reduced more people form the habit of eating fruit, and the producer learns how to produce at less cost. The best Concords were sold the past season in ten pound baskets at sixteen cents per basket net, basket and all, and the result was profitable to the grower. Five years ago we would not have thought it possible to produce at such low prices. Our methods of pruning and culture have improved, and above all our methods of marketing. In old times each grower sold for himself, paid high rates for shipment, commission, etc. Now several growers of grapes, apples, pears, etc., club together and fill a car, or ten cars, daily or weekly, as the case may be. All goes to one commission house, all are paid for in one check, and one of the shippers divides the money among all who put fruit in the car. Thus a small grower who could not pay double freight on half a car load of grapes, apples, etc., gets car load rates for freight, and more rapid transit, as special attention is given such full car lots. The commission house also expects the full car load lots at certain intervals and makes sales in advance.

Home markets are often overlooked. It pays well to supply the home market, and it is aston-

ishing how much fruit will be consumed, even in the open country and smaller villages, if supplied daily with both small and large fruits, and commission and freights are saved. My own locality is well supplied from our fruit farm, and I can testisfy to the rapid increase of consumption. When we began twelve years ago in a small way, we had more difficulty in selling a small quantity than we now have in selling a large quantity. The villagers have learned to eat fruit, more and more each year.

But we must produce a better quality of fruit. As people get experience in consuming fruit they demand better varieties. If we sell a sour basket of grapes, or inferior berries, or other fruits, we are not so warmly welcomed the next time our wagon calls at the consumer's house. He is apt to conclude that his family do not like fruit. The last did not relish very well. He can dispense with it without great sacrifice. But if the varieties sold were of fine flavor, and well ripened, the remembrance of them is retained, and more demanded by every member of the family. If I buy a dozen oranges for my family and they are sour, do I hunt around for more the next day when in the market? No. The children and the wife remark, "Those oranges were sour. Don't get any more. We don't like oranges." But if the oranges were sweet and juicy, I am praised for my gift, my family smacks its lips, and I buy and buy as long as money and the supply hold out, and who can estimate the increased consumption resulting, as a consequence of such conditions, in every home and every market?

In this state we have planted the Baldwin apple largely. More than nine-tenths of the orchards are Baldwin. We have made a mistake. The Baldwin is not of good enough quality. People buy a basket or a barrel, they go off slowly; some are left to rot; no more are wanted. If the barrel had contained Hubbardstons or Swaars all would have been quickly eaten, and other baskets or barrels purchased, hence a large increase of consumption.

"Is the Baldwin good enough for your patrons," I inquired of a leading Rochester grocer?

"No, it is not. My patrons will not buy it if they can get other kinds. It is not good eating out of hand, and is not so good for cooking as the Greening, Spy, etc."

Our insect enemies are no longer masters of the situation. Fruit growers can now have apples, pears, etc., free from worm holes if they are not too lazy to apply the remedies. A spray of water, in which Paris green or London purple has been mixed, applied to the apple, pear, plum or cherry tree in a proper manner, will rid the trees of injurious insects at trifling cost, yet but few avail themselves of these remedies. It has recently been discovered that the plum curculio feeds upon the foliage as well as the fruit of the plum and cherry, hence is easily destroyed with the spray. Also that the curculio works in the apple tree seriously if no plums (which it prefers) are near by. It is advised that plums be planted near apple orchards, for the curculios can be fought and killed in the few plum trees without going all over the apple orchard.

What varieties shall we plant? is the vexing question, not only to the novice, but to the experienced as well, and on the selection success largely depends. While quality is desirable, quality alone must not govern; while beauty is desirable, that alone must not rule; while vigor and hardiness are desirable, these alone will not make profitable orchards or vineyards. We must put all the desirable qualifications of a variety, with all its defects on the scale, and then decide which we will plant. We must also look ahead to the probable improvement in the taste of the public which is to consume the fruits of our planting and to the possible results of new varieties not yet tested. At best, the selection of varieties is something of a lottery, for often varieties that succeed on one farm will fail to do as well on the adjoining farm.

While I would advise planting but few varieties for market, I will name below a few varieties which I recommend as worthy of cultivation in this state, though they will do better in some parts of the state than in others:

Apples.—Bailey Sweet, Baldwin, Ben Davis, Blenheim, Detroit Red, Early Harvest, Esopus Spitzenburgh, Fanny, Golden Russet, Golden

Sweet, Gravenstein, Grimes Golden, Hendricks Sweet, Hubbardston, Jonathan, Late Strawberry, Maiden's Blush, McIntosh Red, Mother, Spy, Shannon, Oldenburg, Peck's Pleasant, Porter, Pumpkin Sweet, Rambo, Red Astrachan, Red Canada, R. I. Greening, Roxbury Russet, St. Lawrence, Shiawassee Beauty, Sutton Beauty, Swaar, Sweet Bough, Talman Sweet, King, Twenty Ounce, Wagner, Wealthy, Yellow Bellflower, Yellow Transparent, Fall Pippin, Red Beitigheimer, Stump, Kirkland, Lady Sweet.

Pears.—I recommend the following as especially worthy of culture: Angouleme, Anjou, Bartlett, Bosc, Buffum, Clairgeau, Clapp's Favorite, Dana's Hovey, Flemish Beauty, Howell, Josephine de Malines, Kieffer, Lawrence, Louise Bonne, Seckel, Sheldon, Souvenir du Congres, Summer Doyenne, Tyson, Winter Nellis.

Plums. Bavay's Green Gage, Bradshaw, Coe's Golden Drop, German Prune, Gen. Hand, Huling's Superb, Imperial Gage, Jefferson, Lombard, McLaughlin, Pond's Seedling, Quackenboss, Shropshire Damson, Washington, Yellow Egg, Niagara.

Cherries—Sweet: Napoleon, Yellow Spanish, Black Tartarian, Windsor. Sour: Richmond, Reine Hortense, Montmorency, Louis Phillipe, English Morello.

Peaches.—Alexander, Crawford's Early, Crawford's Late, Early York, Foster, Mountain Rose, Old Mixon, Rivers, Stump the World, Globe, and Smock.

Strawberries.—Older varieties: Sharpless, Downing, Wilson, Crescent. Newer kinds: Jessie, Bubach.

Grapes.—Older varieties: Concord, Worden, Brighton, Delaware. Newer varieties: Niagara, Moyer, Diamond, Eaton, Mills.

Raspberries.—Black: Gregg, Ohio, Souhegan, Doolittle. Newer kinds: Nemaha, Hilborn, Palmer. Red: Cuthbert, Marlboro, Shaffer. Newer kinds: Golden Queen.

Blackberries.—Taylor, Snyder. Newer: Minnewaska.

Gooseberries.—Downing, Houghton. Newer: Industry, but it mildews in some places.

North Carolina.

Reported by J. VanLindley, of Pomona, Chairman of the State Fruit Committee.

For the year 1888, there was a fair fruit crop in most parts of North Carolina. In some sections, however, the peach and other early blooming fruits were killed by late spring frosts. Mr. N. W. Craft, of Yadkin County, near the mountains, reports a fine crop of apples, peaches, pears, strawberries and grapes, and says he gathered fifty bushels of apples from one tree of the Royal Limber Twig. The tree was thirty years old. The following are the varieties which he says do best in his section: Early Harvest, Red June, Maryland, Horse, Sine-qua-non, Buckingham, Fall Queen, Bonum, Harper's Seedling, Royal Limber Twig, Red Limber Twig, Red Cheese, North Carolina Keeper, Ben Davis, Edwards, Wine Sap and David's Winter.

The following pears do best in his section: Bloodgood, Doyenne d'Ete, White Doyenne, Bartlett, Angouleme, Lawrence, Seckel, Clairgeau, Souvenir du Congres, and Doyenne d'Alencon. All grapes, strawberries and peaches do well. Mr. Moses Hobbs, of Edenton, reports that he has an orchard of pears at Mag's Head, Dare County, in the northeastern part of the state, on the coast. He has one hundred Seckel and three acres in Angoulemes. At the date of his writing, Sept. 26th, 1888, he says he had netted $1,400 from the sale of fruit, and had two hundred bushels of pears not yet sold; so those two varieties of pears seem quite profitable in that section.

Mr. W. L. Baxter, of Ridgeway, in the northeastern part of the state, about one hundred miles from the coast, reports the following list of fruits cultivated in his section for Northern markets:

Strawberries.—Ranking in order as written: Hoffman, Crescent. May King, Sharpless, Wilson.

Wild Goose Plum.—More certain than peaches.

Peaches.—Very uncertain of late years, having been killed by spring frosts. If any were left they would rot just before ripening. The last good crop was in 1882.

Grapes.—A sure crop, but of late years badly affected with black rot. Prices are getting lower every year. The following varieties are grown:

Ives Seedling—the most hardy black variety, and most free from rot.

Concord—rots badly, especially in old vineyards.

Champion—the earliest black grape, of poor quality.

Moore's Early—a fine grape, which rots but little.

Worden—a fine grape, which rots but little.

Brighton—a fine grape of fine quality, but which mildews badly in warm seasons and rots some.

Delaware—free from rot; mildews badly in some seasons, but brings good prices when perfect.

Lady—no rot or mildew; the earliest white grape.

Martha—rots some; free from mildew.

Perkins—free from rot or mildew; very foxy.

Niagara—a fine grape, but rots.

Elvira—a great bearer, compact, free from rot or mildew.

Empire State inclined to rot, but not generally tested.

Apples.—Do fairly well, but are only planted for family use.

Pears.—All varieties blight.

We have a new grape, James, of the *rotundifolia* species: black, large size, good quality, very prolific. Commences to ripen in July, and continues till frost. It is a very valuable grape, which originated in Pitt County, and will succeed wherever the Scuppernong does.

Irvin's October, is another new grape, of the *Labrusca* species, if I am not mistaken. It has long, pendant, large shouldered bunches, with medium berries, of a dingy red color, sweet and good. It is very valuable on account its lateness. It originated on the old Irvin farm in Guilford County, many years ago; but has just been brought to public notice. In the South about all of our best grapes ripen in July and August, hence the value of Irvin's October for the South. It would be worthless in the North.

The Lutie has borne with me two years. It is extremely hardy, and when fully ripe is a fine grape. Many good judges at our state fruit fair tested its quality, and pronounced it equal to any grape on exhibition, and a large collection of the best older varieties was on exhibition. It is one of the most valuable Southern grapes, regardless of what was said about it in the report of 1885.

[An accompanying list of recommended changes in the Catalogue was adopted.]

Nova Scotia.

Reported by Charles E. Brown, Chairman of the Fruit Committee for Nova Scotia.

Under date of November 14th, 1887, I was advised of my appointment as Chairman of the Fruit Committee for this Province, of the American Pomological Society, and asked to select and forward at that date the names of associate members. These were given as follows:

Prof. Lawson, Secretary of Agriculture, Halifax; Rev. J. R. Hart, President N. S. F. G. Association, Bridgetown; C. R. H. Starr, Secretary, Port Williams; W. R. Wentzel, Bridgewater.

Previous volumes report in full as to fruit growing in the Province, history, progress, varieties, etc. Under the stimulus of a European market, there is a steady expansion of planting; the total shipments doubled in about four years, and will soon be up in the millions of barrels.

The season of 1888 throughout Nova Scotia, was one of unprecedented rainfall, the wet, overcast weather continuing from the middle of July to November. A large proportion of the small fruit crop failed to mature, rotting before ripe. The apple crop was small in quantity and poor in quality; the long keeping kinds failed to mature or to keep after storing. In the two leading fruit counties of the Province, King's and Annapolis, it is much to the credit of the Gravenstein that it rises superior to adverse elements, that variety alone of twenty-six popular kinds, being reported in both counties, as above the average in yield by twenty per cent., and excelling in quality by a small percentage as well.

Rhode Island.

Reported by Jos. H. Bourn, of Providence, Chairman of the State Fruit Committee.

The fruit crop of Rhode Island for 1888 was not a profitable one, on account of the cold, wet, sunless season.

Strawberries are a most capricious and irregular crop. More complaint than usual is made of barren strawberries; and no remedy is better than to rely on young plantations. The favorites, Downing, Miner's and Sharpless did not afford a respectable show of well ripened, sweet fruit, while May King, Jersey Queen, Prince, Parry, Belmont and Jewell barely retained their usual good qualities. The newer varieties, Jessie, Bubach No. 5, Gold, Cardinal and Dorchester fruited under adverse conditions; their true merits must be ascertained after another year's trial.

The plum crop was below the average, with the exception of Lombard, the trees of which were loaded with fruit that kept unusually late.

The grape crop was injured by a heavy, early September frost. The Massasoit, Barry and Niagara matured as well as any, and bagging was a beneficial protection. Grapes grown on elevated wires resisted frosts better than those trained near the ground. The Empire State, Ulster, Eaton, Herbert and Mills matured their wood well.

The pear crop was a partial failure. Some of our best dessert pears were unusually thin of fruit, and specimens were under size. Superfine, Lucrative, Dana's Hovey, Sheldon and Bonne of Ezec were among the best in flavor.

Apples were fairly good. The Gravenstein, Fall Pippin, Tompkins' King, Baldwin, R. I. Greening, Bowen, Garfield and Roxbury were unusually fine, but every year we find the field of apple selection is widening. The Palmer, Sutton Beauty, McLellan, Dyer, Jewett's Red, Hawley, Mother, Garden Royal, Jonathan and Mexico are now among our choicest varieties.

A weakness or tendency to disease pervades many fruits in Rhode Island. The Early Harvest apple; White Doyenne, Diel and Flemish Beauty pears; Black Eagle and Black Tartarian cherries; Isabella and Creveling grapes; Triomphe de Gand, Jucunda and Wilson strawberries, are only a few varieties of the many that are now grown with indifferent success.

Cultivated fruits will grow for their allotted time, and supply us plentifully as long as our plans conform to those conditions of soil and climate which are necessary to the health and vigor of the plants, and no longer.

The best fruits of to-day may be prolonged; but decline will inevitably come, and newer varieties will take their places, to be supplanted in due time by others.

Pennsylvania.

Reported by H. M. Engle, of Marietta, Chairman of the State Fruit Committee.

There is, even after a period of four years, since my last report, not much to be said that is new and important; not that our state is not progressing at all in fruit culture, but that progress is much slower than enterprising pomologists wish to see. In some localities there is sufficient interest manifested to indicate more rapid progress in the future.

Juniata County is having quite a boom in peach culture in consequence of the enterprise of the Smith brothers, mentioned in a preceding report. About 15 years ago they planted a few hundred trees as an experiment, on land worth $15 to $20 an acre. Not having had any experience in peach growing, but being close observers, enterprising and industrious, they succeeded so well that not only Juniata County, but the neighboring counties of Mifflin, Huntington, Blair and others, are now awake to the possibilities of peach culture within their borders.

The Smith brothers have for years been shipping peaches by the carload, not only into the mining regions, but also to Philadelphia, thus unexpectedly encroaching upon the peach monopoly of Delaware and Eastern Maryland.

From the nucleus of the few hundred trees referred to, I have learned from reliable reports that last season $50,000 passed through the banks at Mifflin for peaches, and the proceeds from local sales must also have been considerable.

Three hundred thousand peach trees were intended to be planted last spring, principally in Juniata County. There are a half dozen or more other counties in this state where peach culture can be made equally successful; and indications are that Pennsylvania will at no distant day, not only grow the peaches needed for home consumption but have a surplus for abroad.

Small fruit culture has also received an impetus in the above named counties. Raspberries particularly, have been planted by the ten thousand.

Although the northern and northwestern portions of the state are as well adapted to apple culture as the southern are to peach culture, there is little indication at present of a tendency to extensive planting for commercial purposes. With the exception of the counties adjacent to Philadelphia, where fruits are grown for the city market, Berks, York, Adams, and Franklin are probably the leading counties for general large fruit culture, as also to small fruit culture to some extent.

Insect depredations have not yet received the attention necessary to give material aid to fruit culture, but there is quite a disposition shown by progressive growers to profit by the success the few have had in the application of arsenical mixtures.

Diseases of fruit and fruit trees have received still less attention than insects. Yellows in the peach is probably the most difficult of all tree diseases to prevent or counteract, and it seems difficult to persuade planters in general that it is not caused by borers; consequently, instead of removing trees as soon as they show signs of yellows, they are left to stand for the sake of a few sickly peaches until they are dead, when the usual conclusion reached is: "Peaches don't succeed as well as when our fathers planted them along the fences."

Pear and quince trees may sometimes be saved when affected by blight by amputating the diseased branches, hence some try to save peach trees by the same method.

One of the greatest drawbacks to fruit culture in general in this state, is the neglect to keep up the fertility of the soil, which in many cases invites disease, and to some extent, insect depredations. While field crops, as a rule, are not expected to yield full returns without a properly fertilized soil, the orchard is expected to yield a crop of fruit, and a field crop in addition, with little or no manure.

From the southeastern to the northwestern borders of our state there is quite a variety of soils, climates, altitudes and conditions, and planters who make proper selection of fruits adapted to the various localities and conditions, seldom fail to succeed. We still have a large majority of those who plant at haphazard, and who consequently do not succeed, insisting that it "don't pay."

New fruits are introduced so rapidly that it is almost impossible to be posted well on all; as it is, I have no changes to recommend in the Catalogue for our state.

Mr. Frederick Jaekel, of Hollidaysburgh, Blair County, member of the State Fruit Committee, reports as follows:

"In this section of the state all kinds of fruit, apples, pears, plums, peaches, cherries, grapes, and berries of all kinds, do well in most situations. The fruits grown here are believed to be finer in appearance and better in flavor than the same kinds grown farther south. Comparatively little fruit is grown here for market, however, and few persons are well informed upon the subject of fruit growing. Yet there has been a gradual increase in the production and consumption of fruit, and probably four times as much is used in proportion to population now as ten or twenty years ago. Large quantities of fruit of all kinds are imported from Delaware, New Jersey, and Maryland, with apples from New York, Ohio, and other places. Raspberries and blackberries grow wild in abundance on the mountains and are shipped in considerable amounts to markets east and west, besides those used at home and supplied to the guests at the numerous summer resorts. Almost every family depends on the wild berries for its preserves and "spreads."

"The apple and cherry seem to increase in health the higher one ascends up the Alleghany

Mountains, and nowhere have I found healthier and thriftier orchards than in those sections of Cambria, Centre, and Somerset Counties, reaching from 14,000 to 19,000 feet above the sea, where ice freezes almost every month in the year. There are orchards in that section which were planted more than fifty years ago, and which though sadly neglected still bear an abundance of almost perfect fruit. There are fewer insects and diseases at these high altitudes than elsewhere in the state.

"In counties south of Blair, peaches grow finely, but only a few are planted, and those seldom properly cared for. Pears are but little grown. Blight is troublesome mainly in young orchards, three to ten years old. The kinds which suffer most are, beginning with those most affected: Bartlett, Vicar, Howell, Madelaine and LeConte. Bartlett however is still regarded as at the head for profit, with Duchess (dwarf) next on the list. Kieffer is very profitable, perhaps more so than any other, but it is too acid and is liable to overbear.

"Plums are grown in small orchards, and do well. The curculio is less troublesome than the black knot. The best variety for all purposes is the German Prune.

Of cherries the Hearts and Bigarreaus should only be planted on rich soil; though cultivation is not necessary. These are less profitable than the Dukes and Morellos, of which Montmorency Ordinaire deserves, under all circumstances, the first place. It is an early and prolific bearer, responds freely to good cultivation, and as the fruit is somewhat acid it is not attacked by the birds so much as other kinds.

"Of peaches, the medium early varieties, those ripening from August 10th to October 20th, are best, and the most profitable variety is undoubtedly Early Crawford. Peaches from Delaware and Maryland are imported in large quantities, but within the last two years the orchards of Mifflin County have done considerable toward supplying the demand.

"The quince is but little grown on account of borers.

"Grapes, mainly Concord, generally do well, but are seldom grown for market. Late spring frosts are prevalent and injurious, both to grapes and orchard fruits, but may be largely avoided by planting on the high lands."

South Carolina.

Reported by L. A. Ransom, of Columbia, Chairman of the State Fruit Committee.

Fruit culture does not receive the attention in South Carolina that the soil and climate justify. Almost every farmer in moderate circumstances grows some fruit for home use, but generally it is done in so loose and careless a manner that the results are unsatisfactory and rarely profitable.

From the Alpine region of the state, down through the Piedmont and Middle Belts to the coast, there is scarcely any fruit, common to the United States, that cannot be successfully grown. Col. R. M. Sims, President of the South Carolina Horticultural Society, says: "All fruits of the temperate zone, and many of the semi-tropical ones grow in South Carolina." Apples, peaches, pears, plums, cherries, grapes, melons, figs, and berries are grown, and "on the coast," says Hammond, "the olive and the orange bring their fruit to full perfection. Once only during a period of sixteen years, previous to 1880, were the orange trees injured by frost, when the tops of about one-fourth were killed. The fruit from single trees in the neighborhood of Beaufort, has for a series of years sold for $150 to $250. The oranges of this region bring a higher price in the market and are thought superior to those grown further south. Even the banana, with a not expensive protection, has been made to ripen its fruit. Fig trees of every variety, with little or no attention, grow everywhere and produce several abundant crops yearly." In the sand hills of the Middle Belt the same writer mentions a peach orchard where the proprietor cultivated, with three hands, sixty acres in this fruit, and in six years made crops realizing from $5,000 to $10,000. In this section watermelons are grown in great quantities, and of large size and excellent quality. In 1670 colonists reported seeing peach trees on St. Helena Island. It is stated that in recent years hundreds of thousands of cuttings of the Warren grape, native in the

Piedmont Region of this state, have been ordered from France, and being planted there have yielded wine of excellent quality. "The Alpine Region," Hammond says, "is blessed with an unusual number of clear days, and a large amount of sunshine. The fig tree there thrives without protection, at an elevation of 1,500 feet above the sea."

The pecan, English walnut, and other nuts can be made profitable in several sections of South Carolina.

New Native Varieties.—Major J. J. Lucas, of Darlington County, has a fine seedling autumn apple that he considers worthy of cultivation.

Mr. Alfred Moore, of York County, has discovered a pear on his place that seems to be a hybrid, partaking of the quality and sweetness of the sugar pear, and having the size and shape of the "Choke" pear, but not so prolific as either variety.

Dr. E. T. Avery, of York County, has a new pear of promise, as large as the Bartlett, which ripens in July, and resembles the Flemish Beauty.

Mr. B. Frank Keese, of Oconee County, has a seedling from a Red June apple that is white, but when ripe is a bright yellow. The tree is a moderate grower and a prolific annual bearer.

Mr. H. B. Buist, of Greenville, has a late seedling grape, which has fruited for ten years, which is supposed to be a cross between the Catawba and Brighton. It is a little inclined to mildew, but is hardy, and a strong grower.

Synonyms.—The Amelia peach is called "Old June," Alexander is called "Amsden." Tall Top apple is sometimes called "Earle." This variety is reported to have been in the state for sixty years. The Shockley apple is known by the mountain people of Oconee as the "Neverfail," and some nurserymen tag it the "Horse Bud." In York County the Lincoln or Black July grape is called the "Hart."

Obstacles to Fruit Culture.—The chief obstacles to fruit culture in South Carolina consist of variable spring weather and late frosts; insects; blight in apples and pears; black rot and mildew in grapes; the lack of a home market, and the high freight rates on fruit shipped out of the state.

Remedies.—Winter cultivation and mulching; bagging the bunches of grapes; kainit applied in early spring, about two pounds to the tree, sown broadcast under the tree for rot and curculio; applications of lime, blue stone and the various insecticides, and lime wash with carbolic acid; pigs and poultry for the curculio.

Culture and Pruning.—Deep winter plowing, running shallow near the trees, and pruning in the latter part of September. Some growers prune in March. Short stems and pyramidal heads are desired. Low trees do best on uplands, and high on bottoms.

Grapes are planted eight to ten feet apart, plowed twice in spring, and the land sown to peas. Vines cut back to two or three buds of previous year's growth. The trellis is the usual support. The Scuppernong, Thomas, and Flowers, however, are trained to a stake. All side shoots are removed for six feet, and arbors constructed for the vines to spread, six feet high. Pruning is done in summer with this class. The crop is sometimes short, from heavy rains during blossoming.

Statistics.—According to the census of 1880 the value of the fruit crop in South Carolina was $113,834, including wine made. This statement evidently included only that part of the crop marketed. By the latest official [state] reports the value of the crop sent to market was, in 1888, $391,984, exclusive of the wine sold. This amount does not exceed one-fourth of the value of the crop produced. It is within bounds to say that the value of the crop in 1888 was not less than $1,500,000.

The greatest progress in fruit culture, in recent years, has been in berries on the coast, melons in the middle section, and grapes in the upper and eastern sections of the state. The strawberry crop of 1888 on the truck farms around Charleston, was estimated at 800,000 quarts, valued at $80,000. The South Carolina railroad alone transported last year (1888) 826 car loads of watermelons. The value of the melons grown was about $150,000. The acreage is said to be increasing, and with lower freights the crop would soon become an extensive one. In Chester County, in 1887, the average yield of

grapes was about 8,000 pounds per acre, and the fruit sold readily at eight cents per pound. The growers in that county make about 250 gallons of wine to the acre, and sell it at $1 per gallon. In Darlington County one of the most extensive growers reports that he has about 100 Scuppernong and Thomas vines that yielded him 1,000 gallons of wine this season, and the demand for the wine was good. About 10,000 gallons of wine are made in Darlington County annually. From Greenville County over 100,000 pounds of grapes, and a small quantity of wine, were shipped last season. The result was very satisfactory, and the business is increasing. Within a radius of six miles of Greenville there are two large vineyards yielding profitable returns on the investment. Hundreds of acres are planted in smaller vineyards, where a few years ago there were no vines except a few in each garden. Strawberry and raspberry culture is just beginning to become important. Near Walhalla, in Oconee County, there are 19 vineyards, containing 60,000 vines. No demand has yet been established for the wine made here, but the grapes are shipped all over the country and paying prices received for them. Last year one grower shipped over 40,000 pounds of grapes to Atlanta and Birmingham. In York County, previous to 1870, little attention was given to fruit culture, but since that time orchards and vineyards have been planted quite extensively, varying from one to twenty acres. Grape culture has proved the most profitable.

Wisconsin.

Reported by A. L. Hatch of Ithaca, Chairman of the State Fruit Committee.

1. The species of fruit grown in, and native of Wisconsin, are indicated fully by the Catalogue of 1887, as herewith corrected.

2. In correcting or revising the Catalogue for Wisconsin, I mention many varieties with a minus sign following, to show they have been grown in Wisconsin but have generally failed, and are now considered unreliable, *e. g.*, number 18, Ben Davis.

These failures have been largely on account of want of hardiness, or inability to endure our severest cold winters; 30 to 40°.

3. *New Varieties.* McMahon's White apple, size l.; from r. ob.; color y. w., sometimes blush in sun; quality g.; use K. M.; season Aut.; origin Am.

In Waupaca County, Mr. Wm. A. Springer, of Fremont, reports many seedling apple trees from 35 to 40 years old, and very hardy there. At the meeting of the Waupaca County Horticultural Society in 1888, 150 varieties of seedling apples were shown.

4. Edgar Red Streak apple is known entirely as Walbridge in Wisconsin. Oldenburg is Duchess; Fall Queen is here called Haas, Hoss, or Horse. The Champion strawberry is Windsor Chief here.

5. The obstacles to successful fruit culture are:

a. Severe cold during winter, accompanied with extreme dryness of the air that freezes the trees dry. Extremes of cold, as low as —55°, are reported from some parts of the state.

b. Prevalence of parasitic fungi, notably *Fusicladium dendriticum* on apple trees, and *Peronospora* on grapes. Blight is prevalent, especially on crab apples, and hybrids of the Siberian type. Avoid high culture and fertility.

c. Noxious insects harboring in native trees, vines, and plants, which also serve as host plants for parasitic fungi; *e. g.*, native grapes (*riparia*) are in many places densely loaded with galls of phylloxera, and in some seasons heavily stocked with *Peronospora viticola*. New York weevils (*Ithycerus Noveboracensis*) and the apple curculio (*Anthonomus quadrigibbus*) are much more troublesome in orchards near woods of oaks, wild crabs, haws, etc., in which they seem to harbor. Experience has taught us that the remedy is largely in destroying such trees and plants as serve as hosts and harbors for fungi and insects. Also select such varieties as have the best foliage to resist attacks of fungi, and also cultivate and manage so as to destroy infested foliage and give healthy leaves, *e. g.*, mow and burn strawberry beds as soon as fruit is gathered, cut out and remove fruiting bushes as soon as berries are off. Also fertilize and culti-

vate apple trees according to kinds; thus, Talman Sweet and Edgar Red Streak are rendered more free from scab if manured, or on rich soil.

d. Want of proper sites and soils. Wisconsin embraces 54,000 square miles, and includes widely different soils and possibilities for fruit culture. The south half and eastern part only may be classed as apple growing. Its surface in the southwest is in the driftless area potsdam sandstone, overlaid on dividing ridges by lower magnesian limestone between valleys 200 ft. deep.

The north and northwest regions embrace granite and gneiss formations, abounding in soft water lakes and streams. The eastern and southern area embraces the glacial drift, and along Lake Michigan, the Niagara limestone, and other of the youngest geological formations. The central region embraces, along the Wisconsin river and tributaries, the cranberry marshes, some of the largest in the West, while the great pine forests stretch out through swampy lands to the great iron mines in the north. Blueberries in vast quantities are found in the central and northwestern parts, and thousands of bushels are shipped on the railroads. Apple culture in the driftless area is successful only on the high lands and lower magnesian limestone soils, or Trenton limestone in the south. Here pears do not thrive — not even the Russian varieties owing, no doubt, to the presence of magnesia in the soil. Along Lake Michigan, and in the youngest geological formations of the state, pears are more successfully grown, while the native flora is also different, notably the beech being found, which is entirely wanting in the other parts of the state.

6. For tree fruits, low heads and close planting on the highest available sites. Winter protection for grapes, raspberries, blackberries and strawberries.

7. Six hundred acres of strawberries were grown near Racine this last year. I have no statistics available, except for 1885, as follows: Apples, 1,670,000 bushels; grapes, 540,000 pounds; berries, 70,000 bushels. This term "berries" is too vague, and probably includes strawberries and cranberries. Probably the crop of cranberries alone in some seasons exceeds that amount, and strawberries have greatly increased in average since 1885.

NOTE. — The numbered paragraphs in the above report correspond to similar ones in your circular letter, of which these are answers.

[An accompanying list of changes has been duly used in the new Catalogue].

Wyoming.

Reported by John W. Hoyt, of Cheyenne, Vice President for the Territory.

Eighteen years ago when the writer first touched the soil of Wyoming, it was still gravely questioned whether even cattle raising could be made a success in this region. Later, doubts were entertained regarding agriculture; but time has dispelled these delusions, and encourages me to suggest the possibility of success in some branches of fruit culture. We can learn much from the experience of fruit growers in the Northwestern States, avoid their many mistakes, and emulate their perseverance. Some of the more important conditions of success will be briefly mentioned.

1. There must be a judicious choice of species, Latitude alone will not settle the question of practicability, altitude is an important factor. It may be safe to say, that at altitudes much above 5,000 — perhaps it will do to say 5,500 feet, — it is only the hardier small fruits, such as currants, gooseberries, raspberries and extra hardy apples of the crab variety, that can be counted on with entire success. Many of these grow natively in the territory, which fact is a good indication that they may be easily domesticated. In the lower valleys, the hardiest of the larger fruits, such as cherries, plums, pears and apples may also be attempted.

2. There must be the most careful choice of varieties of the approved species; "Iron clads," only should be tried at first. A list for trial would be at follows:

Of strawberries, the Crescent, Manchester, Wilson and Manitoba Wonder; of raspberries, Gregg, Herstine and Doolittle, though some succeed equally well by giving winter protection,

(which as a matter of fact is needed for all raspberries), with the Terence and Cuthbert, which are varieties of the *Rubus strigosus*, or red raspberry; of currants, the Red Dutch and Black English; of gooseberries. Smith, Downing, and Houghton; of juneberries, the indigenous and the Russian; of blackberries, with requisite protection, Snyder, Taylor and Wilson.

The fact that the choke-cherry (*Prunus Virginiana*) is indigenous in Wyoming would indicate that domestic varieties should also succeed. The cherry cannot be regarded as altogether reliable, however; Early Richmond and English Morello are recommended for trial.

Since the native plum of the north (*Prunus Americana*) grows indigenously from about 38 far northward, even in British America, we should expect to succeed with this species also. Several Russian varieties give promise of doing well; while, of the varieties already familiar, the Miner, De Soto, Forest Garden and Wild Goose are worthy of trial.

If any living in low valleys, with exceptional protection, would try the grape, let them adopt the Concord, Moore's Early or Worden.

The apple can be made to succeed—some varieties of it in almost any inhabited part of the territory. At high altitudes we should only attempt to grow the best varieties of the crab, such as the Siberian, Hyslop, Transcendent and Quaker Beauty. Of apples proper, we feel justified in recommending Cherry Red, August Dart, Duchess, Hall's Greening, Kaump, Okabena, Wealthy and Orange Winter.

3. A third requisite is proper attention to the matter of locality, a comprehensive term, embracing for us questions of altitude, mean temperature and range of temperature for the year, for the several seasons, and for the day, exposure to the sun, protection from cold winds, feasibility of irrigation, etc. It is, perhaps, needless to urge the importance of shelter in this region for fruits of every sort; natural shelter, as of hill, bluff or body of timber, where it can be had, and where it cannot, then belts of cottonwood, willow or other forest trees, planted and cultivated for that purpose.

4. The question of soils is hardly less important. There must be skillful transplanting, thorough culture, and frequent watering and mulching, such as will keep the soil about the roots constantly moist, and so far soluble as to enable them to absorb therefrom the requisite nutriment.

MISCELLANEOUS PAPERS.

The American Pomological Society, and its Rules of Pomology.

T. T. LYON, SOUTH HAVEN, MICH.

In the early days of this Society, it adopted a code of rules to guide its deliberations, the principles underlying which are mainly the same as those embodied in the code more recently framed and adopted.

The former, although their general principles were still recognized, had so far fallen into "innocuous dessuetude," that even the fact of their existence can scarcely be said to have been generally known.

The more recent rules, while they cover a broader field, and are adapted to the requirements of more modern practice, have afforded a basis, not merely for a more scientific nomenclature in the future, but also for the amendment, and at least the partial renovation of that of the past. The purpose was to eliminate, even from past pomological nomenclature, so much of its prolixity, redundancy and coarseness, as can be spared without endangering the identity of varieties, and especially to wield the now generally recognized influence of the Society, in the most practicable and efficient manner, to the redeeming of its future from the use of rowdyish, sensational, prolix and pretentious names; to reduce our pomological nomenclature to a system in some sense akin to the approved practice of the modern sciences; and, as far as practicable to suppress the obvious tendency of

not always scrupulous originators or introducers of new fruits, to the use of such names as Monarch, Emperor, King, Golden Queen, Prince of Berries, General Grant, Col. Cheney, with multitudes of others, of kindred character, which seem but too often to be employed to lend a facticious reputation to varieties, new or newly introduced, but which, from lack of genuine merit, should have remained nameless.

These rules accord to the originator or introducer (in the order specified) the prior right to bestow a name upon his introduction. To this we are not disposed to object; and yet, it by no means necessarily follows, that the bestowal of an objectionable name imposes upon any person or society the necessity to degrade its record by the use of such name. This, we infer, was the thought underlying the Society's action four years since in providing that when a new or newly named fruit shall be presented for consideration, the name, if objected to, shall be first considered; and, if deemed objectionable, shall not be permitted to appear in the Society's records.

That the new rules are in accord with the needs as well as the tendencies of modern pomology, as indicated by the practice of the best authorities, as well as with popular tendencies in the direction of simplicity and brevity, will not, we trust, be questioned.

With the rapidly growing importance of pomology, in both its domestic and commercial branches, it is assuming, and doubtless should assume, a scientific character, in some sense comparable with that of botany and entomology; and the need is becoming yearly more urgent, that, as in those sciences, so in pomology, the Sheepsnoses, Hogpens, Big-Bobs, Monarchs, Generals, Comets, Golden Queens, *et hoc genus omne*, should be rejected, and eliminated from its discussions and text books; not alone because of their tendency to degrade the science (if such it may be called), but also for the reason that too many of the terms, have, from too frequent use, long since become meaningless; while the mere increase of verbiage is becoming seriously burdensome to tongue, pen and press.

The need of guidance in this respect is rendered greater by the circumstance of the increasingly common practice by writers, nurserymen and planters, of (not always judiciously) abbreviating these prolix names of varieties, not unfrequently to such extent as to render them ambiguous. Duchesse d'Angouleme pear is very generally shortened to Duchess, which may mean a pear, a cherry, a grape, or a strawberry. In common parlance, Rhode Island Greening is simply Greening; which may mean any one of half a dozen or more varieties of the apple; King of Tompkins County, Monarch of the West, and dozens of others, are but illustrations of the popular practice of dropping needless words; in such cases, not unfrequently, retaining the word possibly imposed by the godfather, as a means of giving the variety a factitious attractiveness.

Quite recently, in defiance of the popular objection to Latin scientific names, the domain of botany has been invaded, and the names, Prunus Pissardi and Prunus Simoni captured and applied to a couple of recently introduced varieties of the plum, thus (intentionally or otherwise) in effect, assuming that they are distinct species, instead of mere varieties.

We will not attempt to divine the motive that prompted such misuse of these terms. It is sufficient to say that such use of them can only mystify or mislead the more ignorant; while, to the better informed, they will be simply Pissard and Simon plums.

Under the administration of Mr. Barry, as chairman of the committee on revision of the Society's Catalogue, the work of reform was well begun; and that in so cautious and conservative a manner, that the then Apostle of American Pomology, the late lamented Charles Downing, in a letter to the writer, remarked that the process of elimination might properly have been carried even further.

In the revision of the Catalogue of the Michigan State Horticultural Society, which was made after the adoption of these rules, and prior to the appearance of the revision of Mr. Barry, their provisions were applied even more strongly; and yet the result seems to have been generally

satisfactory, leaving no occasion for complaint of ambignity or mistaken identity; while the persistent use of the revised names in the Society's exhibitions and discussions, reinforced by popular tendency, has apparently occasioned their very general adoption throughout the state.

The American Society, having adopted these rules, and, by resolution, provided for the exclusion of objectionable names from its deliberations and records; and having also devised a mode of determining their inadmisability; it would seem to be a necessary, and not a difficult matter to enforce their exclusion. And yet, such enforcement seems to have been so generally omitted that, at the last meeting, at Boston, when, in a case of obvious transgression, objection was made, a reporter indulged in a fling at the objector, characterizing the objection as "inevitable."

The Society, after enacting these rules, can have nothing to gain, but on the contrary, much to lose, at least in prestige, by omitting their enforcement in its deliberations, and upon its exhibition tables; since, in the face of such neglect, they will very surely be ignored by the public; and the thought and effort given to the proposed reform, by a very considerable number of leading pomologists, prominent among whom was the late lamented president Wilder, prove to be labor lost. As in civil, as well as in criminal law, impunity begets contempt, so with organizations of this character, public respect and confidence can only be secured and retained by resolute adherence to their principles and purposes.

Although this effort for the simplifying, purifying and elevating of our nomenclature was inaugurated six years since, the fact remains that, of the multitude of nursery catalogues annually issued, nearly all, including even those issued by our own members, still mainly adhere to the long since meaningless excrescences and crudities of the past; and even accept, without apparent dissent, the objectionable names now so frequently put forth by partial, if not even dishonest, introducers of modern novelties.

That all this is but the legitimate outcome of a failure on the part of the Society to manifest an adequate appreciation of the importance, to pomology, of the principles which underlie these rules, goes without saying; and we regard it as equally certain that a resolute, unflinching application and enforcement of the same by the Society, would, ere this, have carried the reform into the catalogues of the more influential nurseries, especially those of its members, into the premium lists of societies, and into the current literature of the day.

In the early days of American Pomology, the application of a pretentious name to a new plant or fruit was usually due to a possibly inflated estimate of its qualities, but with little reference to pecuniary profit; the idea of money making by such means, being, as yet, unheard of; but under the conditions of the last thirty or forty years, during which period even small fortunes have occasionally been realized, from the introduction and dissemination of a single novelty, it has become but too common, in choosing a name, to select with far less regard for appositeness, than to create the impression of superiority—an impression, which, in a large majority of cases, fails to be realized.

This method of creating factitious values for unworthy products, whether by the use of pretentious names or by a free and unwarrantable use of printer's ink, has recently grown to be a veritable calamity, one for which we can imagine no more effective remedy than a resolute enforcement of the rules in question; not by this society only, but generally, by other and kindred societies.

Judging Citrus Fruits.

H. E. VAN DEMAN, WASHINGTON, D. C.

In view of the fact that the American Pomological Society, is, at this meeting, likely to adopt some sort of rules for judging citrus fruits, it seems to me fitting to discuss the methods by which such judgments are made.

I was first brought face to face with this subject, when, as one of the judges of citrus fruits at the New Orleans Exposition, it became my duty to help decide upon the merits of the numerous and extensive collections there shown. The

"Florida Scale of Points" for judging oranges, as has been said in some of the newspapers, was the standard partially adopted at that Exposition; but it should be understood that it was only for that part of the competition in which Florida was against Florida, and this in deference to the special request of the exhibitors from that state.

When the committee came to consider the matter of competition between fruit from all parts of the world, five members were in favor of the adoption of what we deemed a better scale. It was necessary to adopt some scale, for all the fruits were not, and could not be, shown at once, because of their different seasons of ripening. This was particularly true as regards the exhibits from Florida, California, and Mexico on that occasion, and it is likely to occur in other national and international fruit shows. The principal objection to this horizontal "Florida Scale," it seems to me, lies in the *equal stress upon all points of character.* For convenience the scale under discussion is quoted, as follows:

OLD FLORIDA ORANGE SCALE.

1. Size	10
2. General appearance	10
3. Smoothness of peel	10
4. Weight	10
5. Thickness of peel	10
6. Absence of seeds	10
7. Juiciness	10
8. Absence of pulp	10
9. Sweetness	10
10. Vinous flavor	10
Total points in a perfect orange	100

For instance, "smoothness of peel" and "absence of seeds" are given as much prominence as "general appearance" and "sweetness." That these are equal as regards the make-up of a good orange, no one can justly contend. It seems to me unnecessary to have just ten points, and to grade them all alike from 1 to 10.

If I may be allowed to offer a substitute, the following is what my present understanding of the subject would suggest:

NEW OR SUGGESTED ORANGE SCALE.

1. *Size.*—Standard, $2\frac{1}{2}$ to 3 inches diameter, with one point off for every $\frac{1}{8}$ inch less than $2\frac{1}{2}$ inches. Nothing credited for over size	10
2. *General Appearance.*—Freedom from all blemishes, such as rust, scale, decay, bruises, and lack of properly cut stem	20
3. *Weight.*—Should sink in water, points deducted according to buoyancy	15
4. *Thickness of Peel.*—Standard $\frac{1}{8}$ inch or less, one point off for every 1-32 additional	10
5. *Absence of "Rag."*—Standard $\frac{1}{8}$ inch in diameter, segments thin and tender	10
6. *Absence of Seed.*—Standard, seedless	10
7. *Flavor.* Judged by satisfactory taste	25
Total points in a perfect orange	100

Regarding the suggested scale I would make the following explanations on each point, in the order in which I have arranged them.

1st. Very large oranges are generally objectionable for the general market, which is, by the way, the criterion to be heeded by the orange grower. Very small ones are objectionable also, because of the small price paid,

Two and one-half to three inches in diameter seems to be about right, and such oranges pack 176 to 200 to the box, and bring the highest price paid, except for a few of large size and high flavor sold to special customers, which is especially true of the "Navel" varieties. Mandarins and Tangerines are of such peculiar qualities, and usually of such small size, that they should be judged by themselves.

2nd. The outward appearance of an orange has so much to do with its sale that this point should not be passed lightly by. Whatever pleases the eye of the buyer goes to make up "general appearance." Any one who has sent rusty or dirty oranges to market needs no such reminder. Bruises, decayed spots, scale insects and lack of stem, are also points that should be considered even more closely by the critical pomologist than by the tradesman. No specimens should be considered perfect that have any of these defects. What is termed "smoothness of peel," according to the "Florida Scale," is, to my mind, only a part of "general appearance," and should be so considered in judging on this point.

As this second division of the scale is very important, I have allowed it twenty points.

3rd. A heavy orange is always a juicy one, and quite certain to be rich in sugar. Its spec-

ific gravity cannot be determined more easily by the ordinary fruit tester, than by putting it in water. One that sinks is never lacking in juice, and may be considered perfect. This is not a very pleasant part of a judge's duty, but I think it should not be neglected. The two following characteristics are partly covered by this one, but I cannot feel satisfied in ignoring them.

4th. A certain degree of thickness of peel is quite essential to the shipping qualities of an orange, but when it exceeds one-eighth of an inch it becomes simply so much waste and worthless matter. The degree of ripeness, and the time elapsed, and treatment after picking have somewhat to do with this feature, but an experienced and reasonable critic can easily detect about how much allowance a certain sample should have. When the peel exceeds one-eighth of an inch in thickness it should lose two points for every one-thirty-second additional.

5th. The core of a good orange should be very small, and the partitions dividing the pulp should be very thin and tender. Whatever space they occupy means just that much less juice, which we know is all there is edible in an orange. This internal structure forms what is called "pulp" by some pomologists, but this appears to me, a term quite out of place, and I have thought to adopt the less elegant, but to my mind, more descriptive term "rag." Indeed it is somewhat like a wet rag in texture and appearance. The pulp is, more correctly speaking, the part which contains the juice, and certainly the same name should not be given to the two parts of the same fruit.

A perfect orange in this respect should have a core not more than one-eighth of an inch in diameter, for absolutely no core is never found. Maltese Blood is a variety that comes quite near this standard. For every one-sixteenth of an inch increase I would deduct one point from the ten that I have allotted to this characteristic.

6th. As all experienced judges of oranges know, a perfect one should have no seeds. Yet a few seeds are not especially objectionable, and it is rarely that there are enough to be very much so. I have, therefore, in the arrangement of my scale allowed but ten points to this character. The presence of one or two seeds should take off one point, and three or four seeds, two points, and should increase as the judgment may indicate.

7th. When the flavor is tested (and by flavor I mean the taste) the vital point is reached. Whatever else an orange may be, it must please the eater. The palate is an invisible scale that only the possessor can use, nor can another person do more than surmise what it may indicate to the mind. We may descant upon acids, and divide the taste into "vinous flavor" and "sweetness," but they are all sooner or later brought under the one general term "taste," which expresses all that there is good, bad or indifferent in the qualities of the juice.

Chemical analysis will not reveal, nor will scientific formulæ express, the degree of feeling, either pleasant or unpleasant, that these infinitely delicate organs easily detect. How else can we put in black and white whatever these sensations may be, than to place on a numerical scale the thought engendered by eating all or a part of the orange under consideration?

I have allotted twenty-five points to the flavor, and I think the proportion none too large.

And it seems also, at least to myself, that the balances of the palate are so delicately adjusted by our Creator, that such as are frequently soaked in a solution of nicotine or in alcohol, are not, and cannot be, in fit condition to pass judgment upon the flavor of an orange; or for that matter, the quality of any other fruit. Seriously and candidly, I wish to say that this has been my conviction for years past.

MANDARINS AND TANGERINES.

These are oranges of such peculiar character, that the standard should be modified to suit their requirements; size should be lowered a half inch, and a separate section added which should require easy separation of the peel from the pulp.

THE LEMON.

The absurdity of judging lemons and all citrus fruits by any scale used for the orange is very plain. This has, however, been done at

some of the fruit shows in Florida, as some of you know.

Imagine the difficulty, or rather the utter impossibility of defining the degree of "sweetness" or "vinous flavor" of a lemon. It would be much like trying to decide upon the fattening qualities of a Morgan horse or the trotting abilities of a Poland China pig. Recognizing the necessity for a special scale for the lemon, I have prepared and would offer for consideration the following:

LEMON SCALE.

1	*Size*—Standard, 2^1_1 to 2^1_2 inches in transverse diameter	10
2.	*General Appearance*—Freedom from all outward defects	10
3.	*Weight*—Should sink in water	10
4.	*Thickness of Rind*—Standard, 1 16th inch	10
5.	*Sweetness of Rind*—No bitterness	20
6.	*Rag*—Core, $^1_8$ inch in diameter	10
7.	*Seeds*—None	10
8.	*Quality of Juice*—A clear, strong acid, without bitterness	20
	Total points in a perfect lemon	100

Remarks:

1st. Size: perfection, ten points.

By consulting those who sell and consume the lemon, I find that, as a rule, two and one-fourth inches in transverse diameter, is about the proper size. The length is not so material, but such as pack 300 in a box are most profitable to both grower and dealer.

One point should be deducted for each one-eighth of an inch larger than two and one-half inches, or smaller than two and one-fourth inches.

Very large lemons seem to be objectionable, and when they exceed the standard they should be deemed faulty, the same as when falling below it. Ten points should be allotted to size.

2d. General appearance: perfection, ten points.

A clear, bright skin, showing no green color, and without scale or marks of other insects or of fungi, not shriveled, no bruises, no scratches or decay.

Deduction made according to the judgment of the committee.

3rd. Weight: perfection, ten points.

When the skin is properly cured, a lemon of high character should sink in water. The only practical way to determine approximately the buoyancy in water, is by the eye of the judge.

4th. Thickness of peel: standard, ten points.

After curing, the peel should not exceed one-sixteenth of an inch in thickness, and one point should be deducted for every thirty-second in excess.

5th. Sweetness of peel: perfection, ten points.

This is one of the essential questions as to the character of a lemon. If the rind is bitter when soaked in water for some hours, the quality is materially impaired.

6th. Rag: perfection, ten points.

The core of a perfect lemon should not be more than one-eighth of an inch in diameter, and the segments dividing the pulp, very thin. Deduction should be made as the judgment of the committee may dictate.

7th. Seeds: perfection, ten points.

Lemons without seeds are rare, but as they do exist, a perfect specimen should be so. The judges should deduct points according to their abundance.

8th. Quality of juice: perfection, twenty points.

The juice of a lemon should abound in citric acid, of a strong yet pleasant flavor. There is no way, to my mind, better to judge of this quality, than by simply tasting it.

OTHER CITRUS FRUITS.

I would also suggest that the lime be judged by the same standard as the lemon.

The Pomelo should have a standard of four inches, as to size, and one-eighth of an inch in thickness of peel. The standard, as to diameter of core allowed, should be one-fourth of an inch; otherwise, the orange scale will be found to apply.

It is not claimed that the ideas herein advanced are perfect, but, if what I have said may lead to the adoption of better methods of judging citrus fruits, the effort will not have been in vain.

DISCUSSION.

C. F. A. Bielby, Florida: In the matter of orange grading there are several points about which I think we ought to take the sense of this

meeting. We, in Florida, regard oranges which run from 174 to 200 to the box as the proper size. This is based upon the fact that such bring the highest price in market. Our standard for thickness of peel is one-sixteenth of an inch. A Florida orange having a one-eighth peel is coarse. We do not place our trade mark on such fruit. Again, I am opposed to the plan of bunching together 25 points under the head of flavor or sweetness. This discourages all attempt to breed any special flavor. Flavor is a composite quality. What we call vinous flavor is entirely distinct from sweetness, but by the proposed method of marking, a Cuban orange would rank equal to the best Navel. Again, I do not think cavity should count against an orange as core does. The loss of weight is a sufficient discount for cavity. The actual amount of "rag" (core and membranes) however, should be taken into account.

What is meant by appearance is also a composite quality, and should I think be subdivided. The fact of an orange being rusty, for example, though detracting from its appearance, is not a very serious market fault. I think our method of marking should enable us to favor such specimens, when they have a smooth peel, and are otherwise of good appearance.

E. S. Hubbard, Florida: We are using a scale having fifty points for physical properties, and fifty for the properties of the juice. For flavor there are forty points: ten for sweetness, ten for subacidity, ten for lack of free acid, and ten for vinous flavor. By this scale we think we get better results than by means of any other scale we have used.

[Mr. Hubbard exhibited a specimen of Washington navel which graded 99, the highest score ever reached in any orange competition. He also showed a Double Imperial which scored 96.]

H. E. Van Deman: It is well to remember that not all the oranges in the United States are grown in Florida. California oranges have a thicker skin than those of Florida, and yet they sell well. This Society is a national one, yet it might not be advisable to attempt to bring California oranges to the Florida standard. In the matter of flavor, however complex it may be, people think of it as a simple attribute, and decide accordingly. What can a man's palate tell, for example, of the amount of free acid? Tasting is not an exact science.

At the close of the discussion G. B. Brackett of Iowa, offered the following motion which was adopted:

"*Resolved*, That a special committee, of three, be appointed to draft a set of rules or scale of points for judging citrus fruits, the same to be subject to the approval of the Executive Committee, and to be published as soon as completed."

The President appointed as such committee A. W. Rountree of Louisiana, A. H. Manville of Florida, and J. E. Cutter of California.

As a further contribution upon the subject "Judging Citrus Fruits," the following article, by Mr. E. H. Hubbard of Federal Point, Florida, taken from the *Florida Dispatch*, of November 5, 1888, is here reprinted:

LET US IMPROVE THE SCALE FOR JUDGING ORANGES.

"While assisting at the arduous, as well as delectable occupation, of judging oranges at the South Florida Fair last winter, the unbalanced character of the present scale was brought forcibly to my attention; and, considering that the American Pomological Society visits us this winter, we should have the tests conducted in a thorough and comprehensive manner.

"Now, that so large a list of varieties is offered for competition, and the scores are published, the fullest opportunity should be given for intelligent comparison of flavor; as, with many varieties of similar appearance, their differences on the several points in this particular are the only means of determining excellence. The quality of an orange is shown by its physical and juice characteristics; and the flavor is usually of more importance to the connoisseur or consumer than the texture.

"In our present scale, however, the proportion is as seven to three in favor of the physical characteristics, as follows:

Physical Characteristics:

Size	10
General appearance	10
Smoothness of peel	10

Weight	10
Thickness of peel	10
Absence of pulp	10
Absence of seed	10–70
Juice Characteristics:	
Juiciness	10
Sweetness	10
Vinous flavor	10–30
Total points in a perfect orange	100

"Of the physical characteristics, general appearance and smoothness of peel are two scores on the outside of the peel, and should be combined under the single head of appearance. Juiciness determines weight, as shown by the water test for weight last winter, and the latter should be dropped to avoid two scores on one characteristic.

"I submit the following amended scale:

Physical Characteristics:	
Size	10
Appearance	10
Thickness of peel	10
Absence of pulp	10
Absence of seed	10–50
Juice Characteristics:	
Juiciness	10
Sweetness	10
Sub-acidity	10
Vinous flavor	10
Absence of free acid	10–50
Total points in a perfect orange	100

The above presents, comparatively, as accurately as a committee of judges can determine, the elements of flavor of an orange; and if it is deficient in any, it shows what and how much is lacking. Under the old scale sweetness is easily defined; but it is customary with the judges to give considerable prominence to a mild sub-acidity in scoring for vinous flavor, and if an orange rates low in sweetness it is impossible to tell from the published score whether it is owing to insipidity, or raw, unripe sourness.

"Anybody at all acquainted with oranges knows the difference between the raw acid of inferior and unripe fruit, and the delicate sub-acidity of our finer varieties, or between this sub-acidity and their boquet or vinous flavor. The study of the relation that the malic acid of unripe fruit bears to the citric and other more highly carbonaceous acids of the same when mature should be an interesting study for the agricultural chemist, as showing the action of different soils and fertilizers on fruit growth, structure and flavor. In the laboratory the changes that re-agents produce on malic acid are singular and suggestive. Nitric acid converts it into oxalic acid, a deadly poison; hydrated potash, into oxalic and acetic acids, and ferments into succinic, butyric, acetic, carbonic acid and water.

"I trust our new experiment station will systematically consider these questions, as they are of vital importance to profitable fruit growing."

The following paragraphs are extracted from an article by Mr. A. H. Manville, of Denver, Florida, in the above journal for December 24, in the same year:

THE BEST STANDARD FOR JUDGING THE ORANGE.

"The defects in the scale now in use for judging oranges at our fruit exhibits have been pointed out too often to need recapitulation here; at the same time, some of the changes suggested in the public prints have not been in the way of improvement. The present scale, which was gotten up by the Florida Fruit Growers' Association some years ago, is ahead of anything of the kind ever used before, but in practice more subtle distinctions than are indicated by its findings are made, and it is of the utmost importance that a scale be devised that will indicate these distinctions; in fact, unless the lines are drawn finer it will be impossible to accurately distinguish between the good, better and best of the superior fruit that is now sent to our competitive exhibits.

"These finer distinctions are not at all imaginary, but are on the contrary, as clear as day to those who have had experience in the scientific judging of the fruit at the exhibits of the past few years; and it is to be hoped that an improved scale will be devised and established in the light of such experience.

"Some of our leading pomologists in other parts of the country are inclined to pooh! pooh! at the findings of our judges, and insist that the merits of an orange consist in its "eatableness;" they would at most have but three points in the

scale, namely, appearance, weight, and flavor. It is needless to say that these critics are ignorant of orange pomology, and cannot, until they attempt to apply their convenient scale, understand that flavor and the physical properties of an orange are made up of certain component parts, only ascertainable by an analytical process by which they are resolved.

"The exhibit at Ocala will be the most important in the history of fruit growing in Florida. Not only will it be the first held under the auspices of the State Horticultural Society, but it will be inspected and commented upon by the most prominent and scientific fruit growers of the nation, who will be in attendance upon the American Pomological Society at the same time and place. The scale used at this time for the citrus fruits, and especially for oranges, will, in all probability, be fixed as the Society's standard for some years to come, and for this reason it should be carefully revised.

"Mr. Hubbard [the writer of the preceding article.—SEC'Y.] was secretary of the committee of judges of citrus fruits (of which I was a member) at the Sanford exhibition last winter. He has been a careful student of pomology in this state for some years, and is one of our best posted men, especially in judging the relative and comparative merits of varieties and specimens of citrus fruits.

"The amended scale, suggested by Mr. Hubbard, which gives the physical properties and the juice characteristics of the fruit each fifty points, is certainly an improvement on the present scale (which gives the former seventy and the latter thirty points); and after carefully studying the matter I do not see how it can be improved upon.

"Mr. Hubbard omits smoothness of peel (according to present scale), as this is synonymous with appearance; also weight, as being the same as juiciness, the latter being determined by the water test. The reasonableness of these changes is apparent. In their stead he introduces "subacidity" and "absence of free acid," two juice characteristics for two physical characteristics.

"According to the amended scale four divisions of ten points each are left to the judgment of the palate, and go to make up the "eatableness" of the fruit. First, in an orange perfect in juice characteristics, there must be abundance of juice; second, this juice must not contain crude acid, which makes the fruit sour, owing to immaturity or natural deficiency; third, there must be sweetness, but this would leave the fruit insipid without the fourth property of flavor, namely, sub-acidity; this gives tone and sprightliness, and to the uncultivated taste completes a perfect fruit; but to the more discriminating taste the fourth juice characteristic is the acme of perfection in an orange; it is "vinous flavor," an exquisite, subtle, spicy, aromatic boquet, only found in fruits of the best varieties under the most favorable conditions. None of these qualities can be omitted in determining the merit of an orange.

"What say our pomologists? Shall Mr. Hubbard's amended scale be adopted as the standard of the Florida Horticultural Society?"

NOTE FROM MR. GARFIELD.

Mr. Charles W. Garfield, of Grand Rapids, Michigan, formerly secretary of the society, sent to the secretary, by request, the following note in regard to judging fruits by means of scales of points:

"Your letter asking about the advisability of the Society adopting scales of points for judging fruits is a good one *to think about*. I have serious doubs about ever obtaining any scale that will be satisfactory, it is so difficult to determine the relative importance to give to each characteristic. Our State Orchard Committee, in 1872, made a carefully digested scale for market apple orchards, and marked honestly under it, and had the chagrin to find that the result gave the highest award to an orchard of Ben Davis. A scale might be made by averaging the opinions of experts, but nothing is more misleading than averages.

It would be a good matter to discuss at any rate. Mr. H. G. Reynolds, secretary of the Michigan State Board of Agriculture, has for a number of years used a scale of his own in judging collections at our State fair. He is methodical, and thinks this is the safest way for committees to act. One thing is certain; com-

mittees should have some better reason for their judgment than simply impresssions."

An article upon the same general subject, by Prof. W. J. Beal, of the Michigan Agricultural College, may be found in the report of the Michigan Horticultural Society for 1878, page 207.

Testing and Introducing New Fruits.

C. L. WATROUS, DES MOINES, IOWA.

Of late, this subject has claimed much interest, and is yearly assuming greater importance. The wonderful development of the means of communication and of transportation has brought the most distant lands nearer to us, practically, than were adjoining states a half century ago, while the growing cheapness of printers' ink has made it easier to spread the fame of a new fruit thousands of miles across land and sea, than it was only a few years ago to properly advertise one in the next county.

Again, vast regions of our country, with conditions like none hitherto known, have been settled by an eager, prosperous, enterprising race, determined to have the best, and quite willing to pay for it. Furthermore, the universal custom of propagating all fruits by budding, grafting, layering, etc., that is, — by extending the life of the individual—to the exclusion of the method of sexual reproduction by the creative effort of two life germs from different individuals, has practically deprived us of all benefits from the use of the natural method of adapting fruits to new or changing environments by seedling production, selection, and the survival of the fittest.

No distance across sea or land has been too great for transportation. Neither has any change of latitude or of longitude been conceded to present reasonable grounds for distrust and probation of new comers before full fellowship.

There will be time here for no more than a glance at some laws of climatology involved in such work, but that glance will open vistas into the domain of nature that no pomologist's life will be long enough to explore.

It will occur at first sight that all maritime regions must have many similar conditions, from the presence of the ever changing, but also ever steadfast, sea. A certain degree of moisture and of warmth must always pervade the atmosphere near unfrozen water. It further appears that the western shores of all continents have softer climates than any other regions, and are similar to each other; also, that the eastern continental shores bear a like climatic resemblance to each other, while less mild than that of either western shore; and finally, that the eastern and western coasts of the same continent are extremely dissimilar.

The interiors of continents, besides differing greatly from any maritime regions, also differ profoundly from each other, each subject to comparatively sudden and violent changes, and each, of course, subject to laws and conditions peculiar to itself.

The eastern continent is, in its northern part, a vast plain, open to all ocean influences from the west, extending without any considerable barrier, from the most westerly cape of France to the most easterly sand spit of China, more than six thousand miles. On the western continent, on the contrary, all long vistas are in northerly to southerly directions. There are narrow maritime belts on the east and on the west, soon interrupted by the Appalachian range near the eastern coast and by the many ranges on the west, including the Coast range, the Cascades, the Sierras, and the lofty Rockies.

The broad interior region of this continent, known as the Mississippi region, swept by fierce winds north and south, and subject to extreme electrical disturbances, is quite unlike either coast region, and also quite unlike any other known inland region of the earth. In this inland prairie region, not only do fruits and plants, natives of California or of Europe generally fail, but also those from our Atlantic States, as well. It was supposed that fruits from Russia formed an exception to the rule, but, with more extended experience, failures have multiplied and doubts gained force. At present there is not a single variety of any fruit, great or small, of known Russian origin, that has given good promise of permanent usefulness in any Western state.

Trials are still carried on, but with greatly moderated hopes.

It has been shown, by Dr. Gray and others, that the principal forms of plants of the northern hemisphere once flourished together in the region about the north pole, that thence they were driven southward, along the lines of least resistance, by glacial cold; returning northward with returning warmth, and repeating these migrations till we now find regions of vegetation almost as distinctly marked as geographical boundaries on the map. Seedlings of conifers growing on the eastern slopes of the Rocky Mountains will flourish vigorously in the interior or Mississippi region, while seeds of the same species from the western slopes of the same mountains fail to produce seedlings able to live there; yet, plants from the western seeds give full satisfaction in Europe, and to some degree though a lesser one, in our Atlantic region.

A late horticultural report in Iowa showed in a certain county a pear orchard of 350 trees of over 50 varieties, not a tree of which had been destroyed by the late extreme seasons there, while in a second county, distant not more than fifty miles, pears were not mentioned, and scarcely any varieties of apples had escaped.

The late geological survey of Indiana develops in that state at least seven distinct botanical regions, marked by specific differences in the characteristic native plants. In the cold and marshy north are found the plants that characterize the vegetation all the way up to Hudson's Bay, while in the southwest are those that dot the slopes and bottoms down to the Gulf. Nay more, sometimes on opposite sides of the same ravine in a certain hilly region may be found the uttermost outlying pickets of the opposing floral hosts.

The same laws hold in every region. In the new Stanford Arboretum near San Francisco, subject to the influence of the unchanging Pacific, the trees of South America and of Siberia; of our Atlantic States and of Japan; of Western Europe and of China, vie with each other in luxuriant growth, along with those of Alaska, of Dakota, and of Mexico—so writes Mr. Douglas, the Director.

The contrary exists in the upper Mississippi region, where trees of the native forests are sometimes injured by extreme seasons, and all strangers may well beware.

Thus it appears that one must study his own conditions to judge the limit of his reasonable faith in new fruits.

Experience has lately shown that trees from an extremely severe climate, or from the far north, are not, therefore, to be presumed well adapted and hardy in a climate much warmer. Partial unlikeness of environment, that is, unlikeness of some of the surrounding conditions, though neither great nor obvious, may quite easily be sufficient for utter disappointment. The wound of poor Mercatio was "not so deep as a well, nor so wide as a church door," but, it was enough. Very short distances, and slight changes in elevation, are often sufficient to cause failure in new fruits.

Moreover, it is found by trial that fruits and plants transported so far from their native habitats may thrive very well while young, but fail miserably in middle age, or after producing fruit. Therefore, it is found that no one can safely commend a new fruit for general cultivation in any region until it has been well tested there under all usual conditions, nor until after thorough trial, for a period at least equal to the usual life of an individual of that species.

Both these safe and conservative rules are persistently violated by introducers of foreign fruits—where such violations are most dangerous of all—as well as by those lightning operators who propagate, advertise and introduce their prodigies all in one and the same season, leaving the testing and the groaning to be done at leisure by the purchaser and planter.

Of course, no members of learned societies ever do such things, and I hasten to leave this painful ground; yet, let it not be forgotten that there be those wicked ones in the land who have found thrift in such practices.

There seems abundant reason to believe that every botanical region must be willing to undertake the task of originating, from seed and by selection, the bulk of its fruits, if success be expected. This is because health, vigor and adapt

ability of tree or plant can seldom be perfectly secured except by nature's process of creation and survival. It follows, also, that the purchaser of new fruits should inquire carefully as to the conditions of soil and climate characterizing the birthplace of the tree or plant offered for his money, because, if at its very best under one set of conditions it cannot possibly be also at its best under very different ones.

It is not sufficiently appreciated that plants are indicators of such extreme delicacy of climatic and soil differences, that the finest instruments of men are clumsy beside them.

Is it too much to say, in the light of experience, that no region can reasonably hope for as good results from the plants of any other region on earth as from selected individuals from abundant seedlings produced in that very region and subject to all its peculiarities. It seems to me that the proposition needs no argument, but that an attitude of distrust and caution towards all fruits of distant origin is the duty of every planter.

Upon every fruit grower is equally laid another duty, that of annually planting some seeds from his best fruits, that the course of nature be kept clear for the perpetuation of a race of successful fruits for the changed times and changing conditions in which his posterity must exist.

Commercial Apple Orchards of Ontario.

L. WOOLVERTON, GRIMSBY, ONTARIO.

To many of our American cousins, and especially to those who live in the land of orange groves, or of cotton plantations, the notion of gardens and orchards will seem incongruous, when associated with the name of Canada. And still more strange, perhaps, will be the statement that those portions of the province of Ontario bordering on the lakes, Erie, Huron, and Ontario, rank among the foremost apple producing regions of this great American continent, and strongly compete with the great state of New York in the foreign apple markets.

The acreage of orchard in Ontario, according to the latest report of the Bureau of Industries, is nearly 200,000 acres. I cannot say that this area is increasing rapidly, because the profits of fruit culture have been declining, and the difficulties in the way of success yearly increasing. The soil is losing its native fertility, and this must be restored at great expense, if large crops are to be expected; the hosts of insect enemies are gaining ground upon us, so that only those who are enterprising enough to use the prescribed remedies, carefully and perseveringly, can have any hope of success in producing any quantity of first class fruit.

The prospects of the Canadian orchardist are, however, on the whole encouraging. He has some of the best markets in the world within reach, and that by the best and most expeditious routes. During the year 1887 Canada exported over 400,000 barrels of apples, of which about 100,000 barrels have gone to the United States markets, and the rest chiefly to the British markets. Many of our largest growers ship their own apples, sending them directly to one of the three great British apple markets, viz., Liverpool, London or Glasgow; while the smaller growers sell to speculators who buy for those same markets, and who, by careful packing and shipping, hope to make good profits. The writer has a commercial orchard of one hundred acres, chiefly devoted to the apple. It is situated on the southern shore of Lake Ontario, with the favoring influence of the lake on the north, and of the Niagara escarpment on the south, the latter being an almost perpendicular wall of rock strata some 300 feet in height, which encloses a warm stratum of air, and thus gives immunity from many a destructive frost. I grow about sixty varieties of apples, but only about a half dozen for profit, viz., Red Astrachan, and Duchess of Oldenburg for home markets in summer, the Gravenstein for fall, and Baldwin, Greening, Roxbury Russet, Northern Spy, and King for winter export apples. Our apples take on a high and beautiful color in our Canadian autumn of frosty nights and bright sunny days, and are acknowledged by connoisseurs to equal, if not excel, in the important combination of beauty of appearance and excellence of flavor, any apples in the world, so that they are commanding a propor-

tionate price in foreign markets. The medals for excellence, bestowed upon the fruit displayed by the Fruit Growers Association of Ontario, at the Philadelphia Centennial in 1876, and at the exhibits of the Massachusetts Horticultural Society, bear witness to the truth of this statement. Ripening late in the season, on account of our northern climate, our apples also excel in keeping qualities, and for this reason should be desirable among our Southern friends. We import from you the orange and the banana; why should you not have our apples in exchange?

There is one delicious apple which is grown in Canada to perfection, and which has already been shipped to Southern markets to a considerable extent. I refer to the Snow apple, so called from its snow-white flesh, and also well named the "Fameuse," or Famous, by the French, who grow it in large quantities on the island of Montreal, and along the banks of the St. Lawrence River.

The Wealthy apple is becoming very popular in our northern sections, where the varieties mentioned above are too tender, for it is quite hardy, even in the county of Renfrew, where the thermometer frequently touches 40° below zero. It grows with us to a good size, and takes on a beautiful carmine color, but it ripens too early and is too tender in flesh to be a favorite in the commercial orchards of Southern Ontario, unless for near markets.

The Winter St. Lawrence, a Canadian apple of somewhat uncertain origin, is a very fine table apple, and is in season from November to about the end of January. It has the dark stripes and splashes of carmine of the Fall St. Lawrence, and a tender juicy flesh, somewhat similar to that of the Fameuse; but it shares in the fault of the two varieties just mentioned, viz., that of having a flesh too tender for distant shipment, unless put up in some special case, such as the Cochrane fruit case, in which each apple is kept firmly in a separate compartment. The tree is a strong, vigorous grower, and bears fruit every year, but more abundantly every alternate year. It is free from that serious fault of the Tetofsky, which has been the condemnation of that variety as a commercial apple, viz., the premature casting of its fruit. Mr. R. W. Shepherd, of Montreal, who has grown this variety in the province of Quebec as a market apple, speaks very highly of it as being one of the few apples worthy of cultivation in that province in the commercial orchard.

Baxter's Red is another Canadian apple, so called after its originator, and as yet very little disseminated, but said to be perfectly hardy as far north as Ottawa, and an abundant bearer. It is so large that it has been called "Pound Apple" and indeed, in general appearance, it somewhat resembles the King. The apple may be further described thus: Calyx closed, in a deep basin; color deep red with yellow specks, and stem short, slender, and set in a deep, slightly russeted cavity.

The Brockville Beauty and the Princess Louise are two other new Canadian apples from which much is expected. The former is a very attractive looking apple, and in quality very good; it ripens just after the Duchess of Oldenburg. The latter, a sample of which was shown at the last meeting of this Society at Boston, may be thus described: Size above medium; form nearly conical, flattened slightly at both ends; stem not very stout, and projecting beyond the cavity, which is deep and regular; calyx closed, and set in a shallow slightly wrinkled basin; skin smooth and free from blemishes, with a very bright waxy lustre; color, clear bright carmine, on a transparent yellow ground; flesh pure white, tender, juicy, melting, with a rich aromatic flavor.

Among the apples from the United States, which we value for our northern districts, in addition to the Wealthy from Minnesota, we look with much favor upon the Scott's Winter of Vermont, and Whitney's No. 20 Crab.

Of the Russians, we are very hopeful to find several of great value to us, as for instance the Yellow Transparent, the Golden White, and the Longfield.

With such apples as these I have mentioned, then, it appears that even in the northern sections of Ontario, it is possible to grow apples with profit, some orchardists claiming to receive as much as $65.00 net profit, per acre, per an-

num, where favorably situated with regard to markets.

As I have already said, we, who have orchards in the southern part of the province, have every favoring environment for successful orcharding, and can grow all the more popular varieties to perfection. My whole crop of winter apples went forward to Covent Garden Market, London, England; and, notwithstanding that over a million barrels of apples have gone over from the Atlantic seaboard this season, and that ordinary grade apples would scarcely sell for cost of transportation, my extras paid me well. For instance, my selected Kings and Gravensteins sold at $6.00 a barrel in the month of October. The charges, from Ontario through to Liverpool, average about $1.00 per barrel, and to London via Liverpool, about forty cents more, exclusive of commission.

The harvesting of our apples is done for about ten cents per barrel, the packing for about as much more, and the barrel itself thirty cents; thus it is evident that our apples must sell in Britain for at least two dollars per barrel, in order to cover the bare expenses.

With regard to the productiveness of the apple tree in southern Ontario, I may state that in favorable soil it is sometimes extraordinary. Although in ordinary conditions an average yield from a Baldwin or Greening tree, which varieties are our best croppers, is about seven or eight barrels, I have taken in one season from one immense Greening tree no less than fifteen barrels of apples; and my father, Mr. C. E. Woolverton, states that, on one season, he gathered from that same tree no less than twenty barrels.

The vitality of the apple tree in southern Ontario, on deep rich sandy loam, is exceptional; many fine trees of one hundred years of age still growing and bearing heavy loads of fruit, and that of as good quality as when in their youthful vigor.

One variety, formerly very highly valued, has apparently deteriorated, but whether according to Van Mons' theory, it has reached its age of perfection, and is consequently now on the decline, or from other causes, is an open question. I refer to the Esopus Spitzenburg, an apple of the highest degree of excellence, but of late a miserable sickly tree which scarcely ever yields a crop of fruit, and when it does the fruit is below size, scabby and misshapen.

And now, gentlemen, please allow me to refer briefly to the Fruit Growers' Association of Ontario, as being a sister organization which has been doing for us in Canada a work similar to that which the American Pomological Society has been doing for the United States, only in a more limited field. Our aim, like yours, is wholly unselfish, and has in view the diffusion of knowledge of the science of horticulture, the testing of new varieties of fruits, the proper nomenclature of those already in cultivation, and the introduction into general use of those worthy of a place in our orchards. Forestry and floriculture also have a place among the subjects which receive a share of our attention. We make an annual report to the Ontario government, in return for which we receive an annual grant in aid of our work. Regretting that a meeting of this Association, at which my official duties require my attendance, inadvertently conflicts with yours at Ocala, I extend to you all, our most cordial greetings.

Cherry Growing in the Mississippi Valley.

J. L. BUDD, AMES, IOWA.

Mr. President, and Members:

With the cherries of Southwest Europe and their seedlings, our success over a large portion of the Mississippi Valley has been very discouraging.

This is shown in a positive way by the fact that cherries are hardly known in the fruit markets of the West at this time, except as imported in a small way from the Pacific Slope, or from the East and South.

But recent experiments on the college grounds at Ames, Iowa, with some of the varieties from the north and east plains of Europe, seem to promise a new era in the growing of this palatable and healthful fruit, in the West, and in portions of the states east of the Lakes.

A. J. Downing, in the first edition of "Fruits

and Fruit Trees of America," quotes Loudon's graphic statements relative to the continuous miles of cherry avenues of Saxony, North Silesia, Poland, and South Russia. We also note that tourists, since the days of Loudon, have not failed to express astonishment upon finding cherry trees so general by the road sides and on the division lines of estates in the parts of Europe north and east of the grape belt. Even this morning I noticed in "Forest and Garden" this editorial note, "Every visitor to Saxony remembers the cherry trees which line all the roads. As there are so many of them, the loss from petty thieving is not serious."

But the thought did not seem to occur to Loudon, or other tourists, that the varieties so generally grown north and east of the Carpathian Range were not identical with those common to southwest Europe, or that they differed essentially in foliage, habit of growth, fruit bud, flower, or fruit, from those of England, France, or the parts of Germany south and west of the Carpathians.

With a map of Europe before us, we cannot fail to note reasons why trees, hardy at Vienna, would utterly fail to endure the climate only a few miles north and east, on the other side of the mountain range, and on the edge of the great plains, extending north to the Polar Ocean, and east to the Ural Range in Asia. In Saxony, North Silesia, Poland, and South Russia, the westerly winds bring the soft breath of the Gulf stream, as at Vienna or in Belgium, but the northern and eastern winds bring the breath of the northern tundras or the interior steppes; still, cherry growing is quite general in parts of the great east plain, hundreds of miles north and east of Saxony; even in the province of Vladimir, nearly two hundred miles north and east of Moscow, cherries of good quality, and rich in grape sugar, are grown by the train load, indicating a wide range as to hardiness of varieties in tree and fruit bud.

Passing over this region in the cherry season, in the summer of 1882, with Mr. Charles Gibb, we decided that many of the varieties we tested should succeed perfectly in parts of the West and North, where sorts of the grade of hardness of early Richmond utterly fail, and the trial of such as we could then procure, during the recent trying seasons, appears to confirm this belief.

The tests have been made on grounds on which trees, young and old, of Early Richmond, Late Kentish, and English Morello, have been killed by the test winters and extreme summers of the past five years. Yet I am pleased to report that a number of the new sorts appear to be as hardy as our native De Soto plum, in both tree and fruit bud.

During the blossoming period last spring, the severe frosts made this an "off season" for the cherry, and mainly for the plum, in Iowa, yet twenty or more of our cherries fruited, some of them heavily.

With this brief experience, under peculiarly trying conditions, I offer the following notes of our record of 1888, on what now seem the most promising varieties:

VARIETIES THAT APPEAR TO BE MUCH HARDIER THAN ENGLISH MORELLO IN TREE AND FRUIT BUD.

Spate Amarelle. Much grown for dessert and culinary use in East Poland and North Silesia, where it is noted for its regular and bountiful crops. Tree smaller than English Morello, with pendulous habit.

Our trees from five to six feet in height were bending with the weight of the fruit this season. Fruit medium to large, color dark purple when ripe. Flesh and juice colored. When first colored red the fruit has a bitter taste. At this stage of growth it is excellent for canning, and when fully matured it is desirable for dessert use. Season about the 20th of July.

Schatten Amarelle. The word "schatten" is said to mean shadow. Hence we shall send it out as Shadow Amarelle. The name comes from the mirror-like reflection from the shining skin. Much like the above variety in size, shape, quality and season of fruit. Trees were laden this "off" cherry year.

Gros Lang Loth. We have sent this out as "Large long late." A small growing variety, coming into bearing in the nursery. It is known in Poland and Silesia as "Double Shadow

Amarelle," but it is not identical with Brusseler Braune as stated by Leroy.

Fruit large, roundish, truncate at stem end, nearly black when ripe. Juice colored. Pleasant sub-acid flavor when ripe. Season of English Morello.

King's Amarelle. Tree larger than the above and less pendant in habit. Fruit round, truncate at both ends. Flesh white, soft, juicy, but when fully ripe the juice is slightly red. Pit very small. Ripens with Early Richmond.

Amarelle Boquel. A small growing tree, with fruit much like Richmond in season and quality, but with more grape sugar.

Cerise De Ostheim. Tree some larger than the above, with pendulous shoots even when young. It fruits early, and is hardier in tree than what is known as Minnesota Ostheim, and bears larger, better, and earlier fruit. Pit small, flesh and juice red, tender, juicy, and when ripe pleasantly sub-acid.

Orel. We have given this name to a dwarf variety from Orel, Russia. It belongs to the Vladimir race, with small leaves and close habit. It comes into bearing when from three to four feet in height. Fruit larger than Montmorency, nearly black when ripe, and very mildly sub-acid in flavor. Promises to be very valuable for the North.

Shubianca (6m). Another variety of the Vladimir family, with small leaves and close habit. Fruit smaller and later than the above, black and excellent in quality.

23 Orel. As yet we are not certain as to the proper name. A neat round topped tree with firm thick leaves. It comes into bearing early and seems very hardy in fruit bud. Fruit much like Early Richmond in color, season, and quality.

Doppelte Natte. Tree of larger size than the above, with more upright habit. It has not held its leaves this season better than Montmorency, but it is ordinarily good in foliage. It has stood the recent winter perfectly. The fruit this year was perfect and agrees with Dr. Hogg's description. Fruit large for its class; skin dark brown or brownish black. Flesh very red and juicy, and when fully ripe of rich aromatic flavor. This late year it ripened July 20th.

Griolte Imperial. A small tree and an early bearer. Foliage better than Early Richmond, but this year not perfect. Fruit large, dark red, inclined to conical, flesh and juice red. Flavor pure and free from bitter, even when immature. Mildly sub-acid when ripe.

Brusseler Braune. A variety much prized on the sandy plains of East Poland. A larger grower than Richmond, with good foliage. Fruit large, nearly round, purplish red in color, juice slightly red, flavor pure and quite acid. As it contains much grape sugar it is valuable for canning and drying. Later, I think, than English Morello.

Lutovka. A fine round topped grower, with strong shoots and good foliage. Much grown in Poland, North Silesia, and South Russia, for making "Kirschwasser." Fruit large, yellowish red when ripe, flavor pure and sprightly; season late. Will be valuable for dessert and culinary use.

Bessarabian (No. 62). Our favorable report of this variety of 1885 we are glad to repeat. It will endure more abuse of tree than most of our forest trees. Our original tree has been cut for buds and scions for five years, taking off all the new growth, yet the tree is sound to-day. Fruit large, dark red, firm fleshed, and when ripe very mildly sub-acid. It promises to make a long lived tree of considerable size, and to prove a regular bearer of choice fruit.

Sklanka. A handsome round topped tree, with pendant branches and best of foliage. Our trees standing on rich black soil, where the Richmond utterly failed even prior to our recent test winters, are as perfect as box elders.

Fruit large, skin yellow and red. Flesh yellow, firm, very mildly and refreshingly sub-acid. Pit very small; season of the Montmorency.

Frauendorfer Weichsel. A strong growing tree with weeping shoots. Tree very hardy and foliage good. It is described by the leading horticultural writers of West Europe, and it seems strange that it was not previously introduced. Much grown in Poland and North Silesia. Fruit large, dark red, truncate. Flesh

tender, juicy, sub-acid, and good for any use.

Strauss Weichsel. Another fine tree with good leaves. Fruit large and nearly black when ripe. Flesh juicy, refreshing, and nearly sweet. Season a few days later than Early Richmond, very promising.

Lilhaur Weichsel. Much grown in Livonia, in Southwest Russia, for drying and cherry wine. A good hardy, strong growing tree. Fruit smaller than Early Richmond, but with smaller pit, and thicker flesh. Skin nearly black, flesh quite acid, colored dark red, and with much grape sugar. Most valuable for culinary use.

Griotte Du Nord. As introduced from North Silesia this is not identical with "Ronald's Large Morello" as stated by Downing. A good tree with very good foliage. Fruit large, nearly black, flesh firm. Matures about the 20th of July. In East Europe it is grown on north walls for very late use.

Junial Amarelle. A neat, round topped tree of the Griotte type. Fruit much like Early Richmond in size, color, and season, but firmer in flesh, and better in quality.

24 Orel. The name is not yet known on account of loss of invoice when the one year old trees were imported. A fine grower with large thick leaves, strong buds, and large shoots. Fruit about the size of the English Morello, dark red, firm, colored flesh, mildy acid, season of the Late Richmond.

27 Orel. Another strong growing hardy sort of great promise. The few first specimens indicate a late season, but they were taken before they were ripe enough for testing.

26 Orel. This is the "Lianzkaja Black" of East Europe, which we will send out in the future as "Orel Sweet." It appears to be hardy in tree and fruit bud, but may not do well as far north as some of the preceding. The single original tree has been sadly abused by continued scion cutting, in summer for buds, and in autumn for grafting, yet it is in good condition with perfect foliage. Fruit, medium in size, black, with very small pit. Flesh, dark colored, and decidedly sweet. Very promising, as the hardiest sweet cherry in our collection.

25 Orel. This was spoken of in my Bulletin of 1885 as one of the Vladimar varieties, but it proves to be a Griotte, much like 23 Orel, though some later in fruit and larger in tree.

Heart Shaped Weichsel. This is given in Eastern European catalogues as "Herzformige Weichsel." It is an evident cross between the sweet cherries of the East and the Dukes. It is admitted as a lawn tree in East Europe on account of its symmetrical growth and handsome striped leaves. The first impression is that the tree is not in perfect health, on account of its peculiar foliage.

Fruit large, heart shaped, purplish black in color, and nearly sweet. Highly prized for dessert use in West Europe, where most of the sweet cherries do well. It may not succeed well north of the 42d parallel.

George Glass. Under this name we have a cherry from Marshal County, Iowa, where it was introduced from Northeast Germany. In leaf and habit of growth it much resembles Bessarabian. Its fruit also shows a near relationship to that variety. Very promising.

LESS HARDY VARIETIES.

The following varieties are hardier with us than Early Richmond, and their foliage is quite as perfect as that of any of the above sorts. But on our trying grounds they have shown in the stem some slight indications of winter injury, and cannot be recommended for trial north of the 41st parallel. The descriptions of fruit are mainly from our European notes.

Abbesse De Oignies. Of the Red Duke family, grown in East Russia, on favorable soils in North Silesia, and in Southeast Russia. In no case have we known the leaves to be injured by rust or mildew. Even the present unfavorable season the foliage of our budded trees is perfect. Fruit large, round, dark red. When ripe mildly sub-acid.

Red Oranien. This is given by Hogg and Leroy as a synonym of Carnation. But as we have it from North Silesia it is of the Red Duke family, and very unlike the Carnation in leaf, habit of growth or fruit. As it endures the spring frosts in North Silesia and East Poland, it is promising for trial in South Iowa. Fruit in season and quality much like the preceding.

Amarelle Bunt. Another variety of the Red Dukes, much prized in North Silesia for dessert use and cooking. A fine grower in orchard and nursery, and far hardier in tree on our grounds than Early Richmond or English Morello; mainly I think on account of its more perfect foliage. The fruit is highly prized in the markets of Warsaw, Poland.

Duchess d' Angouleme. Of the Red Duke family. Foliage perfect, and a fine grower. A heart shaped fruit of large size and excellent quality.

Gros Gobet. This has been classed with the Montmorencys, and even with the Kentish, but it is plainly crossed with the East Europe Dukes. Fruit large, red. Flesh white, quite acid, and best for canning. Ripens about the 20th of July with us.

Red Muscateller. A cross with the Red Dukes, with neat habit and good foliage. Common in North Silesia on dry soil. Fruit large, and said to be of good quality for dessert and other uses.

Double Glass. First seen in North Silesia. A fine grower, with perfect leaf. A large fruited variety of the Red Dukes, likely to prove valuable in this state south of Des Moines.

Vilne Sweet. A variety sent us from Vilne in Southwest Russia. As tested at Vilne, the fruit was large, early and sweet. A good round topped grower with best foliage. We regard it very promising for trial in South Iowa.

A Promising New Fruit From the Plains.

CHARLES E. BESSEY, LINCOLN, NEBRASKA.

Upon the plains of Nebraska, one of the small native shrubs which has attracted attention on account of its promising fruits, is what has been known as the Sand Cherry. Scientifically it is the *Prunus pumila* of the botanists, and a member of the natural order ROSACEÆ, and of the family AMYGDALEÆ. Its affinities are with the cherries and the plums, native of this country and Europe.

In Nebraska it occurs upon sandy soils north of the Platte River, beginning at about seventy-five or one hundred miles from the Missouri River, and extending thence westward and southwestward to the Colorado line. It appears to prefer the sandier soils, hence its popular name, and over the great area I have outlined wherever the soil is sufficiently sandy it occurs in abundance. In these portions of the country the inhabitants have for a long time been in the habit of collecting and using the fruit, and in some cases attempts have been made to bring the shrubs under cultivation.

The fruits are true cherries, occurring usually in pairs or threes (rarely singly) on the last year's wood. The cherries are about one-half an inch in diameter, and when ripe are of a deep purple-black color. In shape they vary from flattened spherical (oblate spherical) to spherical, and even bluntly conical. At the base they are slightly indented, and the apex is usually marked by a slight indentation also. The stalk is slender, and from one-half to three-fourths of an inch in length. The stone or pit is slightly elongated, but little compressed, rounded on one margin, and bluntly angled on the other.

The fruits have a colored flesh, which possesses in many cases a considerable astringency, but in nearly every clump of bushes one may always find some which have but little, if any astringency. I have frequently eaten the fresh cherries while rambling over the plains, and have often found specimens which were fully as palatable as many of the cultivated cherries.

The shrub grows to a height of from one to two feet, or rarely more. Its leaves are of firm texture, oblanceolate in shape, with slightly serrated margins. Their under surfaces are whitish, and they are borne upon short petioles, and stand alternately upon the stems. Under cultivation the shrubs are much thriftier, and the leaves are larger.

From the fact that in a wild state these cherries are so large, and in many cases so palatable, I am led to hope that by cultivation they may be made to yield us a new fruit for our gardens in some portions of the Northern States, especially in sandy soils. I am, moreover, encouraged in this hope by the fact that experiments upon a small scale, made by persons living in the regions where the Sand Cherry grows, have

given results which indicate that it is readily affected by cultivation.

In closing, I need only say that the Sand Cherry of the plains, while apparently the same botanically as the *Prunus pumila* of the East, possesses such well marked differences, that I am inclined to regard it as at least a good geographical variety. It is from the western form only that I hope we may derive a new fruit.

Fruit Culture in California.

D. B. WIER, SAN FRANCISCO, CAL.

Citrus Fruits. The culture of staple commercial fruits is assuming immense proportions in California, and still the planting of fruit trees goes on, from San Diego on the south to the Oregon line on the north, a distance of over seven hundred miles. For over five hundred miles of this great stretch, north and south, the Citrus Fruits are grown successfully. We have on exhibition to-day in this city of San Francisco oranges grown in Shasta County, in the extreme north end of the Sacramento valley, in the open air, that will compare favorably with oranges grown anywhere.

Last year the whole state had a week of the coldest weather ever known since white men have been here, yet California is to-day ripening her usual full crop of oranges, north as well as south. This now known ability of the orange tree to withstand a temperature as low as 17 degrees above zero without material injury has given a great impetus to the planting of citrus fruits north. It also proves that California has an immense scope of country, suitable for the profitable culture of the orange, possibly as many square miles as the whole Mediterranean orange region. Moreover, nearly all the living trees north are seedlings, grown from the seeds of the imported orange. These have proven very much more hardy and better adapted to the climate than the budded varieties brought here directly from other countries. Some of these seedlings are of very fine quality, showing that we may expect still hardier, better, and better adapted varieties, after a few more generations from seed grown here.

Raisins. Nearly every acre of California's interior valleys and foot hills is a perfect raisin soil in a perfect raisin climate. A perfect raisin climate must have long continued summer heat, with no rains, or even dews, to interfere with the health of the vine or the curing of the fruit. All these the interior of California has in perfection. The raisin industry is extending with immense strides.

Stone Fruits. The almond family settled in this state at a very early day, even with the first missionary fathers, and has since remained in the perfection of health and fruitage. Almonds flourish all over the length and breadth of the state, the hardier varieties climbing away up the mountains.

A perfect raisin climate is also perfect for most of the stone fruits. In all the vast interior the Peach and Nectarine are peculiarly at home.

With very little care stone fruits can be dried in the interior of California in the sunshine as well as they can be elsewhere in an evaporator.

I think that young California can show the largest cultivated cherry trees on this earth to-day. She can show trees averaging a *ton* of marketable fruit each, for each year of the past five.

California has certainly a monopoly in the fruit of the delicious Apricot. This prince of fruits thrives nearly everywhere in the state. Plums of nearly every kind are wonders of health and productiveness, though the fruit has not yet such a commercial value as some of the other stone fruits. Kelsey and other plums of Japan, seem destined to have a great future here.

The prune, especially the French prune (Petit Prune d' Agen) is now a great favorite with planters.

The Fig has so far developed no enemy to the tree, fruit or roots, its crops in the interior being simply enormous. The summer climate of the coast is too cool to ripen this fruit, but in the interior it ripens from two to four crops in a summer.

The Grape in some of its varieties thrives everywhere. We can, I think, grow everything

of the Vitis family to perfection, from the Royal Muscat of Alexandria down, let me say, to the Hartford Prolific and Champion. It is true that our vines are affected in some localities with scale bugs, hoppers, phylloxera, the "mysterious vine disease," etc., but we will control them all in due time.

The Olive is now being very largely planted: it succedes over nearly the entire state.

The Pear. Bartlett is the favorite, fully 90 per cent. of all the trees planted being of that variety.

The Apple. As a rule the summers are too long for keeping apples, and in the interior, too hot, though very choice apples are grown in quantity in the Western Coast counties, and everywhere high upon the mountains.

The Improvement of our American Grapes.

GEO. W. CAMPBELL, DELAWARE, OHIO.

This is a subject which has engaged the attention of many enthusiastic horticulturists for the past thirty years, or more. There are doubtless many present to-day, who can remember when they could count upon the fingers of one hand, all the varieties of our native grapes which were considered of any value. I can remember when no grapes were known in the Lake region of Northern Ohio, but the wild fox and frost grapes of the forest.

Vineyards amounting to thousands of acres, now abound throughout the islands and the shores of the great lakes, of varieties which in my boyhood were unknown.

Although the number of new varieties of grapes of American, or native origin, if we include the crosses of our natives with those of foreign birth, as well as native crosses and seedlings, number hundreds, the work still goes on and there seems ever room for more.

After repeated and invariable failures of all the earlier efforts to adapt or acclimatize the vines of Europe to the soil and climate of our country, it became evident that for successful grape culture we must look to selection and subsequent improvement of our native grapes.

One of the pioneers in this good work was the Catawba, a noble southern grape from the banks of the Catawba river of North Carolina.

Nearly contemporary with it was the Isabella, also credited to South Carolina for its origin.

If, as generally believed, the Concord grape was produced from Isabella seed, she was the mother of the most popular, and all things considered, the most valuable grape yet produced, for a very large portion of our country. The Concord was first exhibited in 1853, thirty-six years ago, and although large numbers of seedlings have been grown from it of more or less value, no one of them has yet been able to supplant the old favorite in public estimation.

The Worden comes the nearest to it; and in many places it stands beside the Concord as an equal, and in northern localities may have the preference, by reason of its early ripening.

As seedlings from the Catawba and Isabella class of vines, which still deserve some popularity, may be named Iona, Diana, Ives and Hartford.

About the year 1855, the Delaware grape was first introduced to the public from the town of Delaware, in Ohio, from which it took its name. It was brought to that place from New Jersey, many years before, and had remained in comparative obscurity until that time. Its parentage and origin are unknown, but many persons believe it to be a natural cross between the Labrusca and Vinifera. Some seedlings grown from the Delaware, show decided characteristics of the Labrusca; others have a strong resemblance to some of the wild grapes, of the Riparia type, with thin, smooth leaves, and small, sour, and uneatable fruit, nearly all skins and seeds. Among the many hundreds of Delaware seedlings, which I have grown, none have shown any marked features of the Vinifera. Its proper classification among species, I think, is not satisfactory established. But the Delaware grape was at once recognized and acknowledged by the most eminent horticulturists, to possess remarkable excellence, and it soon took the high position, which I believe it still maintains, as the finest native grape of American origin; and its advent gave an impetus to grape culture beyond what had been before known. And after more

than thirty years, it still remains one of the most popular and profitable varieties for all purposes, wherever soil and location are suited to its culture.

But it may seem that I am straying a little from my subject, the improvement of our American grapes. That this improvement has been in many ways almost marvelous, no one who compares the present list of many hundreds of named and cultivated grapes, with the five or six varieties of sixty years ago, can doubt.

There are three methods to which we may attribute the past improvement of our American grapes, and to which we may look for advance in the future.

The first is nature's method, of sowing seedlings by chance, from which substantial improvement is necessarily slow, and can only come by selection and cultivation of the best, by the hand of man.

The second method, is the intelligent selection and planting of seeds of the best varieties already produced, and the cultivation and selection again, of the best of these seedlings.

The third, and in my judgment the most important, as well as the most speedy and certain in results of all others, is the careful and intelligent crossing and hybridizing of the different varieties and species of the most valuable grapes of all sections. By this means, the qualities of the fine exotic varieties have been obtained upon vines greatly improved in health and hardiness above those of foreign origin. The most important step in this direction was first taken by Mr. E. S. Rogers, of Salem, Massachusetts, and the grapes known as Rogers' Hybrids, are many of them successfully grown and esteemed, and they have taken the position of standard and valuable grapes in nearly all favorable grape-growing localities. These grapes were produced by crossing one of the hardiest and healthiest of the wild New England Labrusca grapes of the most uneatable quality, with varieties of the pure Vinifera or European grapes. Many of these grapes retain the vigor, and a considerable portion of the health and hardiness of the Labrusca parent, but with fruits wonderfully improved, retaining in a large degree the fine quality of the foreign grape, and losing the coarseness and strong odor of the Labrusca.

Others have followed Mr. Rogers in this work, notably Mr. Jas. H. Ricketts, of Newburgh, Mr. Jacob Moore, of Rochester, and Mr. A. J. Caywood, of Marlboro, N. Y. Mr. T. V. Munson, of Denison, Texas, is also very largely engaged in the production of new crosses and hybrids; and I have seen enough of the results of his labors to predict that from his efforts will come some of the most important results in the improvement of American grapes that have yet been produced.

I may say also, that I, myself, have experimented sufficiently in that direction, to feel perfectly assured that through the influence of practical hybridizing and crossing the different species and varieties of grapes, we may, and will, produce varieties suited to all parts of our country where the vine will grow, that shall at least equal in quality and value the best that are grown in similar localities in foreign lands.

But we must not expect that any one variety will be found possessing all these desirable qualities that will also be suited to all localities. We shall have to select special varieties for special latitudes. Many of our northern grapes are found unsuited to southern latitudes. So, the Scuppernong, and even the Herbemont and its class, are not successful at the North. But I have no doubt that in many places at the South, where the Vinifera fails, crosses or hybrids with our hardy natives will succeed. Some of these cross bred or hybrid grapes I have seen from favorable locations, when well grown and well ripened, that were as beautiful to the sight, and as delightful to the palate, as the finer varieties of Europe; and I have seen the same kinds under the influence of neglect and unfavorable situations, unattractive, and indifferent in quality. The Lady Washington is a grape of this character. And even the hardy Pocklington may be classed in the same way. Only a few days ago I read an article in one of our horticultural journals, commending this grape most highly, as one of the best and most profitable of all for that locality. The same day, in another journal, a correspondent reported the Pockling-

ton so poor, and so generally worthless, that he proposed to root them out; and he wanted to know, from the editor, if he could not prosecute, and recover damages from the nurseryman who had sold him the vines.

This will partially account for the different reports we have of the same grape, from different persons and localities. One extols highly what another condemns, simply because in the one case the variety is suited to the locality, in the other not.

From my experiments for the past thirty years, I am now convinced that hundreds of my seedlings, which I have destroyed simply because they did not perfectly suit my particular locality, or come up to the standard of excellence which I desired, would have been, in other places, of great value. I had been vainly striving to produce one or more varieties of faultless excellence, with, also, the health and hardiness adapting them to all situations where grapes could be grown.

By crossing the finer foreign varieties upon the most rugged and hardy of our natives, there is no difficulty whatever in producing varieties that bear grapes wonderfully improved—in some cases nearly, if not quite as good, as those of the foreign parent, with all the coarseness or foxiness of the native entirely eliminated. I have in my mind an experiment in crossing the West's St. Peters, a large, late, and excellent black foreign grape, upon the Janesville, a small grape, also black, which is one of the hardiest, earliest, and poorest of our native varieties. The result is a vine of fairly vigorous growth, very productive, bearing heavy clusters of large, oval berries, resembling in size and appearance the foreign parent, ripening medium early, and in quality very nearly, if not quite equal to it. In the fruit all trace of the Janesville has disappeared. The vine and foliage, however, appear intermediate between the two. I do not expect the vine, however, to be as hardy, and the foliage may not be as healthy, as that of the Janesville; but it is a great improvement upon the foreign vine, and to all appearance better than that of some of our so-called pure natives. Crosses of Muscat Hamburgh upon a native of the Hartford class, have produced grapes both black and white, that have no trace of the Hartford, but having the beauty and the excellence of some of the finest of the foreign grapes. In their character and habit of growth, however, the vines all have something of the foreign appearance, although grown from the seed of the native parent; and although their foliage is generally healthy, they show a greater tendency to mildew in unfavorable seasons than our native Labruscas, and they require some winter protection where the temperature falls much below zero.

I have reason to believe that such varieties as these will succeed and prove valuable and profitable in many localities; and that they will produce grapes in favorable situations, that for beauty and excellence are surpassed by very few of the choicest varieties of foreign lands But still another step has been taken. Another cross with these improved hybrids upon others of the hardiest and healthiest natives, promises to increase the hardiness of the vines in the second generation, and to retain the high character of the fruit. Some experiments in re-crossing these hybrids upon the southern Rupestris grapes are very promising indeed. The Rupestris vine, when planted at the North, has proven absolutely "iron clad" against our severest winter, enduring 30 below zero wholly unharmed, and resisting attacks of mildew in the most unfavorable situations. Recent crosses of some of the best native and hybrid grapes, so far as they have fruited, have produced new types of the most interesting character, with vines of remarkable vigor, fruit of excellent quality, and considerable variety. One cross with Muscat Hamburgh, a pure Vinifera, with Rupestris, produced a light red grape of the size and general appearance of the Delaware, but hardly equal to it quality. The foliage too, has rather too much of the foreign element, and has certainly lost something of the healthy character of the Rupestris. Except this one, all the crosses have been black in color.

Some of our best native varieties, and hybrids which were crossed the other way, using pollen from a male plant of the Rupestris, produced very handsome vines, but very poor fruit—small

in size, and inferior in flavor showing that the quality of the grape is strongly impressed by the staminate parent. And I may say that most of my experiments indicate that this is the rule, with rare exceptions.

I have, perhaps, pursued this branch of the subject as far as it is profitable, at this time. I would say, however, that it is my firm belief, that through intelligent and continued crossing and hybridization, one must look for the most rapid, successful, and important improvement in the character and value of our American grapes; for by this means the best varieties from every quarter of the globe can be brought together, and their best elements united and blended to form new types and combinations, of every character and degree of excellence, and adaptability to all situations where the vine can be successfully grown.

I have no doubt that there are now growing within the United States, east of the Rocky Mountains, thousands of varieties of grapes from seedlings, both accidental and intentional, that will average far higher in character than the few cultivated sorts of sixty years ago; and these have all come through the agency of man. Nature's energies seem to be directed mainly to the perpetuation of the species through vigorous vines and abundant seeds. Man seeks to eliminate the seeds as far as possible, and to increase and improve the amount and quality of the juice and pulp, to render the fruit agreeable and valuable for human food.

Another element which I regard as of the greatest importance in the future of grape culture in America, is the recent discovery of successful remedies against the mildew and rot, which have been so prevalent and so destructive in many places, as not only to discourage, but to prevent the planting of vineyards. Carefully conducted, and well authenticated experiments for the past two years have demonstrated that, at a mere nominal expense, vineyards may be protected, the vines remaining healthy and the fruit abundant and perfect, where without the remedy, wholesale loss and destruction have occurred. Both in the foreign and American vineyards, the use of the sulphate of copper and lime remedies have proved effectual. Alternate rows in the same vineyards have been tested, by treating one with the remedy and leaving the others untouched. The treated rows held their foliage green and fresh and ripened their fruit, while the others prematurely cast their leaves, and the fruit was destroyed by reason of rot and immaturity. Large blocks in the same vineyards, treated and untreated, gave the same results.

These facts have a significance and value, even beyond the protection of our present vineyards. For, by the use of these remedies, at a cost of no consequence compared with their benefit, the finer varieties of our improved hybrids can be successfully and profitably grown in thousands of localities where, without them, it would be impossible.

The most serious of all the diseases of the vine, are those which attack and destroy the foliage, and which I include under the general and popular name of mildew. All of this class of diseases seem to be prevented by a timely application of these remedies, and when we remember that it is principally our finest grapes that are subject to these attacks, the immense importance of these remedies will be at once recognized.

I may not live to see it, but I have an abiding faith, that through the efforts of our horticulturists and the aid of the practical investigations and experiments of our scientists, we shall overcome all obstacles to successful and general grape culture, and that both the grapes and the wines of America will rival, if they do not surpass, those of any nation under the sun.

My remarks, so far, have been confined mainly to observations from a northern standpoint, where we have a rigorous climate in winter, and cannot, except under glass, produce the splendid foreign varieties which our brethren in California are growing so successfully. I believe that in many sections of that state they are afflicted by the phylloxera, and also by mildew and rot. These remedies may be of incalculable benefit to them also; but the time may also come, when they will be obliged to abandon the foreign varieties, as our friends in France have done,

and replace them with native and hybrid varieties of our own country.

Grape culture, in this fair Florida, and in the South generally, I believe to be comparatively in its infancy. With its charming climate, and wonderful variety of soil and situation, I see no reason why, with the proper selection of varieties, and the aids which the experience of horticulturists, and the investigations of science can give, the "Sunny South" should not be both the garden, and the vineyard of the North American Continent.

In reply to some questions that have been asked since I came to this meeting, I will name Wilder, Duchess and Triumph, as hybrids or crosses that succeed well in many localities. Also, Brighton and Jefferson, as second crosses, having but one-fourth of the foreign element. Grapes of the pure Vinifera type, have invariably been unhealthy and short lived in the Northern and Middle States, and the hybrids and crosses are hardier, healthier and more enduring in every way.

DISCUSSION.

G. B. BRACKETT, Iowa: I wish to call attention to the Ives. At Burlington, Iowa, it is raised by the car load and brings twice the money of any other variety. It is hardy, and perfect in foliage and fruit.

G. W. CAMPBELL: It originated with Mr. Henry Ives, of Hamilton County, Ohio. It is an ironclad, and in some places is of great value. It colors, however, long before it is ripe, and is therefore often marketed green. It should hang two to four weeks after it colors. When fully ripe it loses its hard pulp and is an excellent table grape.

G. B. BRACKETT: It has a thick skin, and will keep well on the vine, and often dry almost to a raisin.

W. C. STRONG, Mass.: What is its season?

G. W. CAMPBELL: With us in Ohio, early in October, after the Concord.

G. B. BRACKETT: In Iowa, the first of September.

E. WILLIAMS, N. J.: With us it never ripens within three weeks of the Concord. It is larger than Concord, and better when fully ripe.

J. VAN LINDLEY, N. C.: Ives takes the lead in North Carolina, and also, I am told, in Missouri.

J. H. WHITE, Fla.: Ives has done better than any other Labrusca variety in Florida, but there are other varieties here that are still better.

MR. CALLAHAN, Fla.: I have at Melrose, a large number of varieties that fruit abundantly. I apply salt and ashes, the same as to my figs, and turn under pea vines, beggar-weed, crab-grass, etc. Otherwise, I use no fertilizers.

MR. TRUEBLOOD, Fla.: I succeed with Black Hamburg, grafted on any wild stock.

G. W. CAMPBELL: I have been grafting grapes for nearly fifty years, and I do not think that the benefits of grafting on other stocks to cause early bearing, or increased vigor, are lasting. For a year or two such an effect may be seen, but afterward no difference appears between such vines and those on their own roots.

Nut Culture.

H. M. ENGLE, MARIETTA, PA.

It seems somewhat unaccountable that in this progressive age, nut culture should be so much neglected, while all manner of fruits, vegetables and flowers are being improved and multiplied to an almost unlimited extent. One cause of the neglect of the former, no doubt, is their being considered as luxuries instead of food.

They are however rich in certain food elements, adapted to the human system, and as such knowledge becomes disseminated the demand will increase, and production and consumption in a corresponding degree. Thousands of acres might be made profitable in this branch of horticulture that now pay neither interest nor taxes. Large areas might be made a source of profit, and large supplies of food for man might be obtained with more certainty than by an equal amount of money spent and labor applied in the production of some other crops. An inducement to nut culture is that so little care is required in keeping them, while fruits and vegetables require special care during winter,

when the former are most required and the latter least. If more of the natural products of the earth, and less of artificially prepared and adulterated articles, were eaten, mankind would be much the better for it. It is to be hoped that a reliable chemical analysis of the nutritive properties of edible nuts will be forthcoming. Wherever the chestnut will flourish, it may safely be placed at the head of all nuts, since for quality it is unsurpassed. There is of course some difference in quality, in which however, our natives are not excelled.

Some of the Spanish, or seedlings of the same, are nearly if not altogether equal to our natives in quality. Much has been claimed for the Japan chestnuts, but those we have fruited are not equal to some of the Spanish, either in size or quality. We may reasonably conclude that speaking of Spanish, French, Italian, or Japan chestnuts, is as indefinite as speaking of apples, pears, or any other fruits from these countries, as all chestnuts vary when grown from seed.

Therefore, by cross-fertilization, new varieties will no doubt be produced, which will combine many if not all the best qualities of the originals, just as has been done with so many other fruits.

Hoping for such results, it will be important to have new varieties properly named and classified the same as other fruits, for among the forthcoming varieties there will be large, medium and small, vigorous and slow growers, prolific and tardy bearers, hardy and tender ones, with intermediate grades of quality. In the case of such results, we should by all means avoid synonyms, improper names, and the dissemination of inferior varieties.

The Black Walnut (*Juglans nigra*), Butternut (*J. cinerea*), English Walnut (*J. Regia*). Pecan (*Carya olivæformis*), Shellbark (*C. alba*), and Filbert (*Corylus Avellana*), are no doubt susceptible of improvement in the direction of less shell and more kernel.

This should not be more difficult than for stockmen to breed off horns, increase muscle, and reduce bone, with other desirable points. Nut culture opens a wide field for the delicate process of hybridization and cross-fertilization, and the obstacle should be no greater than to hybridize wheat and rye, which has been successfully accomplished.

After all, the raising of seedlings is like a lottery; many blanks are drawn, but the outlay is not expensive, and should one superior variety be produced, the producer may consider himself a benefactor to his race, even more so than he who causes two blades of grass to grow where but one grew before.

The different nuts require various soils and locations; walnuts flourish best in rich loam; butternuts thrive in similar soils; both bear transplanting well. Pecans and Shellbarks have long and heavy tap roots, and must be carefully managed; they should be transplanted once or twice in the nursery, and by cutting off part of the tap root they will throw out side roots, after which there is little risk in their removal. Wherever the peach and Mazzard cherry flourish, the chestnut will succeed, *i. e.*, in light soils, either sand, slate or gravel. Pennsylvania has large areas of chestnut forest which are cleared once in twenty or twenty-five years for the timber, but the nuts on such trees do not amount to much, as the woods grow too dense, and the nuts are small. But a new departure has been made which, we trust, will spread extensively. After clearing the land, when the sprouts are of one season's growth, they are grafted with some improved variety, at such distances as trees should stand were they planted for fruiting, and all the rest are destroyed and kept down. The oldest of these trees are now but two seasons' growth since they were grafted, but some have already borne fruit, and indications are that in a comparatively short time there will be nut orchards in full bearing, instead of timber forests.

I will just here predict that in less than a decade there will be a boom in this direction, in our state at least.

In treating of nut culture, the Peanut must not be forgotten, but our Southern friends know more about its cultivation than we of the North can tell them. In commerce it has no rival in the line of nuts.

REPORTS OF COMMITTEES.

Resolutions.

The Committee on Resolutions, consisting of H. H. Cary of Georgia, O. B. Hadwin of Massachusetts, and B. T. Galloway of Washington, presented the following reports, which were adopted:

DEPARTMENT OF AGRICULTURE.

WHEREAS, The American Pomological Society recognizes the very valuable services rendered to fruit growers throughout the entire country by the United States Department of Agriculture, under its present able head, Hon. Norman J. Colman; therefore, be it

Resolved, That the thanks of this Society are hereby tendered Hon. Norman J. Colman, Secretary of Agriculture, for his untiring efforts in behalf of Pomology, and especially for the energy which he has shown in directing investigations in Pomology, Mycology, and Entomology.

EXPERIMENT STATIONS.

Resolved, That it is the sense of this Society that the Agricultural Experiment Stations throughout the Union give special attention to the raising of seedling fruits upon the most approved and scientific principles, for dissemination in their respective localities.

Resolved, That originators of new varieties of fruits be requested to send specimens of their plants to the Agricultural Experiment Stations, to there be tested for their adaptation to the localities wherein the stations are located, and that the results be published in the station reports.

FLORIDA MEETING.

Resolved, That the thanks of the American Pomological Society, in convention assembled, are due, and are hereby tendered, to the various transportation lines, both in and out of Florida, for courtesies extended in giving our officers and members reduced rates to and from this convention.

Resolved, That the thanks of the Society are tendered to the officers of the Ocala International Sub-Tropical Exposition for their courtesy in furnishing the exposition building for our opening exercises, and the opera house for our regular meetings.

Resolved, That our thanks are tendered to the members of the Florida Horticultural Society for their many acts of kindness shown during our stay in their state.

Resolved, That the thanks of the Society are most heartily tendered to the transportation lines of the State of Florida for their great kindness shown in giving us free transportation all over the State; and finally be it

Resolved, That the heartfelt thanks of this Society are tendered to the citizens of the beautiful city of Ocala, for the many refined courtesies shown during our meeting, and that we shall, one and all, carry home the most pleasant memories of their land of flowers.

In this connection we desire to say that we should not be true to our feelings if we failed to thank Mr. and Mrs. M. A. Johnson, for the beautiful display of Camellias presented to our honored President.

IN MEMORY OF WASHINGTON.

As the closing session of the meeting occurred upon Washington's birthday, Feb. 22, the following resolution, introduced by Dr. C. M. Cullen, of Waldo, Florida, was adopted by the Society:

Resolved, That in grateful remembrance this day of George Washington, "first in war, first in peace and first in the hearts of his countrymen," the American Pomological Society honors his principles and his virtues, and hands them down to coming generations as the best guarantee of the safety, honor, and glory of the United States of America.

Nomination of Officers.

The report of this committee through its Chairman, Dr. H. H. Cary, of Georgia, was made at the second session, following the report of the Treasurer. It was adopted unanimously. The names of the committee and a list of the officers will be found in the first pages of the volume.

President's Address.

The report of this committee is given at the close of the Address.

Credentials.

President of the American Pomological Society:

Your Committee on Credentials, having carefully examined the records, beg leave to make the following report:

There are present with proper credentials one hundred and four members of the Society, representing twenty-two States and Territories, and the Dominion of Canada.

We also find among the members thirteen State and other minor Horticultural Societies represented.

All of which your Committee most respectfully submit.

F. M. MARBLE,
C. F. A. BIELBY,
G. B. BRACKETT.
Committee.

Fruits Exhibited.

To the President and Members of the American Pomological Society:

Your committee on Fruits Exhibited report the following awards:

WILDER MEDALS—SILVER.

Lake County Shippers' Union, for 40 varieties of oranges, 8 varieties of lemons, 2 varieties of citrons, 3 varieties of limes, 2 varieties of shaddocks, 2 varieties of pomelos, 2 varieties of pineapples, 5 varieties of guavas, 1 variety of loquats, 1 variety of persimmons, 2 varieties of prickly pears, 1 variety of sweet pomegranates, 3 varieties of bananas, 1 variety of strawberries, 1 variety of pawpaws, 2 varieties of peaches (half grown), in all 460 plates; also 24 boxes of packed oranges.

Marion County, for 35 plates of oranges, 12 plates of lemons, 15 plates of pomelos, 6 plates of shaddocks, 1 plate of citrons, 20 boxes of oranges, also several Hoffman strawberry plants in bearing.

Sumter County, for 275 plates of oranges, 90 trays of oranges, 3 varieties of pomelos, 16 varieties of lemons, 1 variety of limes, 1 variety of citrons, 1 variety of pineapples, 1 variety of figs, 16 baskets of Neunan strawberries.

Lee County, for a creditable collection of some thirty tropical and semi-tropical fruits.

Rev. Lyman Phelps, for 11 varieties of Navel oranges, 8 varieties of Blood oranges, 18 varieties of ornamental oranges, 52 varieties of other oranges, 16 varieties of lemons, 5 varieties of limes, 4 varieties of citrons. A highly meritorious collection.

E. H. Hart, for 25 varieties of oranges, 2 varieties of lemons, 1 variety of limes, 1 variety of pomelos, 1 variety of shaddocks, all showing good management and skillful cultivation.

Dudley W. Adams, for 46 varieties of oranges, 3 varieties of lemons, 1 variety of limes, 1 variety of pomelos, 1 variety of shaddocks, 1 variety of guavas, 1 variety of loquats, 1 variety of citrons.

BRONZE MEDALS.

Citrus County, for 22 varieties of oranges, 3 varieties of lemons, 2 varieties of limes, 1 variety of citrons, in all 175 plates; also 60 boxes of oranges, 2 boxes of lemons, 2 boxes of pomelos, and a large collection of fruits on branches.

Polk County, for 104 plates of oranges, 25 plates of pomelos, 4 plates of shaddocks, 3 plates of yellow pomelos, 1 plate of kumquats, 1 plate of loquats, 1 plate of guavas, 1 plate of strawberries, 9 boxes of oranges, and many clusters of oranges.

Volusia County, for 50 plates and heaps of oranges, lemons, limes, citrons, persimmons, loquats, kumquats, guavas and bananas.

O. P. Rooks, for 25 varieties of oranges, 7 varieties of lemons, 3 varieties of limes, 4 varieties of shaddocks, 2 varieties of pomelos, 2 varieties of citrons, 1 variety of persimmons, 2 varieties of guavas, 2 varieties of pineapples, 1 variety of loquats, 1 variety of prickly pears.

E. S. Hubbard, for 25 varieties of oranges.

Respectfully submitted,
F. M. HEXAMER,
J. S. NEWMAN,
A. H. MANVILLE,
Committee.

New Fruits.

To the President and Members of the American Pomological Society:

Your committee on Native Fruits respectfully report as follows:

The most noteworthy new fruit which has come to the notice of your committee is the Idaho Pear. It is a chance seedling originated near Lewiston, Idaho. In size, general appear-

ance and aroma, it resembles the crosses of the Chinese Sand Pear, but its eating quality is far superior to that of any of this class known in cultivation. It is very large and handsome; irregular globular, somewhat depressed. The cavity of the fruit is very irregular, basin shallow and pointed; calyx very small and closed; score very small; skin golden yellow, with many russety spots; flesh melting, juicy, with a sprightly, vinous, delicious flavor; season, September and October. So far, it has not fruited outside of its native locality, where the tree has withstood a temperature of thirty degrees below zero.

J. H. Hale, of Connecticut, reports: During the year not as many new fruits have come to my notice as formerly. I am testing some twenty new varieties of strawberries, the two most valuable of which are the Pineapple, sent out by J. H. Clark, of Maryland, and the Miami from J. D. Kruschkie, of Ohio. Pineapple is the most remarkable plant in growth of any that I have ever seen, having strong leaf-stalks eight to ten inches long and very broad heavy foliage of a rich dark, green color. It is entirely distinct in growth from any other variety. The blossom is perfect, and the berries large to very large, of a rich dark crimson color and excellent quality. Miami is a variety of moderate growth, somewhat like Cumberland. The blossom is pistillate, and the berry very large, rich dark red, and of fair quality. I think it will yield more large berries to the acre than any other variety, and is likely to prove valuable for market. Ada, a new blackcap raspberry, is as valuable a late market variety as the Gregg, and has the advantage of being hardy.

Dr. T. H. Hoskins, of Vermont, reports: Yellow Transparent and Scott's Winter ought to be added to the Society's list, both with two stars for Northern Vermont and Quebec; the first as the earliest and the best early, and the second as the longest keeper among the ironclad apples. McIntosh Red should also have a place, with two stars for Vermont and Quebec, as a larger and better fruit than its parent, the Fameuse. Yellow Transparent, Grand Sultan, Charlottenthaler, Sweet Pear, and Red Duck, belong to the same family of Russian apples, and are almost identical in fruit, but the Yellow Transparent is the hardiest and most vigorous. It seems to be valued all over the country from Canada to Alabama as a first early market apple.

Dr. George Thurber, of New Jersey, reports: I can subscribe very heartily to all that has been said of the Improved Dwarf Juneberry, recommended by Western nurserymen. The fruit is borne in clusters like the currant, and ripens in June. Its size equals the wild gooseberry; shape, round; color, reddish purple at first, becomes a bluish black when fully ripened. Its flavor approaches the huckleberry, a mild, very rich, sub-acid. Most people like its quality, and pronounce it delicious. I had two or three bushes that fruited several years in succession. In spring they are a sheet of white, and very ornamental. The fruit, which is borne in great abundance, is, to my taste, better than huckleberries. This species varies widely in its wild state. I have found it (the tall kind) in fruit in Maine, but one of these little bushes will bear as much as half a dozen of the big ones. I am not sure which of the named varieties this is, but incline to think it is *Amelanchier Canadensis* var. *pumila*, Tor. and Gray, or it may be var. *oligocarpa*. At all events I consider it of much promise to those who will take it up and improve it.

Dr. J. S. Newman, Alabama, reports: I found on exhibition at our State fair last fall, a seedling apple which is claimed to have originated in Butler County of this state by Mr. S. H. Thornton, who has named it "Thornton Seedling." It is a large red apple, quite showy, and in flavor very good. It ripens in October, and keeps well. I visited last August a pear tree near Loachapoka in this, Lee county, which seems to be a reproduction of the Duchess by seed. The fruit is identical with the Duchess, but the tree has quite a different habit of growth —spreading instead of compact. The original tree has not failed of a good crop in seven years. Much of the fruit is seedless, as is the case with Duchess when affected by late frost. There seems to be no doubt of the fact that the origi-

nal tree is a seedling, but the fruit is so completely identical with the parent that I do not ask that it be yet reported as new.

C. L. Watrous, of Iowa, reports: There has been no native fruit brought to public notice in Iowa within the past two years that would promise to have general value. A number of new apples and plums are attracting attention more or less extended, but locally.

A new native plum "Hawkeye," originated by H. A. Terry, of Crescent City, Iowa, is very large—larger than Lombard—deep red in color, of good quality for a native, very hardy and productive, promises to be valuable throughout the prairie region for family and market.

C. G. Patten, of Charles City, Ia., has a Soulard crab hybrid, a certain case of crossing one of the *Pyrus coronaria* with *Pyrus Malus*. Some specimens of the fruit are more than three inches in diameter. The tree is perfectly hardy in Northern Iowa, and is being hopefully used as a basis of further crosses with fine varieties of *P. Malus*, in hopes of evolving a cross bred race of undoubted hardiness and of quality suited to the wants of a civilized people.

Many other new fruits might be mentioned, but they would possess no general interest.

All of which is respectfully submitted,

F. M. Hexamer,
Chairman Committee on Native Fruits.

Place of Next Meeting.

The Chairman, Mr. W. C. Strong, of Massachusetts, reported that a number of places had been suggested for holding the meeting of 1891, including St. Louis, Mo., Chicago., Ill., London, Ontario, Nashville, Tenn., Geneva, N. Y., and St. Paul, Minn. From some of these places invitations had been received, but as other invitations would probably be sent in, the Committee were not prepared to recommend a choice.

Mr. Trowbridge, of Ohio, then moved that the next meeting be held in Chicago. This was warmly seconded by Mr. Brackett, of Iowa, Mr. Boone, of Illinois, and others, and seemed to be the unanimous choice of the meeting. Mr. Strong then moved as an amendment that decision upon a place for the next meeting be left with the Executive Committee of the Society, and that Chicago be recommended for favorable consideration. The motion as mended was carried and Committee discharged.

CATALOGUE OF FRUITS.

PLAN OF CATALOGUE.

The arrangement of the names of varieties in the Catalogue is alphabetical and according to the nomenclature adopted by the Society. Synonyms, which include all names which have been changed by the Society together with a few others, are placed under 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.

I.—APPLES.

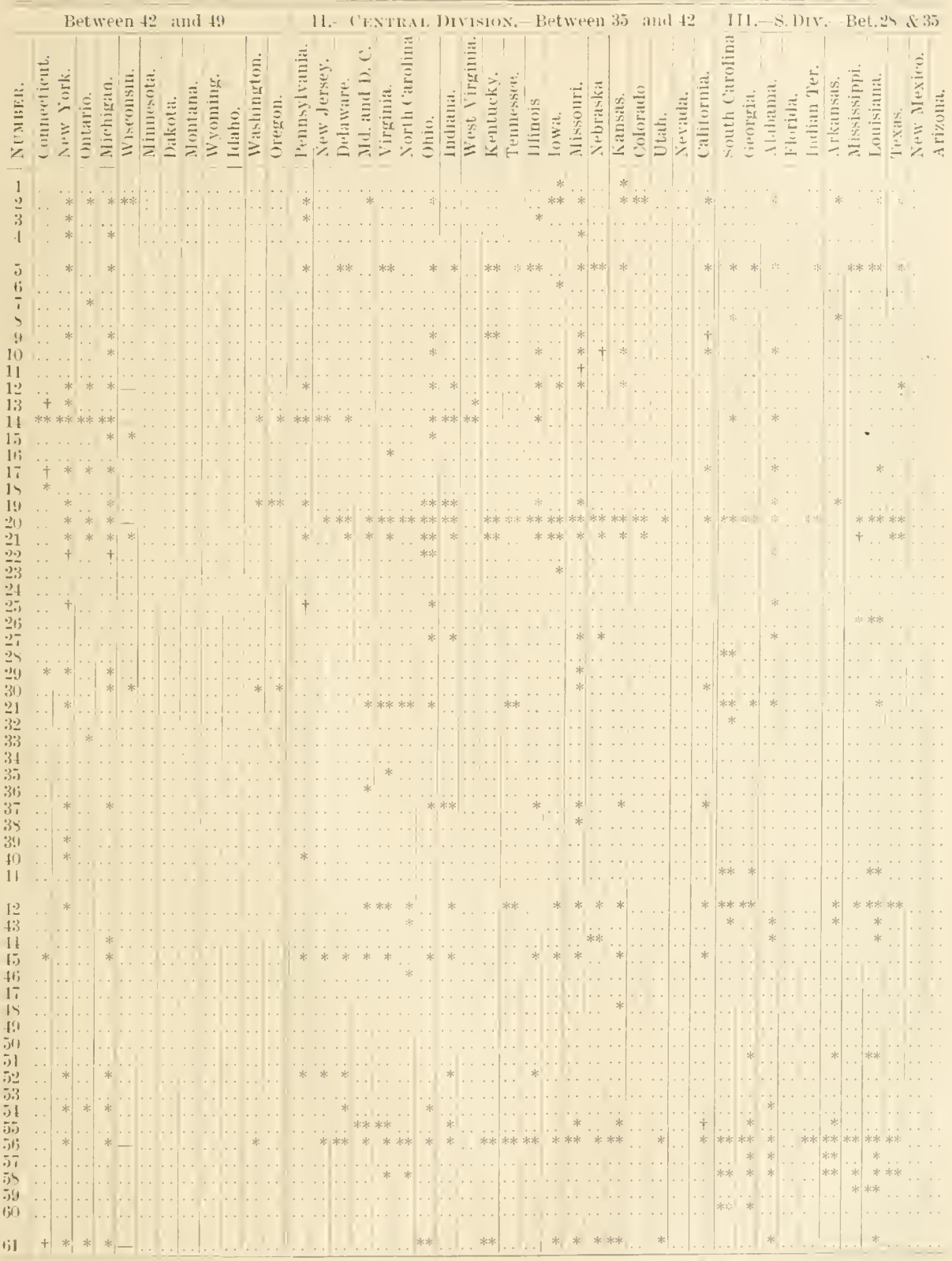
EXPLANATION OF ABBREVIATIONS.—The SIZE is indicated by l. for large; m. for medium, and s. for small. The FORM—r. c. roundish conical; r. ob. for roundish oblate; fl. for flat or oblate; r. for roundish. The COLOR—y. r. for yellow and red; r. s. for red striped; g. y. greenish yellow; rus. for russeted; y. rus. for yellow and russet. The QUALITY—g. for good; v. g. for very good; b. for best. The USE—F., fruit valuable for all family purposes; K. M., valuable for kitchen and market purposes; F. M., family and market. The SEASON S. for summer; E. A. for early autumn; L. A. for late autumn, and W. for winter. All these characters of course only designate leading positive features, and vary in their distinctness according to soil and climate in which they are grown. The ORIGIN is shown by Rus. for Russian; Eng. for England; Am. for American; Ger. for German; F. for 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	Alerson's Early	m.	r.	y.	v. g.	K.	S.	Am.								
2	Alexander	l.	r. c.	r. s.	g.	K. M.	E. A.	Rus.	*	**	*		*	*		
3	American Beauty	l.	r. ob.	y. r.	v. g.	F. M.	W.	Am.						*		
4	American Golden. *American Golden Pippin.*	l.	r. ob.	g. y.	v. g.	F. M.	W.	Am.		*						
5	American Summer. *American Summer Pearmain*	m.	ob.	y. r.	b.	F.	S.	Am.			*		*	*		
6	Anisovka							Rus.								
7	Arnold's Beauty	m.	fl.	y. r.	v. g.	F.	W.	Am.								
8	Aromatic Carolina	l.	fl.	y. r.	v. g.	F.	A.	Am.								
9	Autumn Bough	m.	r. c.	g. y.	v. g.	F.	E. A.	Am.								*
10	Autumn Swaar	m.	r. ob	g. y.	v. g.	F.	L. A.	Am.								
11	Babbitt															
12	Bailey Sweet	l.	r. c.	r s.	v. g.	F. M.	L. A.	Am.					*			
13	Baker	l.	r. ob.	y. r.	v. g.	K. M.	W.	Am.								*
14	Baldwin	l.	r. c.	r. g.	v. g.	F. M	W.	Am.	**		*	**	**	**	**	**
15	Baltimore. *Cable's Gilliflower. Mahaska.*	m.	r. c.	r. y.	v. g.	F. M.	W.	Am.								
16	Baltzby	l.	r. ob.	y.	g.	F. M.	A.	Am.								
17	Beauty of Kent	l.	r. c.	r. s.	g.	K. M.	L. A.	Eng.			*			*	*	*
18	Belden Sweet	m.	r. c.	y.	g.	F.	W.	Am.								
19	Belmont	l.	r. c.	y. r.	b.	F. M.	W.	Am.					*			
20	Ben Davis. *New York Pippin*	l.	r. c.	y. r.	g.	K. M.	W.	Am.	*							
21	Benoni	m.	r. ob.	y. r.	v. g.	F. M.	S.	Am.			†	**	**	*	*	
22	Bentley's Sweet	m.	r. ob.	g. y.	v. g	F. M.	W.	Am.								
23	Bergamot							Rus.								
24	Berkshire Spy	m.	r. c.	r. s.	v. g.	F.	E. W.	Am						*		
25	Bethlemite	l.	r. ob.	y. r.	b.	F. M.	W.	Am								
26	Bevan. *Bevan's Favorite*	m.	fl. c.	y. r.	g.	F.	S.	Am.								
27	Black. *Jersey Black*	m.	fl.	d r.	g.	F.	W.	Am.								
28	Blakeley															
29	Blenheim. *Bleuheim Pippin*	l.	r. ob.	y. r.	v. g.	F. M.	W.	Eng.	**				*			
30	Blue Pearmain	l.	r. c.	r.	g.	M.	W.		*		*		*	*		
31	Bonum	l.	r. ob.	y. r.	v. g.	M.	L. A.	Am.								
32	Borowitzky							Rus.								
33	Bourassa	m.	r. c.	y. r.	g.	M.	L. A.	Ger.								
34	Bowen. *Bowen's Favorite*	m.	r. ob.	r.	g.	M.	A.	Am								†
35	Bower's Nonpareil	l.	fl.	y. r.	v. g.	F. M.	W.	Am.								
36	Bowling's Sweet	m.	r.	y. r.	g.	M.	L. A.	Am.								
37	Broadwell	m.	r. c.	g. y.	v. g.	F. M.	L. A.	Am	*							
38	Broadwell Sweet															
39	Brittle Sweet	m.	r c.	r. s.	v. g.	F.	E. A.	Am.								
40	Brown. *Nottingham Brown*	l.	fl.	r. s.	v. g.	F. M.	L. A.	Am.								
41	Bruce's Summer	l.					S.	Am.								
42	Buckingham. *Fall Queen of Kentucky, Bachelor, Equinetely*	l.	r. ob.	y. r.	v. g.	F. M	E. W.	Am.								
43	Buff	l.	r. ob.	y. r.	g.	F.	W.	Am.								
44	Buffington's Early	m.	fl.	y.	g.	F.	S.	Am.								
45	Bullock's Pippin. *American Golden Russet*	s.	r. c.	y. rus.	b.	F. M.	W.	Am.								*
46	Buncombe															
47	Burlington. *Burlington Pippin*	m.	fl. c.	y. r.	v. g.	F. M.	W.	Am.								
48	Cadwallader. *Cadwallader's Golden*	m.	r. ob.	y.	g.	K. M.	W.	Am.								
49	Calef Sweet	l.	r. ob.	y.	v. g.		W.	Am.								
50	Calkin. *Calkin's Pippin*	l.	r. c.	y. r.	g.	F. M.	W.	N. S	*							
51	Camack Sweet	m.	r. ob.	y.	g.	F. M.	W.	Am.								
52	Campfield	m.	r. ob.	g. r.	g.	M. K.	W.	Am.								
53	Canada Baldwin	m.	ob.	r.	v. g.		W.	Can.								
54	Canada Reinette	l.	r. c.	g. y.	v. g.	F. M.	W.	F.	*	*						
55	Cannon Pearmain	m.	r. c.	r. s.	v. g.	F.	W.	A.								
56	Carolina June. *Carolina Red June*	m.	r. c.	r. s.	v. g.	F. M.	S.	Am.								
57	Carolina Watson	m.	fl. c.	g. y. r.	g.	M.	S.	Am.								
58	Carter's Blue	l.	r. ob.	g. r.	v. g.	F. M.	E. A.	Am.								
59	Cane Creek Sweet	m.	r.	y.	g.	F.	S.	Am.								
60	Chattahoochee	m.	fl.	y.	g.	M.	W.	Am.								
61	Chenango. *Chenango Strawberry, Sherwood's Favorite*	m.	ob. c	g. r.	v. g.	F. M.	E. A.	Am.	*							

2 Moderate bearer; showy; hardy.

5 Slender grower, but healthy.

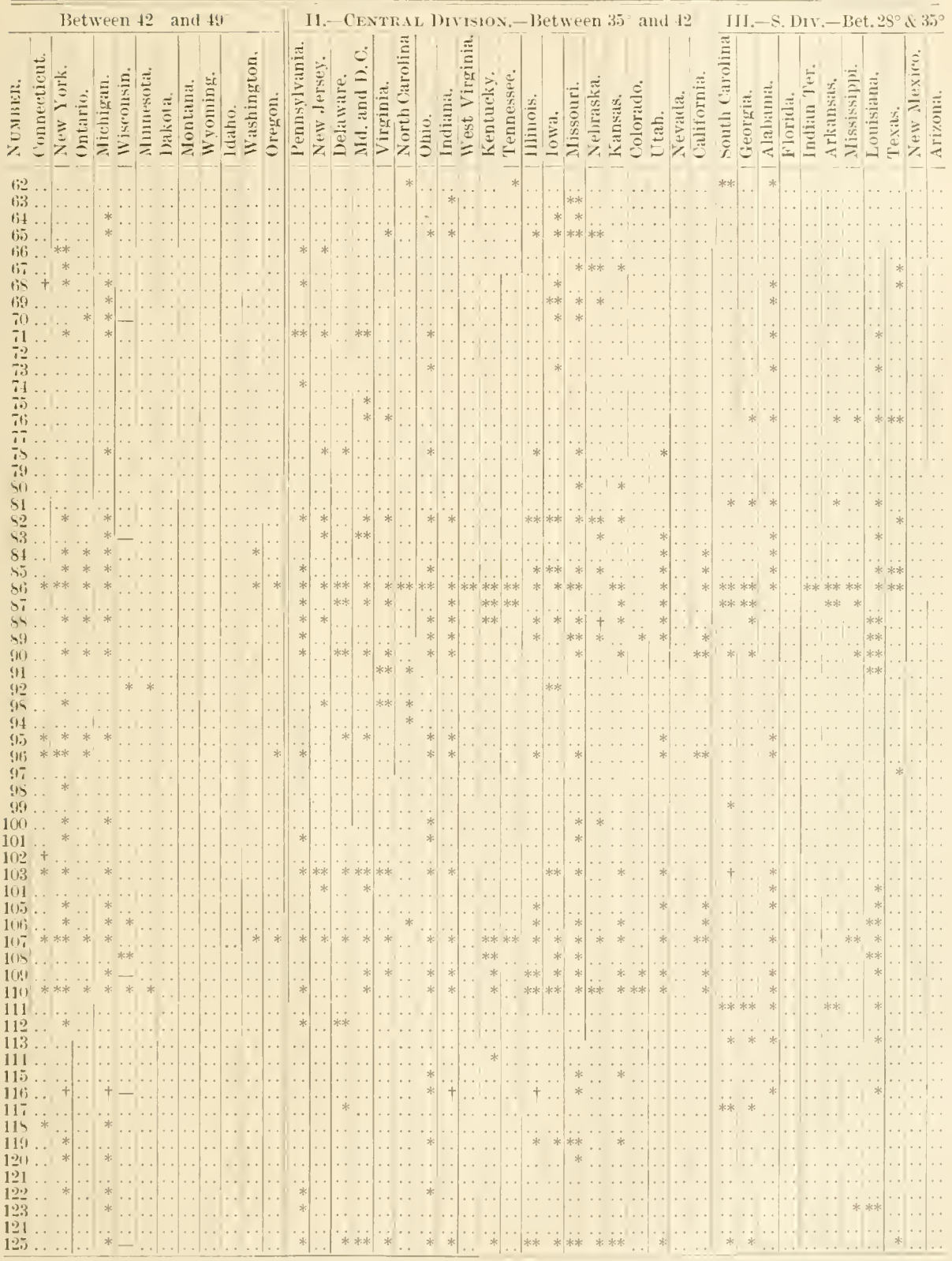
11 In Vermont adapted only to the Southern and Western parts of the State south of Burlington.



15 A hardy tree; very productive.
17 A coarse, showy fruit.
91 Fine for table; too tender for shipping.
20 Valuable shipping sort.
22 Fine winter variety.
25 Resembles Newtown Spitzenburgh.
52 Valued for stock and cider.
56 Esteemed South and West.
58 Valued at the South.

Number.	NAMES.	DESCRIPTION.							I.—N. Div.—						
		Size.	Form.	Color.	Quality.	Use.	Season.	Origin.	Nova Scotia.	New Brunswick	Maine.	New Hampsh're	Vermont.	Massachusetts.	Rhode Island.
62	Clark's Pearmain	m.	r. ob.	y.	v. g.	M.	W.	Am.							
63	Clayton	l.	c.	y. r.	g.	F. M.	W.	Am.							
64	Clyde Beauty	l.	r. c.	g. r.	g.	F. M.	W.	Am.	*						
65	Cooper	l.	r. ob.	g. y.	g.	M.	L. A.	.....							
66	Cooper's Market	m.	r. c.	y. r.	g.	M.	W.	Am.							
67	Cooper's Early. *Cooper's Early White*	m.	r.	y.	g.	M.	A.	Am.							
68	Cogswell	m.	r. ob.	y. r.	b.	F. M.	W.	Am.						**	*
69	Cole's Quince	l.	r. ob.	g. y.	v. g.	F. M.	W.	Am.			*			*	
70	Colvert	l.	r. ob.	y. r.	g.	F. M.	L. A.	Am.	*						
71	Cornell	m.	ob.	y. r.	g.	F. M.	L. A.	Am.							
72	Cox's Orange. *Cox's Orange Pippin*	m.	ob.	y. r.	v. g	F.	E. A.	Eng.	*						
73	Cracking	l.	r. ob.	y.	g.	K.	L. A.	Am.							
74	Creek	m.	fl. c.	y. r.	v. g.	F. M.	W.	Am.							
75	Cross	l.	r. ob.	r. s.	v. g.	F. M.	S.	Am.							
76	Cullasaga	m.	r. c.	y. s.	g.	M.	W.	Am.							
77	Curtis Sweet	l.	r. c.	y. r.	g.	K.	L. A.	Am.					*		
78	Danvers Sweet. *Danvers Winter Sweet*	m.	r. ob.	g. y.	v. g.	F. M.	W.	Am.			*	*		*	
79	Dean	m.	fl.	r. s.	v. g.	F. M.	E. A.	Am.			*				
80	Detroit Red	m.	r. ob.	r.	g.	F. M.	E. W.	Am.							
81	Disharoon	m.	r. c.	g.	g.	F. M.	A.	Am.							
82	Dominie	m.	r. ob.	g. r.	v. g.	F. M.	W.	.....							
83	Drap d'Or	l.	r. ob.	y.	v. g.	F.	S.	Ger.	*						
84	Dutch Mignonne	m.	r. ob.	r. s.	g.	M.	W.	Ger.					*		
85	Dyer. *Pomme Royal*	m.	r.	g. y.	v. g.	F.	E. A.	F.			*		**	*	**
86	Early Harvest	m.	r. ob.	g. y.	v. g.	F. M.	S.	Am.	*	**	**	*	*	*	*
87	Early Margaret. *Early Red Margaret*	m.	r.	r. s.	v. g.	F. M.	S.	Ger.					*		
88	Early Joe	s.	fl.	y. r.	b.	F.	S.	Am.					*	*	
89	Early Pennock	l.	r. c.	g.	g.	M.	S.	Am.			*	*			
90	Early Strawberry. *Red Juneating*	s.	r.	r. s.	v. g.	F.	S.	Am.			*	*	*	*	*
91	Early Ripe	m.	r. ob.	y.	g.	F.	S.	Am.							
92	Edgar Red Streak. *Walbridge*	l.	r. ob.	r. s.	v. g.	F.	W.	Am.							
93	Edward's Early	....	.....	.....	.....	.....	S.	Am.							
94	Edward's Winter	....	.....	.....	.....	.....	.....	.....							
95	English Russet. *Poughkeepsie Russet*	m.	r. c.	y. rus.	v. g.	F. M.	W.	Eng.			*		*		*
96	Esopus Spitzenburg	l.	ob.	y. r.	b.	F. M.	W.	Am.	*		†	*	*		
97	Etowah. *Cooper's Red*	m.	ob. c.	y. r.	g.	.....	W.	Am.							
98	Eustis	m.	r. ob.	r. s.	v. g.	F.	E. W.	Am.						*	
99	Eutaw	....	.....	.....	.....	.....	A.	Am.							
100	Evening Party	m.	fl.	r.	v. g.	F. M.	W.	Am.							
101	Ewalt	l.	r.	y. r.	g.	M.	W.	Am.							
102	Excel	l.	ob. c.	y. r.	v. g.	F. M.	W.	Am.							
103	Fallawater. *Fornwalder, Tulpehocken*	l.	r. c.	g. y.	g.	M.	W.	Am.	†						
104	Fall Harvey	l.	r. ob.	g. y.	g.	M.	L. A.	Am.	†		*			*	
105	Fall Jenneting	l.	fl.	g. y.	g.	M.	E. A.	Am.	*		†				
106	Fall Orange	l.	r.	y. r.	g.	K. M.	L. A.	Am.					*		
107	Fall Pippin. *Holland Pippin*, (erroneously)	l.	r. ob.	g. y.	v. g.	F. M	L. A.	Am.	*		†		*	*	**
108	Fall Queen. *Hass, Gross Pommier*	m.	ob. c.	y. r.	g.	F. M.	A.	Am.		**					
109	Fall Wine	m.	r. ob.	r. y.	b.	F.	L. A.	Am.		*		**			
110	Famense. *Pomme de Neige, Snow Apple*	m.	r. ob.	r. s.	v. g.	F. M.	W.	F.	*	**	**	**	**	*	*
111	Family	m.	fl. c.	y. r.	v. g.	M.	S.	Am.							
112	Fanny	m.	fl.	r. s.	v. g.	F. M.	S.	Am.							
113	Ferdinand	l.	fl.	o. y.	g.	.....	W.	Am.							
114	Ferris	m.	r. fl.	y. r.	g.	F. M.	W.	Am.							
115	Fink	m.	fl.	y. r.	g.	M.	L. W.	Am.							
116	Fourth of July	m.	r. ob.	r. s.	g.	M.	S.	Ger.	†						
117	Faust's Winter. *Faust*	m.	r.	y. r.	g.	.....	W.	Am.							
118	Foundling	m.	r. ob.	y. r.	g.	F.	A.	Am.			†	**	*	*	†
119	Fulton	m.	fl.	g. y.	g.	M.	W.	Am.							
120	Gabriel	m.	r. ob.	r. y.	g.	M.	L. A.	Am.							
121	Gano	....	.....	.....	.....	.....	.....	.....							
122	Garden Royal	m.	r. ob.	y. r.	b.	F.	S.	Am.			*		*	*	*
123	Garretson's Early	m.	r. c.	y.	g.	K.	A.	Am.				•			
124	Gideon	....	.....	.....	.....	.....	.....	.....							
125	Gilpin. *Carthouse, Little Romanite*	s.	r. c.	y. r.	g.	M.	W.	Am.				*			

82 Productive and hardy.
85 Valued for dessert.
86 Succeeds best on strong soils.
88 A delicious table sort; tree of small growth.
89 Popular market sort.
90 Continues a long time after ripening.



110 A hardy tree; one of the best for the North and West.

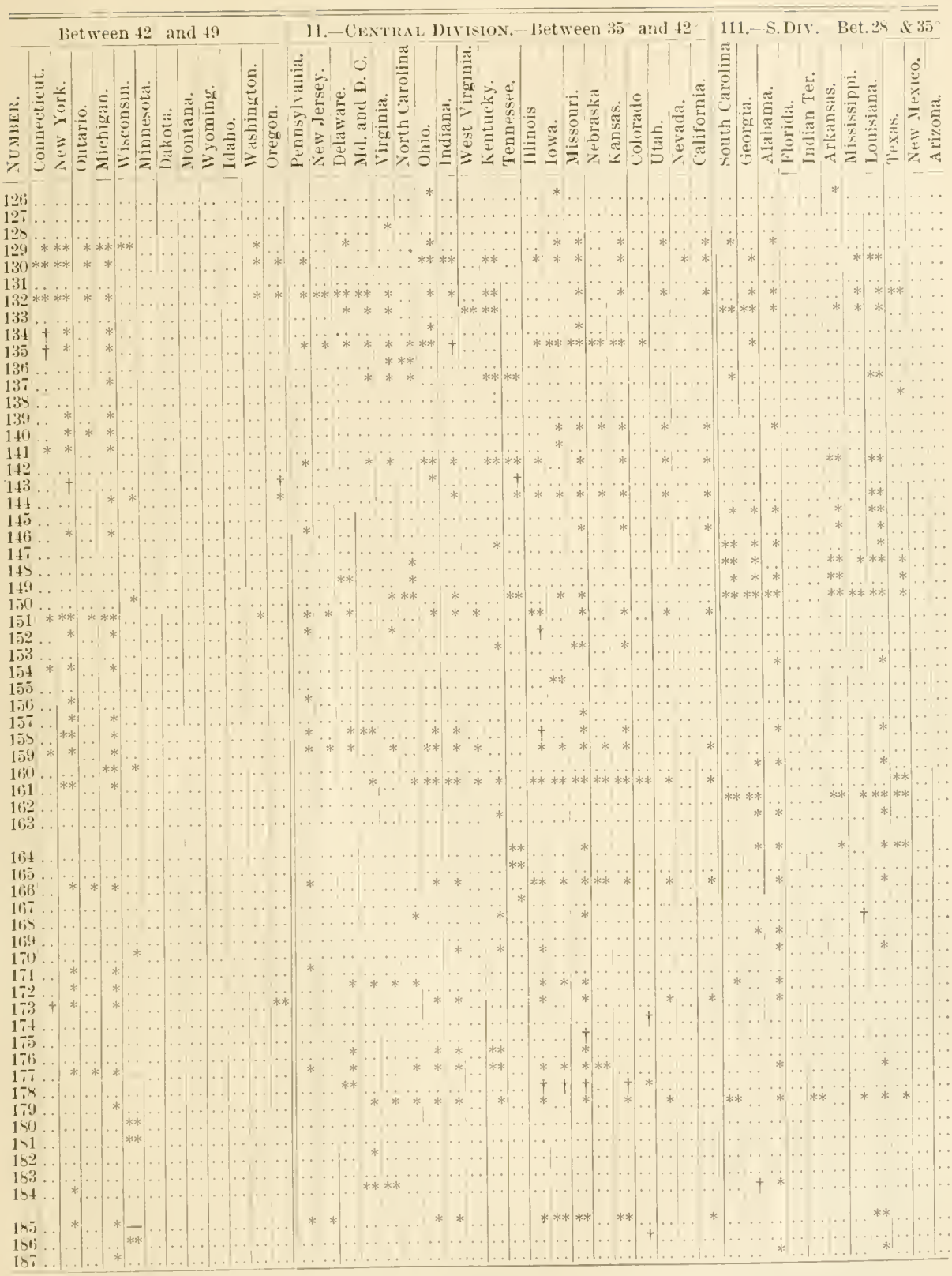
115 Valuable as a very late keeper and for cider.

116 Very hardy tree and handsome fruit.

122 Of a delicious pear flavor.

NUMBER.	NAMES.	DESCRIPTION.							I.—N. DIV.—						
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampsh'e	Vermont.	Massachusetts.	Rhode Island.
126	Goff	l.	fl.	y. r.	v. g.	K. M.	S.	Am.							
127	Golden Ball	l.	r.	y.	g.	F.	E. A.	Am.							*
128	Golden Dixie	m.	r. ob.	g. y.	v. g.	F. M.	S.	Am.							
129	Golden Russet of Western New York	m.	r. ob.	y. rus.	v. g.	F. M.	W.		**				**		
130	Golden Sweet	l.	r.	g. y.	v. g.	F. M.	S.	Am.	*				**	*	*
131	Granite Beauty	l.	r. ob.	y. r.	g.	F. M.	W.	Am.			†	*	*		
132	Gravenstein	l.	r. ob.	y. r.	v. g.	F. M.	L. A.	Ger.	**		**	**	**	**	**
133	Green Cheese	m.	fl.	g. y.	v. g.	F. M.	W.	Am.							
134	Green Sweet	m.	r. ob.	g. y.	g.	K. M.	W.	Am.						*	*
135	Grimes' Golden	m.	r. ob.	g. y.	v. g.	F.	W.	Am.	*				*		
136	Gully	m.	fl.	g. y.	v. g.	F.	W.	Am.							
137	Hall	s.	fl.	y. r.	v. g.	F.	W.	Am.							
138	Hamilton	l.	r.	y. r.	g.	F. M.	A.	Am.							
139	Haskell Sweet	m.	fl.	g. y.	v. g.	F.	E. A.	Am.						*	
140	Hawthornden	m.	r. ob.	g. y.	g.	K. M.	E. A.	F.				*			*
141	Hartford Sweet	l.	r. ob.	r. s.	g.	M.	W.	Am.							
142	Hewes' Crab. *Hewes' Virginia Crab*	s.	r.	y. r.	g.	Cider	L. A.	Am.							
143	Higby Sweet	m.	r. c.	y. r.	v. g.	F.	L. A.	Am.						†	
144	High Top Sweet. *Sweet June*	s.	r.	g. y.	v. g.	F. M.	S.	Am.				*	*	*	
145	Hockett's Sweet	m.	r. ob.	y. r.	g.	K.	W.	Am.							
146	Holland Pippin	l.	r.	g. y.	g.	K. M.	L. A.	F.					*		
147	Holly	m.	r. ob.	y. r.	g.	K.	W.	Am.							
148	Hoover. *Black Coal*	m.	r.	y. r.	v. g.	F. M.	W.	Am							
149	Horn	m.	fl.	g. r.	v. g.	F. M.	L. W.	Am.							
150	Horse. *Haas*	l.	r.	y. r.	g.	K. M.	S.	Am.		**					
151	Hubbardston. *Hubbardston's Nonsuch*	l.	r. c.	y. r.	v. g.	F. M.	W.	Am	**		**	*	**	**	**
152	Hunt Russet	m.	r. ob.	y. rus.	v. g.	F. M.	W.	Am.						**	
153	Huntsman. *Huntsman's Favorite*	l.	ob.	y.	v. g.	F. M.	W.	Am.							
154	Hurlbut	m.	r. ob.	y. r.	g.	F. M.	L. A.	Am.	†		†	*		*	*
155	Iowa Blush														
156	Irish Pippin	m.	r.	r. s.	v. g.	F. M.	E. W.	Am.							
157	Jefferson County	m.	r. ob.	y. r.	g.	F. M.	W.	Am.							
158	Jefferis	m.	r. ob.	y. r.	v. g.	F. M.	E. A.	Am.			†				
159	Jersey Sweet	m.	r.	y. r.	v. g.	F. M.	E. A.	Am.					*		*
160	Jewett's Red. *Jewett's Fine Red.*	m.	r. ob.	r.	g.	F. M.	W.	Am.	*		**	**	*		
161	Jonathan	m.	r. c.	y. r.	v. g.	F. M.	W.	Am.				**	**	*	*
162	Julian	m.	fl. c.	w. r.	g.	K.	S.	Am.							
163	Junaluskee	m.	r. ob.	g.	v. g.	F. M.	W.	Am.							
164	Kentucky Red. *Kentucky Red Streak. Bradford's Best*	m.	r. c.	g. y. dr	g.	F. M.	A.	Am.							
165	Kentucky	l.	r. c.	y. r.	g.	M.	L. A.								
166	Keswick Codlin	m.	r. c.	g. y.	g.	K. M.	E. A.	Eng.	*						
167	Key's Fall	m.	r.	rus.	v. g.	F. M.	E. W.	Am.							
168	Kinnaird. *Kinnaird's Choice*	m.	fl.	y. r.	g.	F. M.	W.	Am.							
169	Kinney's Winter						W.								
170	Kirkbridge. *Kirkbridge White*	m.	ob.	g. y.	g.	K. M.	E. A.								
171	Klaproth	m.	fl.	y. r.	g.	K. M.	E. A.	Am.							
172	Lady Apple	s.	fl.	y. r.	v. g.	F. M.	W.	F.						*	
173	Lady's Sweet	l.	r.	y. r.	v. g.	F. M.	W.	Am.				*	*	*	**
174	Ladies' Sweeting														
175	Langerfeldskœ							Rus.							
176	Lansingburg	m.	r. fl.	y. r.	g.	M.	W.	Am.							
177	Late Strawberry. *Autumn Strawberry*	m.	r.	y. r.	v. g.	F. M.	L. A.	Am.					*		†
178	Lawyer	l.	r. ob.	y. r.	v. g.	F. M.	W.	Am.							
179	Liely							Rus.							
180	Limber Twig	m.	r. ob.	y. r.	g.	M.	W.	Am.							
181	Little Seedling							Rus.							
182	Long Island Russet	m.	r.	rus.	....	K.	W.	Am.							
183	Lorne. *Marquis of Lorne*	l.	r. fl.	g. r.	v. g.	F. M.	W.	N. S.	*						
184	Loudon Pippin	l.	fl.	y. r.	g.	M.	W.	Am.			*				
185	Lowell. *Orange, Tallow Pippin, Queen Anne. Michigan Golden Pippin*	l.	r. c.	g. y.	v. g.	F. M.	E. A.	Am.	*				*		
186	Lubsk Queen							Rus.							
187	Lyscom	l.	r.	g. y.	g.	F. M.	E. A.	Am.	*					*	*

132 Ripens early and keeps late.
133 One of the best south.
140 One of the most profitable of market sorts.
142 Valued only for cider.
143 A delicious dessert apple.



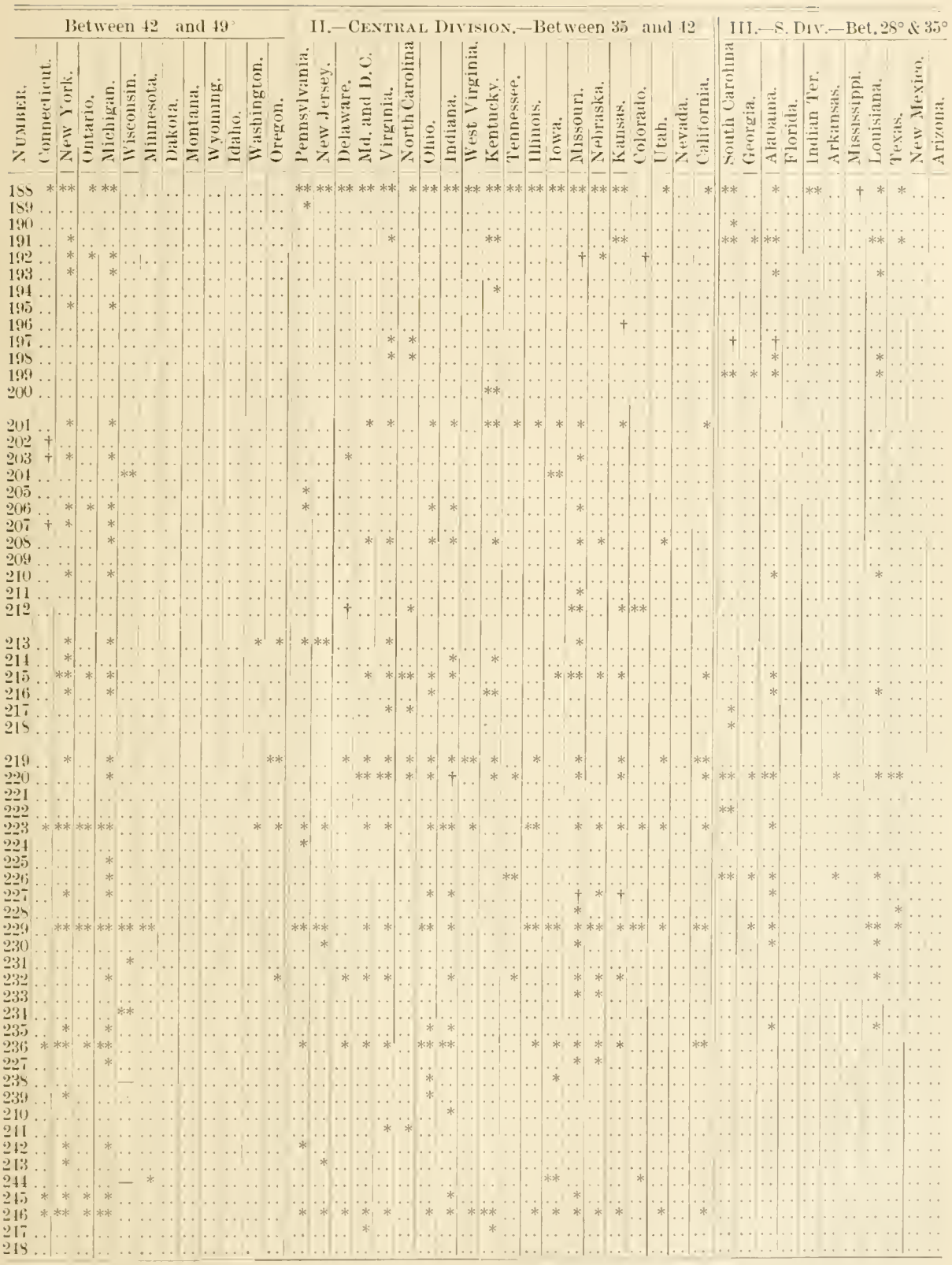
152 A hardy tree and fine fruit. Supposed to be identical with Golden Russet of Mass., but not fully decided.

159 Very valuable for market or stock.

180 Hardy and productive Southwest.

Number.	Names.	Description.							I.—N. Div.—						
		Size.	Form.	Color.	Quality.	Use.	Season.	Origin.	Nova Scotia.	New Brunswick	Maine.	New Hampsh're	Vermont.	Massachusetts.	Rhode Island.
188	Maiden's Blush	m.	r.	g. y.	g.	K. M.	E. A.	Am.	†	..	..	*	*	*	*
189	Major	l.	r. fl.	g. r.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
190	Mala Carle	..	..	..	..	..	..	..	..	..	..	..	..	..	..
191	Magnum	m.	r. ob.	y. r.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
192	Mann	m.	r. ob.	y. r.	v. g.	F. M.	W.	Am.	..	..	..	..	†	..	†
193	Mahomet	m.	r. ob.	y. r.	v. g.	F. M.	E. A.	Am.	..	..	..	..	..	*	..
194	Mary Womac	l.	r. fl.	y. r.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
195	Marston's Red. *Marston's Red Winter*	m.	r. c.	r. s.	v. g.	F.	W.	Am.	..	..	..	*	..	..	..
196	Mason's Orange	v. l.	ob.	y.	g.	F. M.	W.	Am.	..	..	..	..	..	..	..
197	Mason's Stranger	m.	fl.	y. r.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
198	Mattamusket	s.	fl.	y. r.	g.	F. M.	W.	Am.	..	..	..	..	..	..	..
199	Maverack Sweet	m.	r. ob.	y. r.	v. g.	M.	W.	Am.	..	..	..	..	..	..	..
200	Maxy	m.	r. c.	g. r.	g.	F. M.	W.	Am.	..	..	..	..	..	..	..
201	McAfee. *McAfee's Nonsuch, Large Striped Pearmain*	l.	r. ob.	y. r.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
202	McIntosh Red	m.	r. ob.	y. r.	v. g.	F. M.	W.	Am.	..	..	..	..	†	..	..
203	McLellan	m.	r. ob.	y. r.	v. g.	F. M.	W.	Am.	..	..	..	..	*	..	*
204	McMahan's White	l.	r. ob.	y. w.	g.	K. M.	A.	Am.	..	..	..	..	..	..	..
205	Mellinger	m.	r. c.	r. s.	v. g.	F. M.	E. W.	Am.	..	..	..	..	..	..	..
206	Melon	m.	r. ob.	y. s.	b.	F. M.	W.	Am.	..	..	..	..	..	*	*
207	Mexico	m.	r. ob.	r. s.	v. g.	F. M.	A.	Am.	..	..	..	..	..	..	†
208	Milam	m.	r.	r. s.	g.	K. M.	W.	Am.	..	..	..	..	..	..	..
209	Milden or Milding	l.	fl.	y. r.	v. g.	F. M.	E. W.	Am.	..	..	..	**	*	..	..
210	Minister	l.	ob.	r. s.	g.	K. M.	L. A.	Am.	..	..	**	*	..	*	..
211	Minkler	..	..	..	..	..	..	..	..	..	..	..	..	..	..
212	Missouri Pippin. *Missouri Keeper*	l.	r. ob.	y. r.	g.	M.	W.	Am.	..	..	..	..	..	..	..
213	Monmouth. *Monmouth Pippin, Red Cheek Pippin*	l.	fl.	y. r.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
214	Moore's Sweet	m.	r. ob.	r.	g.	K.	W.	Am.	..	..	..	..	..	..	*
215	Mother	m.	r. c.	y. r.	b.	F. M.	W.	Am.	*	..	**	**	*	*	*
216	Munson Sweet. *Orange Sweet*	m.	fl.	y. g.	g.	K. M.	L. A.	Am.	*	..	..	..	..	..	..
217	Nansemond. *Nansemond Beauty*	m.	r. ob.	r. s.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
218	Neverfail	..	..	..	..	..	..	..	..	..	..	..	..	..	..
219	Newtown Pippin. *Albemarle Pippin, Brooke's Pippin*	l.	r. ob.	g. y.	v. g.	F. M	W.	Am.	..	†	..	..	..	..	..
220	Nickajack	l.	r. ob.	r. s.	g.	F. M.	W.	Am.	..	..	..	..	..	..	..
221	Nonpareil Russett	m.	r.	y. g.	g.	F. M.	W.	Eng.	*	..	..	..	..	..	..
222	North Carolina	..	..	..	..	..	..	..	..	..	..	..	..	..	..
223	Northern Spy	l.	r. c.	y. r.	b.	F. M.	W.	Am.	**	..	**	*	**	*	*
224	Northampton	m.	fl.	r. s.	v. g.	F.	E. W.	Am.	..	..	..	..	..	..	..
225	Oakland. *Oakland County Seek-no-further*	m.	r. ob.	y. r.	v. g.	F.	W.	Am.	..	..	..	..	..	..	..
226	Oconee Greening	m.	ob.	y.	g.	.....	A.	Am.	..	..	..	..	..	..	..
227	Ohio Nonpareil	l.	r. ob.	y. r.	v. g.	F. M.	L. A.	Am.	..	..	..	..	..	..	..
228	Ohio Pippin. *Shannon*	l.	r. ob.	y. r.	g.	.....	W.	Am.	..	..	..	..	..	..	..
229	Oldenburg. *Duchess of Oldenburg*	m.	r. ob.	y. r.	g.	M.	S.	Rus.	*	**	**	**	**	*	**
230	Orange Pippin	m.	ob.	y.	v. g.	F. M	A.	Am.	..	..	..	..	..	..	..
231	Orange Winter	..	..	..	..	..	..	..	..	..	..	..	..	..	..
232	Ortley. *White Bellflower, Woolman's Long*	m.	ob.	g. y.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
233	Otoe Red. *Otoe Red Streak*	m.	r. ob.	y. r.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
234	Peach of Montreal	m.	r. c.	y. s.	v. g.	F. M.	A.	F.	..	..	..	..	*	..	..
235	Peach Pond Sweet	m.	fl.	r. s.	v. g.	F.	A.	Am.	..	..	..	..	*	..	..
236	Peck's Pleasant	m.	r.	g. y.	v. g.	F. M.	W.	Am.	†	..	†	†	**	*	**
237	Perry Russet	m.	r. c.	rus.	g.	F. M.	W.	Am.	..	..	..	..	..	..	..
238	Pewaukee	l.	fl.	r. s.	g.	F. M.	W.	Am.	..	*	..	†	..	..	..
239	Phillip's Sweet	m.	r. ob.	r. s.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
240	Pickard. *Pickard's Reserve*	m.	r. ob.	r. y.	g.	F.	W.	Am.	..	..	..	..	..	..	..
241	Pilot	l.	r. ob.	g. y. r.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
242	Pittsburg. *Pittsburg Pippin*	l.	fl.	g. y.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
243	Pleasant Valley. *Pleasant Valley Pippin*	m.	r. ob.	g. y.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
244	Plumb's Cider	m.	r. c.	g. y. r.	g.	K. M.	A.	Am.	..	..	..	..	..	..	..
245	Pomme Grise	s.	r. ob.	y. rus.	b.	F.	W.	F.	*	*	..	..	*	..	..
246	Porter	l.	ob.	g y.	b.	F. M.	A.	Am.	*	..	**	**	**	**	*
247	Premium	m.	r. c.	y.	v. g.	F. M.	E. W.	Am.	..	..	..	..	..	..	..
248	President	l.	r. ob.	y.	g.	F.	A.	Am.	..	..	*	..	..	..	..

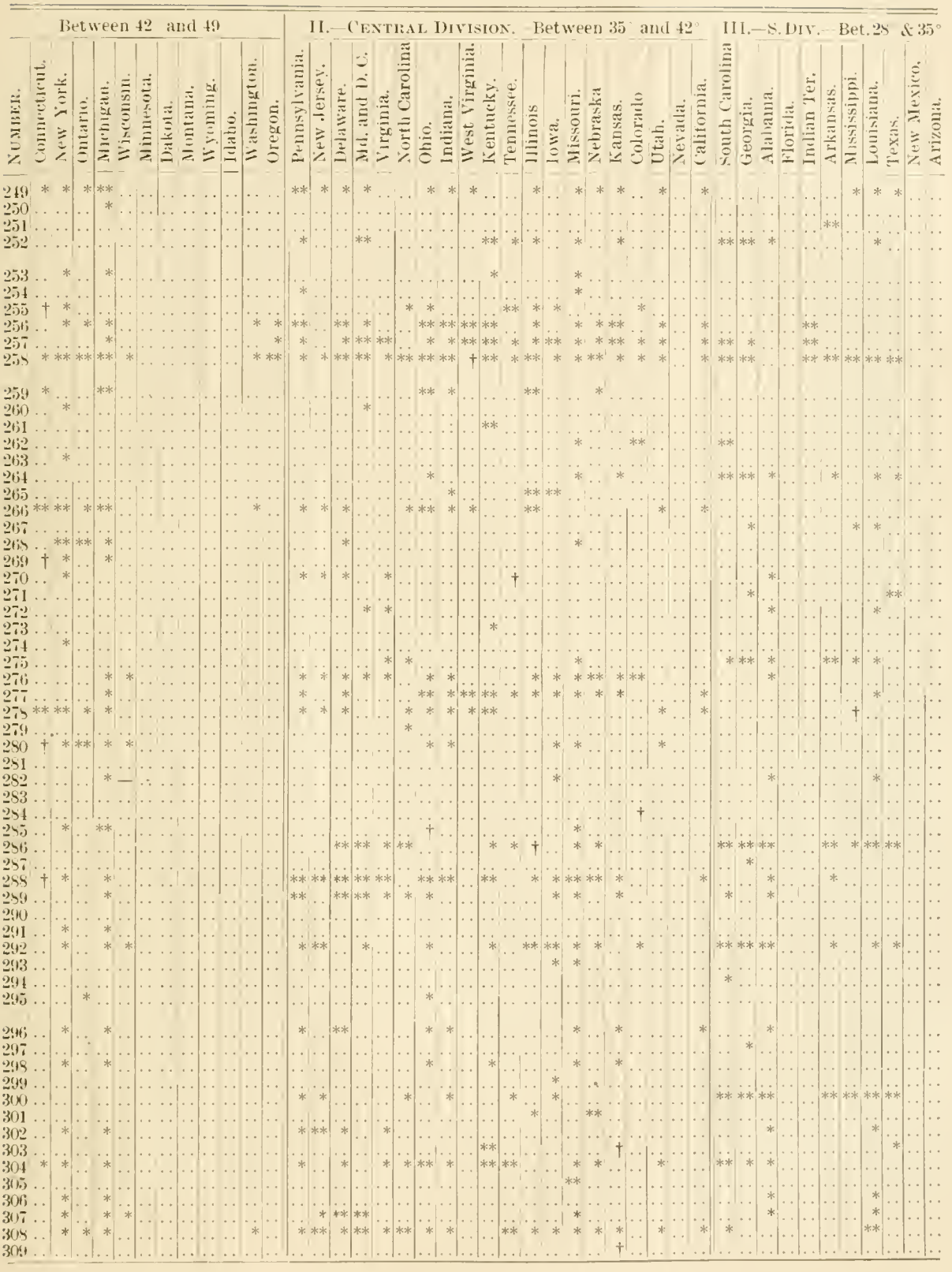
188 A profitable market sort.
193 A valued sweet apple.
191 A seedling from Rambo, which it resembles.
206 One of the most delicious apples; tree a poor grower.
215 Esteemed where known.
220 Known in South and West by over forty different names.



227 Esteemed where known.
229 One of the most hardy varieties.
232 An old variety; extensively planted at the West 25 or more years since.
233 A new variety; originated in Nebraska.
238 Very hardy.
215 Tree of small growth; succeeds well at the North.

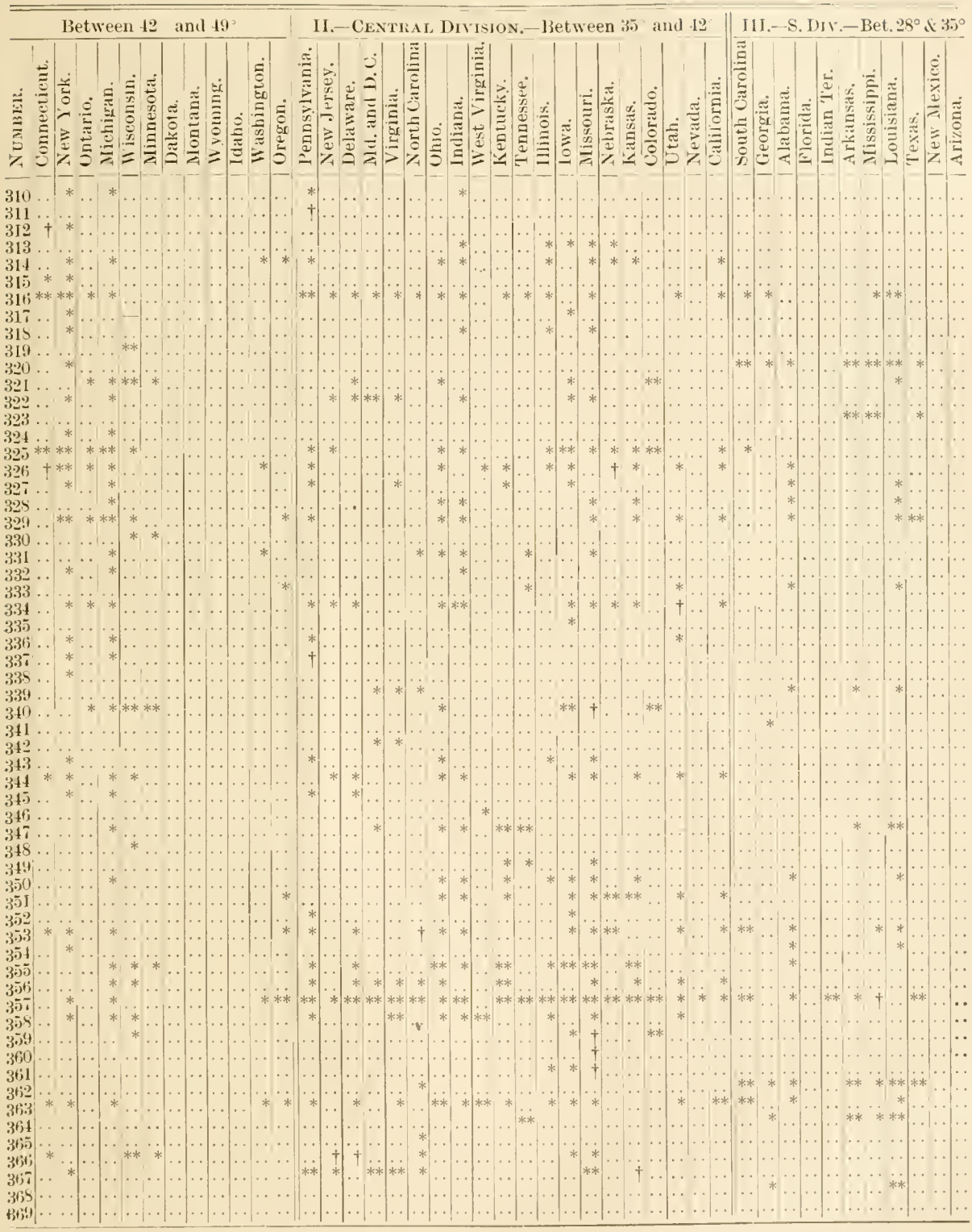
Number.	NAMES.	DESCRIPTION.							I.—N. Div.—						
		Size.	Form.	Color.	Quality.	Use.	Season.	Origin.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts.	Rhode Island.
249	Primate	m.	r. c.	g. y.	b.	F.	E. A.	Am.	*	..	*	*	..	*	*
250	Progress	m.	r. ob.	y.	g.	F. M.	W.	Am.	..	..	..	..	..	..	..
251	Prother's Winter	m.	c.	y. r.	g.	F. M.	L. W.	Am.	..	..	..	..	..	..	..
252	Pryor's Red	l.	r. ob.	y. r.	v. g.	F. M.	W.	.....	..	..	..	..	..	..	..
253	Pumpkin Sweet. *Lyman's Pumpkin Sweet, Pound Sweet*	l.	r. obl.	y.	g.	K. M.	E. W.	Am.	..	*	*	..	*	*	..
254	Pyle's Winter. *Pyle's Red Winter*	l.	r. ob.	r. s.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
255	Ramsdell's Sweet	m.	ob.	y. r.	g.	K. M.	L. A.	.....	..	..	*	*	..	..	..
256	Rambo	m.	fl.	y. r.	v. g.	F. M.	L. A.	Am.	..	..	..	..	*	..	..
257	Rawle's Genet	l.	r. c.	y. r.	v. g.	F. M.	W.	.....	..	..	..	..	..	..	..
258	Red Astrachan	l.	r.	y. r.	g.	K. M.	S.	F.	**	**	**	**	**	**	**
259	Red Canada. *Old Nonsuch, Richfield Nonsuch, Steele's Red Winter*, of some	m.	r. ob.	y. r.	b.	F. M.	W.	.....	..	..	**	*	..	*	..
260	Red Cathead	l.	r. c.	y. r.	g.	F. M.	L. A.	Am.	..	..	..	..	..	..	..
261	Red Crab	s.	r.	r.	....	Cider	L. A.	Am.	..	..	..	..	..	..	..
262	Red June	....	.....	.....	.....	.....	.....	.....	..	..	..	..	..	..	..
263	Red Rance	m.	r. ob.	r. s.	v. g.	F. M.	E. W.	Am.	..	..	..	..	..	..	..
264	Red Winter Pearmain. *Buncombe*	m.	r. ob.	y. r.	g.	F. M.	W.	Am.	..	..	..	..	..	..	..
265	Red Stripe	m.	ob. c.	y. r.	g.	K. M.	S.	Am.	..	..	..	..	..	..	..
266	Rhode Island Greening	l.	r. ob.	g. y.	v. g.	F. M.	W.	Am.	*	*	**	**	**	**	**
267	Rhode's Orange	m.	r. ob.	y. r.	g.	F.	S.	Am.	..	..	..	..	..	..	..
268	Ribston. *Ribston Pippin*	m.	r.	y. r.	v. g.	F. M.	W.	Eng.	**	*	*	..	*	..	..
269	Richard's Graft	m.	r. ob.	r. s.	v. g.	F. M.	E. A.	Am.	..	..	..	..	..	..	..
270	Ridge Pippin	l.	r. c.	y. rus.	g.	M.	W.	Am.	..	..	..	..	..	..	..
271	Robinson. *Robinson's Superb*	l.	.....	.....	g.	F. M.	A.	Am.	..	..	..	..	..	..	..
272	Robertson's White	m.	r. ob.	g. y.	g.	F. M.	L. A.	Am.	..	..	..	..	..	..	..
273	Rock. *Rock Pippin, Lemon*	m.	c.	y.	....	M.	W.	Am.	..	..	..	..	..	..	..
274	Rockport Sweet	m.	r. ob.	g. y.	v. g.	F.	W.	Am.	..	..	..	..	..	*	..
275	Romanite, of the South	s.	r. c.	y. r.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
276	Roman Stem	m.	r.	y. rus.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
277	Rome Beauty	l.	r.	y. r.	g.	M.	L. A.	Am.	..	..	..	..	..	..	..
278	Roxbury Russet	m.	r. ob.	y. rus.	v. g.	F. M.	W.	Am.	*	..	*	**	*	**	**
279	Royal Janette	....	.....	.....	.....	.....	.....	.....	..	..	..	..	..	..	..
280	Saint Lawrence	l.	fl.	y. r.	v. g.	M.	A.	.....	**	*	..	*	*	*	*
281	Sarah	l.	fl.	r. s.	v. g.	F. M.	E. A.	Am.	..	..	*	..	..	..	..
282	Saxton. *Fall Stripe*	m.	r. ob.	y. r.	g.	F.	A.	Am.	..	..	..	..	..	..	..
283	Sheppard's Sweet	m.	r. c.	r. s.	g.	F.	L. A.	Am.	..	..	..	..	..	..	..
284	Sheriff	....	.....	.....	.....	.....	.....	.....	..	..	..	..	..	..	..
285	Shiawassee. *Shiawassee Beauty*	m.	fl.	r. y.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
286	Shockley	s.	r. c.	y. r.	g.	F. M.	W.	Am.	..	..	..	..	..	..	..
287	Simmon's Red. *Red Everlasting*	m.	ob.	y. r.	v. g.	.....	S.	Am.	..	..	..	..	..	..	..
288	Smith's Cider	l.	r. ob.	y. r.	g.	F. M.	W.	Am.	..	..	..	..	..	..	..
289	Smokehouse	l.	r. ob.	y. r.	g.	K. M.	W.	Am.	..	..	..	..	..	..	..
290	Somerset, of Maine	m.	fl.	r. s.	v. g.	F.	S.	Am.	..	..	*	..	..	..	..
291	Somerset, of New York	s.	r. c.	y. rus.	v. g.	F.	E. A.	Am.	..	..	..	..	..	..	..
292	Sops of Wine. *Hominy*	m.	r.	y. r.	g.	K. M.	E. A.	Eng.	..	*	**	*	..	*	*
293	Soulard	m.	r. ob.	y. r.	g.	M.	L. A.	.....	..	..	..	..	..	..	..
294	Southern Porter	m.	r. c.	y.	v. g.	F. M.	S.	Am.	..	..	..	..	..	..	..
295	Spice Russet	s.	fl. c.	y. rus.	v. g.	F.	W.	Am.	..	..	..	..	..	..	..
296	Spitzenburg. *Newtown Spitzenburg, Vandever of New York*	m.	r. ob.	y. r.	b.	F. M.	W.	Am.	†	..	..	..	..	..	..
297	Stansill	m.	r. ob.	g. y.	g.	F.	W.	Am.	..	..	..	..	..	..	..
298	Stark	l.	r. c.	y. r.	g.	F.	W.	Am.	*	..	..	..	..	..	..
299	Striped Anis	....	.....	.....	.....	.....	.....	Rus.	..	..	..	..	..	..	..
300	Stevenson's Winter	m.	r. ob.	y.	g.	F.	W.	Am.	..	..	..	..	..	..	..
301	Summer Bellefleur	m.	r. c.	y.	g.	F. M.	A.	Am.	..	..	..	..	..	..	..
302	Summer Hagloe	l.	r. ob.	r. s.	v. g.	K. M.	S.	Am.	..	..	..	..	..	..	..
303	Summer King	m.	fl.	y. r.	g.	F. M.	S.	Am.	..	..	..	..	..	..	..
304	Summer Queen	l.	r. c.	y. r.	g.	K. M.	S.	Am.	..	..	..	..	..	..	*
305	Summer Penrock	....	.....	.....	.....	.....	.....	.....	..	..	..	..	..	..	..
306	Summer Pound Royal	l.	r. c.	y. rus.	g.	M.	E. A.	Am.	..	..	..	..	..	..	..
307	Summer Pippin. *Champlain Nyack*	m.	ob. c.	y. r.	g.	K. M.	L. S.	Am.	..	..	..	*	*	..	..
308	Summer Rose	s.	r.	y. r.	b.	F.	S.	Am.	..	..	..	..	*	*	..
309	Summer Seek-no-further	m.	ob. c.	y.	v. g.	F. M.	S.	Am.	..	..	..	..	..	..	..

251 Valued chiefly for its keeping qualities.
261 Best of all for cider.
264 Extensively grown South and West.
270 A long keeper.
275 Entirely distinct from Gilpin or Shockley.


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.

Number.	NAMES.	DESCRIPTION.							I.—N. Div.—						
		Size.	Form.	Color.	Quality.	Use.	Season.	Origin.	Nova Scotia.	New Brunswick	Maine.	New Hampsh'e	Vermont.	Massachusetts.	Rhode Island.
310	Summer Sweet Paradise	l.	r.	g. y.	v. g.	F.	E. A.	Am.	..	..	†	..	..	..	..
311	Susan's Spice	m.	fl.	y. r.	g.	F.	A.	Am.	..	..	..	..	..	*	..
312	Sutton. *Sutton Beauty*	m.	r. ob.	r. s.	v. g.	F. M.	E. W.	Am.	..	..	..	..	..	*	†
313	Striped Sweet. *Striped Sweet Pippin*	l.	r. ob.	r. s.	v. g.	F. M.	E. W.	Am.	..	..	..	..	..	..	..
314	Swaar	l.	r. ob.	g. y.	b.	F. M.	W.	Am.	..	..	†	..	..	..	..
315	Sweet Belle et Bonne	m.	r. ob.	y. rus.	v. g.	F.	E. W.	Am.	..	..	..	..	..	..	..
316	Sweet Bough. *Large Yellow Bough*	l.	ob.	g. y.	v. g.	F. M.	S.	Am.	**	..	*	*	*	**	*
317	Sweet Pear	m.	r. c.	y.	v. g.	F.	A.	Am.	..	..	..	..	..	..	..
318	Sweet Winesap	m.	fl.	r. s.	v. g.	M.	W.	Am.	..	..	..	..	..	..	..
319	Switzer	....	....	....	....	....	....	Rus.	..	..	..	..	..	..	..
320	Taunton	l.	r. c.	y. r.	g.	F. M.	A.	Am.	..	..	..	..	..	..	..
321	Tetofsky	m.	fl. c.	y. r.	g.	K.	S.	Rus.	..	..	**	*	*	..	..
322	Tewksbury Winter. *Tewksbury Winter Blush*	s.	fl.	y. r.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
323	Tillaquah	m.	r. fl.	y. r.	g.	F. M.	W.	Am.	..	..	..	..	..	..	..
324	Tinmouth	m.	fl.	y. r.	v. g.	F.	W.	Am.	..	..	..	..	*	..	..
325	Talman Sweet	m.	r.	g. y.	v. g.	K. M.	W.	Am.	*	*	**	**	**	**	*
326	Tompkins King. *King of Tompkins County*	l.	r.	y. r.	v. g.	F. M.	W.	Am.	**	..	*	*	*	*	*
327	Townsend. *Hocking*	m.	r. ob.	r. s.	g.	M.	S.	Am.	..	..	..	..	..	..	..
328	Trenton Early	m.	r.	y.	g.	F.	S.	Am.	..	..	..	..	..	..	..
329	Twenty Ounce. *Cayuga Red Streak*	l.	r.	r. s.	v. g.	F. M.	L. A.	Am.	*	..	†	*	†	*	*
330	Utter	m.	r. ob.	r. s.	g.	F. K.	A.	Am.	..	..	..	..	..	..	..
331	Vandevere	m.	fl.	y. r.	g.	M.	W.	Am.	..	..	..	..	..	..	..
332	Victuals and Drink	l.	ob.	y. rus.	g.	F.	W.	.....	..	..	..	..	..	..	..
333	Virginia Greening	l.	fl.	g. y.	g.	M.	W.	Am.	..	..	..	..	..	..	..
334	Wagner	m.	r. ob.	y. r.	b.	F.	W.	Am.	*	..	*	*	*	*	*
335	Warfield	l.	fl.	y.	g.	F. M.	A.	Am.	..	..	..	..	..	..	..
336	Washington. *Washington Strawberry*	l.	r. c.	y. r.	v. g.	F. M.	E. A.	Am.	..	..	*	..	..	**	*
337	Washington Royal	m.	r. ob.	g. y.	g.	M.	W.	Am.	..	..	..	..	..	..	*
338	Water	m.	r. c.	y. r.	v. g.	F.	E. W.	Am.	..	..	..	..	..	..	..
339	Waugh's Crab	s.	r. c.	r. s.	g.	Cider.	W.	Am.	..	..	..	..	..	..	..
340	Wealthy	m.	r. ob.	r.	v. g.	F. M.	W.	Am.	*	**	..	..	**	..	..
341	Webb's Winter	m.	r.	y.	g.	F.	W.	Am.	..	..	..	..	..	..	..
342	Wellford's Yellow	s.	r. ob.	g. y.	g.	M.	W.	Am.	..	..	..	..	..	..	..
343	Western Beauty *Grosh, Summer Rambo, Etc.*	l.	r. ob.	r. s.	v. g.	K. M.	S.	Am.	..	..	..	..	..	..	..
344	Westfield Seek-no-further	l.	r. c.	y. r.	b.	F. M.	W.	Am.	*	..	..	..	*	*	*
345	White Doctor	l.	r. ob.	g. y.	g.	K. M.	E. A.	Am.	..	..	..	..	..	..	..
346	White June	....	....	....	....	....	....	....	..	..	..	..	..	..	..
347	White Juneating. *May, Early May, Etc*	s.	r.	g. y.	g.	F. M.	S.	F.	..	..	..	..	..	..	..
348	White Astrachan	....	....	....	....	....	....	....	..	..	..	..	..	..	..
349	White Paradise. *Lady Finger*	m.	r. fl.	y. r.	g.	M.	W.	Am.	..	..	..	..	..	..	..
350	White Pippin	l.	r. ob.	g. y.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
351	White Winter Pearmain	m.	r. c.	y. r.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	..
352	White Rambo	m.	r. ob.	g. y.	g.	M.	L. A.	Am.	..	..	..	..	..	..	..
353	Williams. *Williams' Favorite*	m.	r. c.	y. r.	g.	M.	S.	Am.	*	..	**	**	**	**	**
354	Willis Sweet	l.	r.	y. r.	v. g.	K. M.	S.	Am.	..	..	..	..	..	..	..
355	Willow Twig. *James River*	m.	r. c.	y. r.	g.	K. M.	W.	Am.	..	..	..	..	..	..	..
356	Wine. *Hay's Wine, Pennsylvania Red Streak*	l.	r.	y. r.	v. g.	F. M.	W.	Am.	..	..	..	..	..	..	*
357	Winesap	m.	r.	y. r.	v. g.	F. M.	W.	Am.	..	..	..	..	..	*	..
358	Winter Sweet Paradise	l.	r. ob.	g. y.	v. g.	F.	W.	Am.	..	..	..	..	..	..	..
359	Wolf River	l.	r. ob.	r.	g.	F. M.	W.	Am.	..	..	..	..	..	..	..
360	Woodmansee	....	....	....	....	....	....	....	..	..	..	..	..	..	..
361	Wythe	m.	fl.	r. s.	v. g.	F.	W.	Am.	..	..	..	..	..	..	..
362	Yates	s.	fl.	y. r.	g.	F. M	W.	Am.	..	..	..	..	..	..	..
363	Yellow Bellefleur	l.	ob.	g. y.	v. g.	F. M.	W.	Am.	**	..	*	*	*	*	*
364	Yellow June *Nantahalee*	m.	r. ob.	y.	g.	F.	S.	Am.	..	..	..	..	..	..	..
365	Yellow Sweet June	....	....	....	....	....	....	....	..	..	..	..	..	..	..
366	Yellow Transparent	m.	r. ob.	y.	g.	.....	E. S.	Rus.	..	..	..	..	*	..	..
367	York Imperial	l.	fl.	y. r.	g.	F. M.	W.	Am.	..	..	..	..	..	..	..
368	Yopp. *Yopp's Favorite*	l.	r. c.	y.	g.	F.	A.	Am.	..	..	..	..	..	..	..
369	Zachary. *Zachary Pippin*	l.	fl.	r. s.	v. g.	F. M.	E. W.	Am.	..	..	*	..	..	..	..

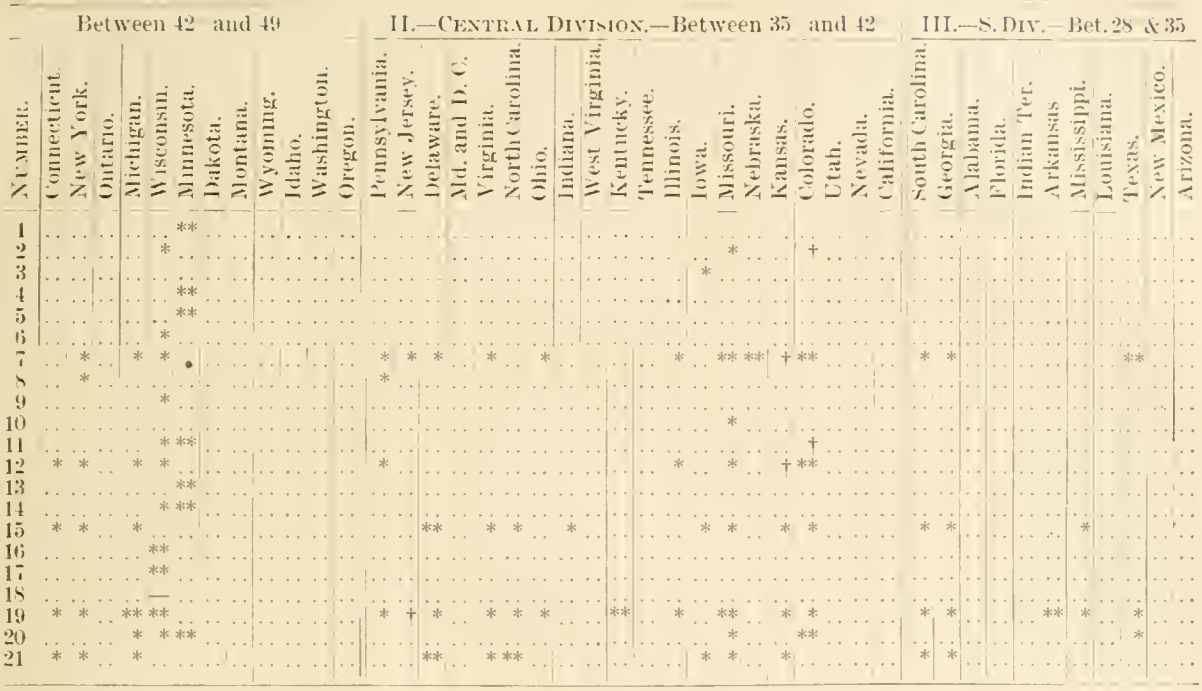
355 Valuable for late keeping.


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.

II.—APPLES—CRABS.

Number.	NAMES.	DESCRIPTION.							I.—N. Div.—					
		Size.	Form.	Color.	Quality.	Use.	Season.	Origin.	Nova Scotia.	New Brunswick	Maine.	New Hampsh'e	Vermont.	Massachusetts.	Rhode Island.
1	Beecher Sweet	m.	r.	r.	v. g.	F. M.	E. A.	Am.							
2	Briar Sweet (of Wisconsin)	l.	.....	r. y.	v. g.	F. M.	A.	Am.							
3	Cherry	s.	r.	y. r.	g.	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's Early	.....	.....	.....	.....	.....	.....	Am.							
7	Hyslop	l.	r.	r.	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.	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.	g.	F. M.	A.	Am.	*		*				
13	Orange	m.	r.	o.	g.	F. M.	L. A.	Am.							
14	Orion	l.	ob.	r. s.	g.	F. M.	L. A.	Eng.							
15	Red Siberian	m.	r.	r.	g.	F. M.	A.	F.					*		*
16	Spitzenburg	.....	.....	.....	.....	.....	.....	Am.							
17	Sweet Russet	l.	r. c.	y. rus.	b.	F.	E. A.	Am.							
18	Sylvan Sweet	l.	r. fl.	y. r.	g.	F. M.	A.	Am.				*			
19	Transcendent	l.	r. ob.	y. r.	g.	F. M.	A.	Am.	*	**	**				*
20	Whitney	l.	r. fl.	r.	v. g.	M.	S.	Am.							
21	Yellow Siberian	m.	r.	y.	g.	F. M.	A.	F.							

II.—APPLES—CRABS.



III.—APRICOTS.

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 dessert, 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 Hampsh're	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.	Am.							
3	Hemskirk	l.	r. f.	o. r.	b.	F. M.	M.	F.							
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.	F. 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. Ambroise	l.	r. f.	y. o.	b.	F.	M.	F.							
13	Turkey	m.	r.	y. o.	v. g.	F. M.	L.	F.							

IV.—BLACKBERRIES.

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 Hampsh're	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. *Brunton's Early*	m.	.....	b.	g.	F. M.	V. E.	Am.							
5	Dorchester	m.	ob. c.	b.	b.	M.	M.	Am.	*		*		*	**	*
6	Early Harvest	m.	ov.	b.	g.	F. M.	V. E.	Am.							
7	Erie														
8	Kittatinny	l.	r. c.	b.	b.	F. M.	M.	Am.	*		*		*	*	*
9	Lawton. *New Rochelle*	l.	ov.	b.	g.	M.	L.	Am.			*		*	*	*
10	Lucretia													*	
11	Minnewaska														
12	Sable Queen												*		
13	Snyder	m.	r. ov.	b.	v. g.	F. M.	E.	Am.					*	*	
14	Stone's Hardy	l.	ob.	b.	g.	F.	.....	Am.							
15	Taylor. *Taylor's Prolific*	l.	.....	b.	g.	F. M.	.....	Am.					*	*	
16	Wachusett	m.	ob. ov.	b.	v. g.	F. M.	M.	Am.						*	†
17	Western Triumph	m.	.....	b.	g.	F. M.	.....	Am.					*		
18	Wilson's Early	l.	ob. ov.	b.	v. g.	M.	E.	Am.	*		*			*	*
19	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.

III.—APRICOTS.

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 dessert, 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.

	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.
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2		*		*									*	*				*				**	*	*		*	*	*										*	*				
3		*											*			*		*	*					*		*	*																
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IV.—BLACKBERRIES.

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.

	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.
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2		*		*	**	**																							**									*					
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8	*	**	*	*							*		*	**	**	*	*		*	*		*	*	*	**	*	*	**		*		**		*				**	*		**		
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10																			*						*											**							
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14				*	*	*																							†														
15	*	*		*										*					†							**		*															
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18		*		*									*	*	**	*	*		*	*		**	*	*	*	*	*	*	**	*		**						*	*	*			
19				*											*													†															

V.—CHERRIES.

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. CLASS—H., Hearts, or tender fleshed sweet cherries; B., Bigarreau, or firm fleshed cherries; D., Dukes, having a character in tree and fruit midway between the Hearts and Morellos; M., Morellos, having acid fruit and the tree of small, slender growth. 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.	CLASS.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts.	Rhode Island.
1	Arch Duke	l.	ob. h.	d. r.	D.	K. M.	L.	F.					*		*
2	Belle Magnifique	l.	r. h.	l. r.	D.	K. M.	L.	F.			*		*		
3	Belle de Choisy	m.	r.	a. m.	D.	F.	M.	F.	*		*		*		
4	Belle d'Orleans	m.	r. h.	y. r.	H.	F. M.	E.	F.						*	*
5	Bigarreau. *Graffion, Yellow Spanish*	l.	ob. h.	y. r.	B.	F. M.	M.	F.	**				*	*	
6	Black Eagle	l.	ob. h.	d. r.	B.	F. M.	M.	F.					*	**	*
7	Black Heart	l.	r. h.	d. r.	H.	F. M.	M.	F.	*		*		*	*	*
8	Black Tartarian	l.	r. h.	d. r.	H.	F. M.	M.	F.	*		*		*	**	*
9	Buttner's Yellow	m.	r.	y.	G.	F. M.	L.	F.					*		
10	Carnation	m.	r.	a. m.	D.	K. M.	L.	F.							
11	Coe's Transparent	m.	r.	a. m.	H.	F.	M.	Am.			*			**	*
12	Donna Maria	m.	r.	d. r.	M.	K. M.	L.	F.							
13	Downer's Late	m.	r. h.	y. r.	H.	F. M.	L.	Am.	*					**	*
14	Early Purple, *Early Purple Guigne*	m.	r. h.	d. r.	H.	F. M.	E	F.	*		*		*	*	*
15	Early Richmond	s.	r.	l. r.	M.	K. M.	E.	F.	*		*		**	*	*
16	Elton	l.	r. h.	y. r.	B.	F. M.	M.	F.			*		*	*	*
17	Eugenie. *Empress Eugenie*	m.	r. ob. h.	d. r.	D.	F. M.	M.	F.							
18	Florence	l.	h.	y. r.	B.	K. M.	L.	F.							
19	Governor Wood	l.	r. h.	y. r.	H.	F. M.	M.	Am.	*				*	*	*
20	Hovey	l.	r. h.	y. r.	B.	F. M.	M.	Am.						*	
21	Knight's Early. *Knight's Early Black*	l.	ob. h.	d. r.	H.	F. M.	E.	F.						*	
22	Late Duke	l.	ob. h.	d. r.	D.	K. M.	L.				*		**	*	
23	Late Kentish	m.	r.	r.	G.	K.	M.	F.					*		
24	Louis Phillippe	l.	r.	d. r.	D.	K. M.	L.	F.			*				
25	Luelling. *Black Republican*	l.	r. h.	b.	G.	F. M		Am.							
26	Mezel. *Bigarreau of Mezel, Monstreuse Mezel, Bigarreau Gaubalis*	l.	ob. h.	d. r.	B.	F. M.	M.	F.						*	
27	May Duke	l.	r. ob. h.	d. r.	D.	K. M.	E.	F.	*		*		**	*	*
28	Montmorency Large	l.	r.	d. r.	M.	K. M.	M.	F.							
29	Morello. *English Morello, Large Morello*	l.	r. h.	d. r.	M.	K. M.	L.	F.	*		*		**		
30	Napoleon. *Royal Ann* (in Cal. and Oregon)	l.	r. ob. h.	y. r.	B.	F. M.	M.	F.			*		*		*
31	Osceola	l.	r. h.	d. r.	H.	F. M.	M.	Am.						†	
32	Ohio. *Ohio Beauty*	l.	ob. h.	y. r.	H.	F. M.	M.	Am.						†	
33	Olivet	l.	r.	r.	D.	F.	M.	F.							
34	Plumstone Morello	l.	r.	d. r.	M.	K. M	L.	F.							
35	Pontiac	l.	ob. h.	d. r.	H.	F. M.	M.	Am.						†	
36	Red Jacket	l.	ob. h.	y. r.	H.	F. M.	L.	Am.						**	
37	Reine Hortense	l.	r.	l. r.	D.	F. M.	L.	F.			*		*	*	*
38	Rockport	l.	r. ob. h.	a. m.	B.	F. M.	E.	Am.						*	*
39	Royal Duke	l.	r.	d. r.	D.	K. M.	M.	F.							
40	Tecumseh	m.	ob. h.	d. r.	H.	M.	L.	Am.							
41	Windsor	l.	r. h.	d. r.	B.	M.	L.	Am.						*	

7 A fine old variety, but by many supposed to be superseded.

12 Very hardy and productive.

15 Believed by many to be identical with Early May of the West; not fully settled.

V.—CHERRIES.

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. CLASS—H., Hearts, or tender fleshed sweet cherries; B., Bigarreau, or firm fleshed cherries; D., Dukes, having a character in tree and fruit midway between the Hearts and Morellos; M., Morellos, having acid fruit and the tree of small, slender growth. 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.	Between 42° and 49													II.—CENTRAL DIVISION.—Between 35° and 42°																		III.—S. DIV.—Bet. 28 & 35°									
	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.
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40		*																	*																						
41	†	*																																							

24 An old excellent sort; little known.

36 The latest ripening large sweet cherry.

VI.—CURRANTS.

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., moderately 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. *Fertile d' Angers*	l.	l.	r.	m. a.	F. M.	M.	F.					*		*
2	Black Naples	l.	s.	b.	m. a.	K. M.	M.	F.	*		*		*	*	*
3	Cherry	l.	s.	r.	v. a.	M.	M.	F.	*		*	**	*	**	*
4	Common Black. *Black English*	s.	s.	b.	m. a.	K. M.	M.	F.							
5	Fay. *Fay's Prolific*	l.	l.	r.	m. a.	F. M.	M.	Am.						†	†
6	Knight's Red. *Knight's Large Red*	l.	m.	r.	m. a.	F.	M.	F.					*		
7	Lee. *Lee's Prolific*	l.	l.	b.	m. a.	K. M.	M.	F.						*	
8	Pallnau. *Fertile d' Palluau*	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. *La Versaillaise*	l.	s.	r.	a.	M.	M.	F.	*		**	**	*	**	*
13	Victoria. *Raby Castle*	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.	*		*		*		*

VII.—GOOSEBERRIES.

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. b.	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	Mountain	l.	o.	r.	g.	M.	M.	Am.				*	*		
5	Orange	m.	r.	y.	g.	K. M.	E.	Am.							
6	Pale Red. *Cluster, American Seedling*	m.	r. o.	r.	v. g.	K. M.	E.	Am.							
7	Roaring Lion	l.	o. b.	r.	v. g.	K. M.	M.	F.	*				*		
8	Smith. *Smith's Improved*	l.	o.	g.	v. g.	K. M.	M.	Am.			*		*	**	*
9	Whitesmith	l.	o.	g.	v. g.	K. M.	M.	F.	*						

2 A little liable to sunburn or blister.

4 A strong growing bush—berry with a very thick skin.

6 An old sort, entirely free from mildew—more upright than Houghton.

VI.—CURRANTS.

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., moderately 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.

	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.
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VII.—GOOSEBERRIES.

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.

	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.
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8 New and promising.

9 One of the best of all the foreign large sorts in its immunity from mildew.

VIII.—GRAPES, NATIVE.

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.	New Brunswick	Maine.	New Hampsh'e	Vermont.	Massachusetts.	Rhode Island.
1	Agawam, *Rogers' No. 15*	l.	s. r. e.	r.	g.	T. M.	M.	Hyb.	*	..	**	*	*	..	*
2	Barry, *Rogers' No. 43*	l.	r.	b.	g.	T. M.	M.	Hyb.	..	..	..	..	..	**	*
3	Berckmans	....	....	....	....	....	....	....	..	..	..	..	..	..	..
4	Brighton	l.	r.	d. p.	v. g.	T.	E.	Hyb.	..	..	..	†	*	*	*
5	Catawba	l.	m. r. o.	r.	b.	T. M. W.	L.	Lab.	..	..	..	..	..	..	..
6	Champion. *Tallman's Seedling*	l.	r.	b.	....	M.	E.	Lab.	*	..	..	†	..	..	..
7	Clinton	s.	m. r.	b.	g.	T. W.	L.	Rip.	*	..	..	..	*	..	..
8	Concord	l.	l. r.	b.	g.	T. M. W.	M.	Lab.	*	..	*	**	*	**	*
9	Cottage	l.	r.	b.	g.	T. M.	E.	Lab.	..	..	..	..	*	*	..
10	Creveling	m.	m. r. o.	b.	v. g	T.	E.	Lab.	..	..	*	*	*	*	*
11	Cynthiana	s.	r.	b.	v. g.	W.	M.	Æst.	..	..	..	..	..	..	..
12	Delaware	s.	s. r.	r.	b.	T. M. W.	M.	? x.	*	..	**	**	**	**	*
13	Diana	m.	s. r. o.	r.	v. g.	T. M.	L.	Lab.	*	..	*	..	*	*	*
14	Dracut Amber	l.	r.	r.	g.	M.	V. E.	Lab.	..	..	..	..	..	..	..
15	Duchess	m.	m. r.	w.	v. g.	T.	M.	Hyb.	..	..	..	..	..	†	..
16	Early Victor	m.	m. r.	b.	v. g.	T. M.	V. E.	Lab.	..	..	..	..	..	..	†
17	Elsinburg	s.	m. r.	b.	v. g.	T.	E.	Æst.	..	..	..	..	..	..	..
18	Elvira	s.	r.	w.	v. g.	W.	L.	Rip. x.	..	..	..	..	..	..	..
19	Empire State	....	....	....	....	....	....	....	..	..	..	..	..	..	..
20	Essex, *Rogers' No. 41*	l.	r.	b.	g.	T. M.	M.	Hyb.	..	..	..	..	..	..	..
21	Eumelan	m.	r.	b.	v. g.	T.	M.	Lab.	..	..	†	†	*	..	†
22	Flowers	....	....	....	....	....	....	....	..	..	..	..	..	..	..
23	Goethe, *Rogers' No. 1*	l.	l. r. o.	g.	v. g.	T. W.	L.	Hyb.	..	..	..	..	..	..	..
24	Hartford. *Hartford Prolific*	l.	m. r. o.	b.	g.	M.	E.	Lab.	*	..	*	**	**	*	**
25	Hayes	....	....	....	....	....	....	....	..	..	..	..	..	..	..
26	Herbemont. *Warren, Etc*	s.	m. r.	b.	v. g.	T. W.	L.	Æst.	..	..	..	..	..	..	..
27	Herbert, *Rogers' No. 44*	l.	l. r.	b.	v. g.	T. M.	M.	Hyb.	..	..	..	..	..	*	†
28	Iona	m.	m. r. o.	r.	b.	T. M. W.	L.	Lab.	..	..	†	..	..	..	*
29	Isabella	l.	m. r. o.	b.	g.	T. M.	L.	Lab.	*	..	..	..	*	..	*
30	Ives	m.	m. r. o.	b.	g.	M. W.	M.	Lab.	..	..	..	**	..	..	..
31	Janesville	m.	r.	b.	g.	T. M.	V. E.	Lab.	..	..	..	..	..	..	..
32	Jefferson	m.	m. r.	r.	v. g.	T. M.	M.	Hyb.	..	..	..	..	..	..	†
33	Lady	l.	r.	w.	g.	T. M.	E.	Lab.	..	..	..	†	*	..	*
34	Lady Washington	l.	l. r. o.	w.	b.	T. M.	M.	Hyb.	..	..	..	..	..	..	..
35	Lenoir	....	....	....	....	....	....	....	..	..	..	..	..	..	..
36	Lindley, *Rogers' No. 9*	m.	m. r. o.	r.	g.	T. M.	M.	Hyb.	..	..	*	..	*	*	*
37	Madeira	....	....	....	....	....	....	....	..	..	..	..	..	..	..
38	Massasoit, *Rogers' No. 3*	l.	m. r.	r.	g.	T. M.	M.	Hyb.	..	..	..	..	..	*	*
39	Martha	l.	s. r.	g.	g.	M. W.	M.	Lab.	..	..	..	*	..	*	†
40	Maxatawney	m.	m. r. o.	g.	v. g.	T.	M.	Lab.	..	..	..	..	..	..	..
41	Merrimac, *Rogers' No. 19*	l.	s. r.	b.	g.	M.	M.	Hyb.	..	..	**	*	..	*	..
42	Missouri Reisling	....	....	....	....	....	....	....	..	..	..	..	..	..	..
43	Moore's Early	l.	r.	b.	g.	T. M.	V. E	Lab.	..	..	..	†	*	**	*
44	Niagara	l.	r.	w.	g.	T. M.	M.	Lab.	..	..	..	..	..	..	†
45	Noah	s.	r.	w.	g.	W.	L.	Rip. x.	..	..	..	..	..	..	..
46	Norton's Virginia	s.	m. r.	b.	g.	W.	L.	Æst.	..	..	..	..	..	†	..
47	Perkins	l.	r.	r.	g.	T. M.	E.	Lab.	..	..	..	*	..	..	..
48	Peter Wylie	m.	r.	w.	v. g.	T.	.....	Hyb.	..	..	..	..	..	..	..
49	Pocklington	l.	l. r.	w.	g.	T. M.	M.	Lab.	..	..	..	..	†	..	*
50	Prentiss	m.	m. r.	w.	v. g.	T. M.	M.	Lab.	..	..	..	..	†	..	..
51	Rebecca	m.	s. r.	g.	v. g.	T.	M.	Lab.	..	..	*	*	..	*	*
52	Salem, *Rogers' No. 52*	l.	r.	b.	g.	M.	M.	Hyb.	*	..	**	*	*	..	*
53	Scuppernong	l.	r.	r.	g.	W.	M.	Vulp.	..	..	..	..	..	..	..
54	Telegraph. *Christine*	l.	m. r. o.	b.	v. g.	T. M.	E.	Lab.	..	..	*	*	*	..	..
55	Tenderpulp	....	....	....	....	....	....	....	..	..	..	..	..	..	..
56	Thomas	....	....	....	....	....	....	....	..	..	..	..	..	..	..
57	Triumph	v. l.	l. r.	g.	v. g.	T.	L.	Hyb.	..	..	..	..	..	..	..
58	Ulster	....	....	....	....	....	....	....	..	..	..	..	..	..	..
59	Vergennes	s.	l. r.	p.	v. g.	T. M.	E.	Lab.	..	..	..	..	†	..	*
60	Walter	m.	s. r.	r.	b.	T. M. W.	M.	Lab.	..	..	†	..	..	..	†
61	Wilder, *Rogers' No. 4*	l.	l. r.	b.	v. g.	T. M.	M.	Hyb.	..	..	**	*	..	**	*
62	Worden	l.	r.	b.	g.	T. M.	E.	Lab.	..	..	..	*	*	**	*
63	Woodruff Red	....	....	....	....	....	....	....	..	..	..	..	..	..	..
64	Wyoming Red	....	....	....	....	....	....	....	..	..	..	..	..	..	..

5 Suited only to clayey loams and certain localities.

6 Valued for earliness and hardiness but of a very poor quality.

7 Hardy everywhere.

VIII.—GRAPES, NATIVE.

This list contains such grapes only as are of American origin; they are either cultivated varieties of one of the following American species of native wild grapes; *Vitis riparia*, *Vitis æstivalis*, *Vitis Labrusca*, *Vitis vulpina*, or crosses between varieties of these species, or hybrids between these and the *Vitis vinifera* (foreign grapes). In the column for origin the species to which each variety belongs is designated as follows: Lab., *Labrusca;* Est., *æstivalis;* Rip., *Riparia;* Vulp., *Vulpina*. An x after one of the species denotes a cross with a variety of some other species. Hyb., hybrid, between a foreign variety and one of the native species.

	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.
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12 Wants rich soil and high culture.
28 Unreliable except in a few locations.
33 Valuable for earliness and hardiness.
36 One of the most valuable of this class.
62 Very like Concord, but earlier and better.

IX.—GRAPES, FOREIGN.

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. *Prince Albert, Brizola*	Black	Sweet	Very late	Hot
2	Black Champion	Black	Sweet	Early	Cold
3	Black Damascus	Black	Sweet	Late	Cold
4	Black Frontignan	Black	Muscat	Late	Cold
5	Black Hamburg	Black	Sweet	Medium	Cold
6	Black Prince	Black	Sweet	Medium	Cold
7	Black July	Black	Sweet	Early	Cold
8	Bowood Muscat	White	Muscat	Medium	Hot
9	Buckland Sweetwater	White	Sweet	Medium	Cold
10	Calabrian *Calabrian Raisin, Raisin de Calabre*	White	Sweet	Late	Hot
11	Canon Hall Muscat	White	Muscat	Late	Hot
12	Chasselas Musque, or Joslin's St. Albans. *Muscat blanc hative(?)*	White	Muscat	Early	Hot
13	Duke of Magenta	Black	Sweet	Early	Hot
14	Golden Hamburg. *Stockwood G. Hamburg*	White	Sweet	Late	Hot
15	Golden Champion	Amber	Sweet	Medium	Hot
16	Grizzly Frontignan. *Red Frontignan, Red Constantia*	Red and Yel.	Muscat	Medium	Hot
17	Gros Colman	Purple	Sweet	Late	Cold
18	Lady Downes. Lady Downes' Seedling	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. *Mrs. Pince's Black Muscat*	Black	Muscat	Late	Hot
22	Queen of Nice	White			
23	Red Chasselas. *Rose Chasselas*	Red	Sweet	Medium	Hot
24	Red Lombardy	Red	Sweet	Medium	Hot
25	Rio Virgin				
26	Royal Muscadine	White	Sweet	Early	Cold
27	Silver Frontignan. *Early Silver Frontignan*	White	Muscat	Early	Hot
28	White Nice	White	Sweet	Late	Hot
29	West St. Peter's	Black	Sweet	Very late	Hot
30	Wilmot's Hamburg. *Dutch Hamburg, Wilmot's Black Hamburg*	Black	Sweet	Medium	Hot
31	White Sweetwater. *Dutch Sweetwater, etc*	White	Sweet	Early	Cold
32	White Frontignan. *White Contantia, Muscat blanc*	White	Muscat	Medium	Hot
33	Zinfindal	Black	Sweet	Medium	Hot

XI.—NECTARINES.

Explanation same as for Apricots.

NUMBER.	NAMES.	DESCRIPTION. SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	I.—N. DIV.— Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts.	Rhode Island.
1	Boston	l.	r. o.	o. r.	v. g.	F.	M.	Am.							
2	Downton	l.	r. o.	o. r.	v. g.	F.	E.	F.							
3	Early Newington	l.	r. o.	o. r.	v. g.	F.	E.	Am.							
4	Early Violet	l.	r.	o. r.	b.	F.	E.	F.							•
5	Elruge	m.	r. o.	o. r.	v. g.	F.	L.	F.							
6	Stanwick	l.	r. o.	o. r.	g.	F.	L.	F.							•

X.—MULBERRIES, FIGS, POMEGRANATES.

The following list of mulberries, figs, and pomegranates was prepared by Mr. P. J. BERCKMANS, of Georgia. In California and many sections of the Southern States, the figs and pomegranates are grown as readily as the apple in the Middle States.

No.	NAMES.	SEASON.	COLOR.	QUALITY.	SIZE.
	MULBERRIES.				
1	Hick's Everbearing	Early and Late	Black	Second	
2	Downing	Early	Black	First	
3	Persian Black	Late	Black	First	
4	Johnson	Medium	Black	First	
	FIGS.				
1	Alicante	Medium	Brown	First	Medium
2	Angelique. *Janne Hative*	Early	Yellow	Second	Small
3	Brunswick. *Madonna, Constantinople*	Early	Violet	First	Very Large
4	Blue Genoa	Early	Blue	First	Medium
5	Black Ischia	Medium	Black	First	Medium
6	Brown Smyrna	Medium	Brown	First	Medium
7	Celestial	Early	Pale Violet	First	Small
8	Green Ischia. *White Ischia. Green Italian.*	Early	Green	First	Medium
9	Lemon	Early	Yellow	First	Medium
10	Violet, long	Medium	Violet	First	Large
11	Violet, round	Medium	Violet	Second	Medium
12	Nerii	Late	White	First	Small
13	Pregussata	Medium	Purple	First	Small
14	White Adriatic				
15	White Marseilles	Medium	White	Second	Medium
16	White Genoa	Medium	White	Second	Large
17	Superfine de la Sausaye	Late	Brown	First	Medium
18	Turkey. *Brown Turkey*	Early to Late	Brown	First	Large
	POMEGRANATES.				
1	Sweet	Early	Reddish	First	Large
2	Acid	Early	Deep Red	Third	Very Large
3	Violet	Late	Violet	First	Very Large
4	Dwarf	Late	Red	Second	Small

MULBERRIES—No. 1 bears three months. No. 2 Best. No. 3 Very tart.

XI.—NECTARINES.

Explanation same as for Apricots.

	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.
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XII.—ORANGES AND LEMONS.

THE FOLLOWING LIST WAS PREPARED BY MR. E. H. HART, OF FLORIDA.

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.

NUMBER.	NAMES.	DESCRIPTION.					I—N. DIV. Bet. 42 and 49°	II. CENT. DIV. Bet. 35 and 40°	III.—SOUTH DIV. Between 28 and 35												
		SIZE.	FORM.	QUALITY.	SEASON.	ORIGIN.			California.	South Carolina.	Georgia.	Alabama.	Florida.	Indian Ter.	Arkansas.	Mississippi.	Louisiana.	Texas.	New Mexico.	Arizona.
1	Acapulo	l.	r.	g.	M.	F.			*				*			*	*			
2	Acis	l.	r.	g. g.	L.	F.			*				*			*	*			
3	Bell	l.	ov.	g.	M.	F.			*				*			*	*			
4	Botelha	m.	r.	g.	M.	F.			*				*			*	*			
5	Brown	....	....	....	....	F.			*				*			*	*			
6	Buttercourt	....	....	....	....	F.			*				*			*	*			
7	Charley Brown	l.	fl.	g.	M.	F.			*				*			*	*			
8	Cleopatra	....	....	....	....	....			*				*			*	*			
9	Dancy's Tangerine	s.	fl.	g.	L.	N.			*				*			*	*			
10	Dulcissima	s.	r.	v. g.	E.	F.			*				*			*	*			
11	Du Roi	m.	r.	g.	M.	F.			*				*			*	*			
12	Egg	m.	ov.	g.	E.	F.			*				*			*	*			
13	Excelsior	m.	r.	v. g.	L.	F.			*				*			*	*			
14	Exquisite	m.	r.	v. g.	M.	F.			*				*			*	*			
15	Hart's Late *Tardiff*	m.	ov.	v. g.	L.	F.			*				*			*	*			
16	Homosassa	m.	r.	b.	M.	N.			*				*			*	*			
17	Jaffa	m.	r.	v. g.	M.	F.			*				*			*	*			
18	Kumquat	....	obl. r.	....	....	N.							*			*	*			
19	Long	....	....	....	....	F.			*				*			*	*			
20	Magnum Bonum	l.	r.	b.	M.	N.			*				*			*	*			
21	Majorca	m.	r.	v. g.	M.	F.			*				*			*	*			
22	Maltese Blood	s.	ov.	v. g.	M.	F.			*				*			*	*			
23	Maltese Oval	l.	obl.	v. g.	L.	F.			*				*			*	*			
24	Mediterran'n Sweet	l.	ov.	v. g.	L.	F.			*				*			*	*			
25	Nonpariel	l.	r.	b.	E	N.			*				*			*	*			
26	Old Vini	m.	r.	v. g.	M.	N.			*				*			*	*			
27	Paper Rind. *St. Michael*	....	....	....	....	F.		•	*				*			*	*			
28	Pomelo *Grape Fruit*	....	....	....	....	....							*			*	*			
29	Prata	s.	r.	g.	M.	F.			*				*			*	*			
30	Queen	....	....	....	....	F.			*				*			*	*			
31	St. Michaels	m.	r.	g.	M.	F.			*				*			*	*			
32	St. Michaels	s.	fl.	g.	E.	F.			*				*			*	*			
33	St. Michael's Egg	l.	ov.	f.	E.	F.			*				*			*	*			
34	Satsuma	m.	fl.	v. g.	E.	F.			*				*			*	*			
35	Shaddock Blood	....	....	....	....	....							*			*	*			
36	Shaddock Orange	....	....	....	....	....							*			*	*			
37	Sustain	l.	r.	g.	M.	F.			*				*			*	*			
38	Sweet Seville	s.	ov.	v. g.	E.	F.			*				*			*	*			
39	Tahiti	l.	r.	g.	M.	F.			*				*			*	*			
40	White	l.	....	g.	....	F.			*				*			*	*			
	LEMONS.																			
41	Bijou	....	....	....	....	F.							*			*	*			
42	Eureka	....	....	....	....	F.							*			*	*			
43	Everbearing	....	....	....	....	F.							*			*	*			
44	French	....	....	....	....	N.							*			*	*			
45	Genoa	....	....	....	....	F.							*			*	*			
46	Imperial	....	....	....	....	F.							*			*	*			
47	Lamb	....	....	....	....	N.							*			*	*			
48	Sicily	....	....	....	....	F.							*			*	*			
49	Villa Francha	....	....	....	....	F.							*			*	*			
50	Willow Leaved	....	....	....	....	F.							*			*	*			

The following are native varieties of the orange resembling each other, of good quality, and having a local reputation: Arcadia, Beache's 3, Dixon, Dummitt, Higgins, Osceola, Parson Brown, Peerless, Spratt's Harmon. Nos. 8, 9, 32 and 34 are varieties of Citrus nobilis or Mandarin orange.

XII CONTINUED.—LIMES AND CITRONS.

THE FOLLOWING LIST WAS PREPARED BY MR. E. H. HART, OF FLORIDA.

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.

NUMBER.	NAMES.	DESCRIPTION.					I.—N. DIV.—Bet. 42 and 49°	II.—CENT. DIV. Bet. 35 and 40°	III.—SOUTH DIV. Between 28 and 35									
		SIZE.	FORM.	QUALITY.	SEASON.	ORIGIN.			California.	South Carolina.	Georgia.	Alabama.	Florida.	Indian Ter.	Arkansas.	Mississippi.	Louisiana.	Texas.	New Mexico.	Arizona.
	LIMES.																			
51	Dulcis												*			*	*			
52	Mexican												*			*	*			
53	Persian												*			*	*			
	CITRONS.																			
54	Medica (Lemon or Citron of Commerce)												*			*	*			
55	Tuberosa (Orange Citron)												*			*	*			

XIII.—PEACHES.

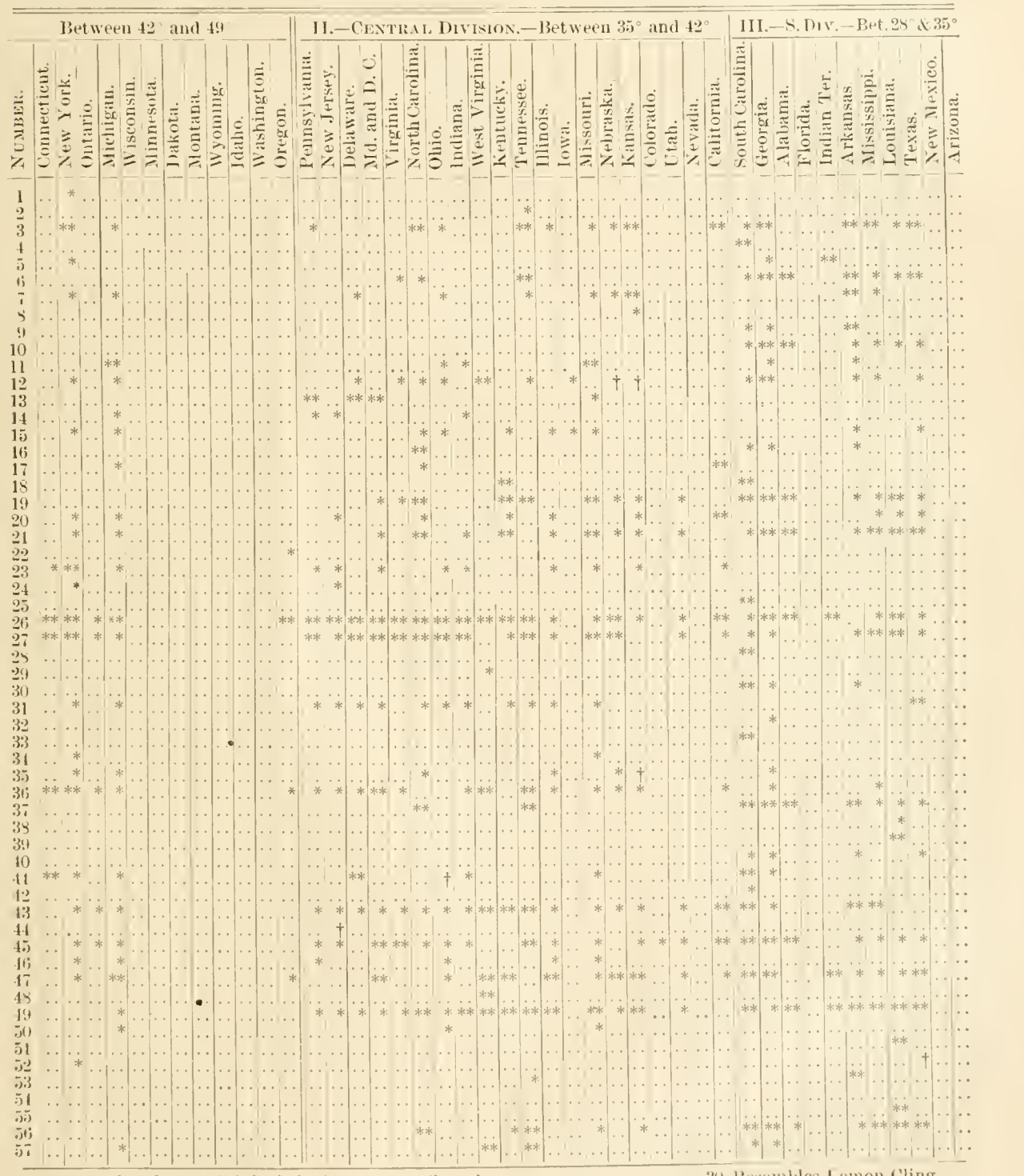
The columns explain: SIZE—l., large; m., medium; s., small. CLASS—F., freestone; C., clingstone. COLOR—relative to the flesh, w., white or pale color; y., yellow or yellowish; g., greenish white; red at stone. QUALITY—j. v., juicy, vinous; m. j. r., melting, juicy, rich; s. j., sweet, juicy; s. j. h., 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 lat. 43 previous to or about Sept 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.

NUMBER.	NAMES.	DESCRIPTION.							I.—N. DIV.—						
		SIZE.	CLASS.	COLOR.	QUALITY.	GLANDS.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampsh're	Vermont.	Massachusetts.	Rhode Island.
1	Albert. *Early Albert*	m.	F.	w.	m. j. r.	r.	E.	F.							
2	Allen's October						L.	Am.							
3	Alexander	m.	F.	w.	s. j.	g.	V. E.	Am.						*	†
4	Alexander Cling														
5	Alexander Noblesse	l.	F.	w.	m. j. v.	g.	M.	F.							
6	Amelia	l.	F.	w.	m. j. r.	r.	E.	Am.							
7	Amsden. *Amsden's June*	m.	F.	w.	s. j.	g.	V. E.	Am.							†
8	Ashby's Early														
9	Austin's Late. *Austin's Late Red*	l.	C.	w.	j. v.	r.	L.	Am.							
10	Baldwin's Late	l.	F.	w.	j. m.	r.	L.	Am.							
11	Barnard	m.	F.	y.	j. v.	g.	E.								
12	Beatrice. *Farly Beatrice*	s.	F.	w.	m. j.	r.	V. E.	F.							
13	Beer's Smock	l.	F.	y.	j. v.		L.	Am.							
14	Bellegarde	l.	F.	g.	s. j.	g.	M.	F.							
15	Bergen's Yellow	m.	F.	y.	j. v.	r.	M.	Am.						*	
16	Bordeaux	l.	C.	y.	j.	r.	E.	Am.							
17	Briggs' May	m.	F.	w.	m.		V. E.	Am.							
18	Catharine	l.	C.	y. g.	j. r.	r.	M.	Am.							
19	Chinese Cling	l.	C.	g.	j. v.	r.	M.								
20	Cole's Early. *Cole's Early Red*	m.	F.	w.	m. j. r.	g.	V. E.	Am.							*
21	Columbia	l.	F.	y.	j. v.	r.	M.	Am.							
22	Conner's Cling														
23	Coolidge's Favorite	l.	F.	w.	s. j. h.	g.	M.	Am.						**	*
24	Cook's Late. *Cook's Late White*	m.	F.	w.	m. j. v.		L.	Am.							
25	Counts	l.	C.	w.	m. j.		M.	Am.							
26	Crawford's Early	l.	F.	y.	j. v.	g.	M.	Am.						**	**
27	Crawford's Late	l.	F.	y.	j. v.	g.	L.	Am.						*	*
28	Crawford's Yellow														
29	Crockett's Late. *Crockett's Late White*	m.	F.	w.	s.	r.	L.	Am.							
30	Deming's Orange. *Deming's Sept.*	l.	C.	y.	j. r.		L.	Am.							
31	Druid Hill	l.	F.	g.	m. j. r.	g.	V. L.	Am.							
32	Duff Yellow	l.	C.	y.	m. j.	g.	E.	Am.							
33	Early Admirable	l.	F.	w.	m. j.	g.	M.	F.							
34	Early Grosse Mignonne	m.	F.	w.	m. j. v.	g.	E.	F.							
35	Early Newington Free	l.	F.	g.	j. v.	g.	E.	Am.							
36	Early York	m.	F.	w.	m. j. r.	s.	V. E.	Am.						*	*
37	Eaton's Golden	m.	C.	y.	s. j.	r.	L.	Am.							
38	Elberta														
39	Fleitas														
40	Flewellen	l.	C.	y.	j. r.		E.	Am.							
41	Foster	l.	F.	y.	j. v.	g.	L.	Am.						*	†
42	General Lee														
43	George the Fourth	m.	F.	y.	m. j. r.	g.	M.	Am.						*	*
44	Globe														
45	Grosse Mignonne. *Royal Kensington*	l.	F.	w.	s. j. h.	g.	M.	F.						*	*
46	Haine's Early	m.	F.	g.	s. j.	g.	V. E.	Am.							
47	Hale's Early	m.	F.	w.	m. j. r.	g.	V. E.	Am.						*	*
48	Harker. *Harker's Seedling*	l.	F.	y.	s. j.	g.	M.	Am.							
49	Heath Cling	l.	C.	g.	s. j. h.	r.	V. L.	Am.							
50	Hill's Chili	m.	F.	y.			L.	Am.							
51	Honey														
52	Honeywell	m.	F.	w.	s. j.		E.	Am.							
53	Hoover's Heath. *Hoover's Late Heath*														
54	Hyslop Cling	l.	C.	w.	m. j. r.	r.	V. L.	Am.							
55	Indian Blood														
56	Indian Blood Cling	l.	C.	y.	j. v.	r.	L.	Am.							
57	Indian Blood Free	l.	F.					Am.							

6 This originated in South Carolina and differs from the Missouri Amelia.

XIII.—PEACHES.

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, venous; 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 lat. 43 previous to or about Sept. 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.



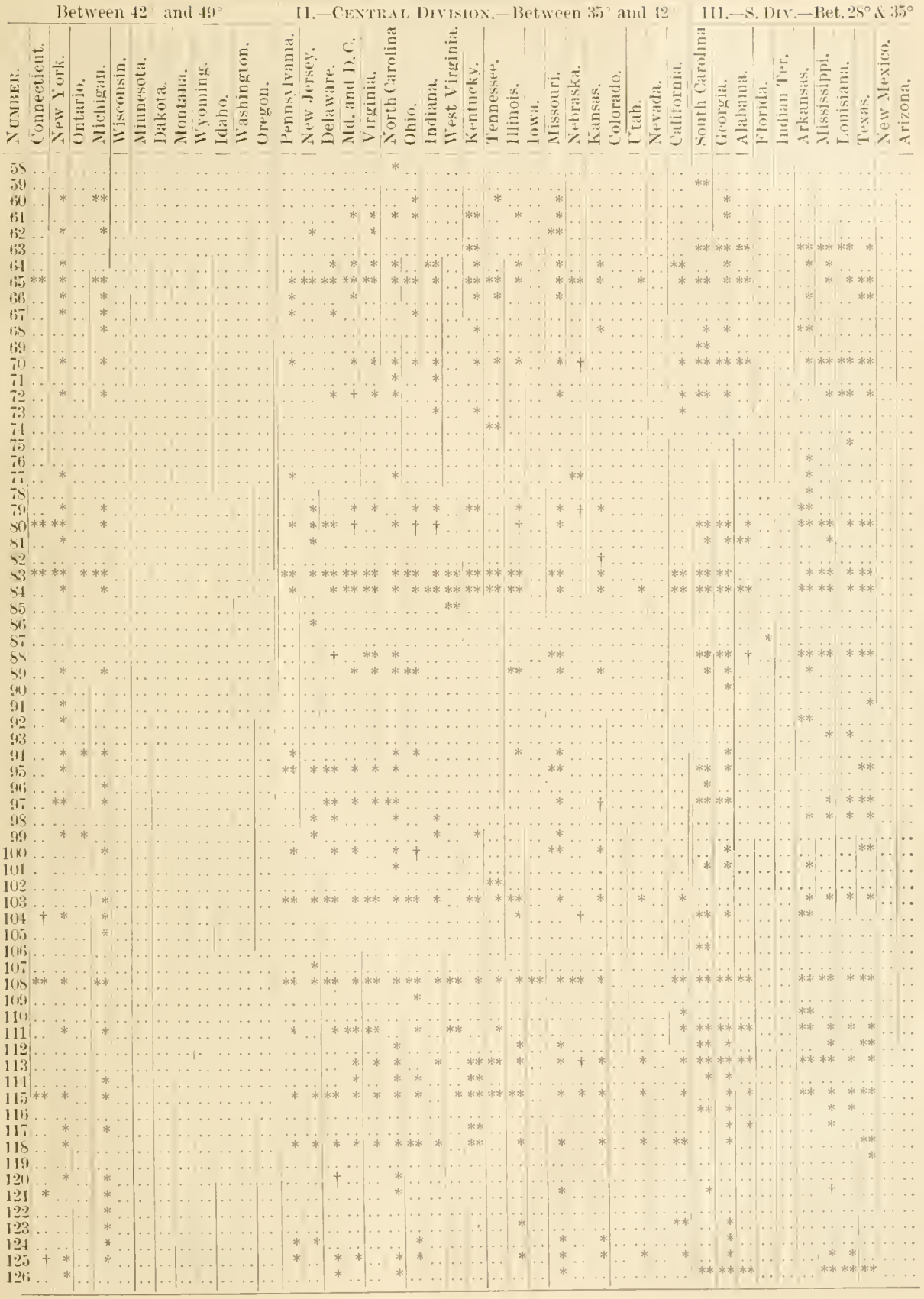
19 Mr. Berckmans thinks it is the same as Shanghae.

30 Resembles Lemon Cling.

Number.	Names.	Description.							I.–N. Div.—					
		Size.	Class.	Color.	Quality.	Glands.	Season.	Origin.	Nova Scotia.	New Brunswick	Maine.	New Hampsh'e	Vermont.	Massachusetts.	Rhode Island.
58	Indian Cling														
59	Incomparable	l.	C.	w.	m. j.	r.	L.	Am.							
60	Jacques	l.	F.	y.	j. v.	r.	M.	Am.						*	
61	Kenrick's Heath. *Heath Freestone*	l.	F.	g.	j. v.	r.	L.	Am.							
62	Keyport White	l.	F.	w. r.	m. j.	r.	V. L.	Am.							†
63	Lady Parham	m.	F.	g.	j. v.	r.	V. L.	Am.							
64	La Grange	l.	F.	w.	s. j. h.	r.	V. L.	Am.							
65	Large Early York	m.	F.	w.	s. j. h.	g.	V. E.	Am.							†
66	Large White Cling	l.	C.	w.	s. j.	g.	L.	Am.							
67	Late Red Rareripe	l.	F.	w.	s. j. h.	g.	M.	Am.							*
68	Late Admirable	v. l.	F.	y. g.	m. h.	g.	M.	F.							
69	Lemon														
70	Lemon Cling	l.	C.	y.	j. v.	r.	L.	Am.							
71	Leopold I. *Leopold Freestone*	l.	F.	y.	j. v.	r.	M.	F.							
72	Louise. *Early Louise*	m.	F.	w.	m. j.	r.	E.	Eng.							
73	Malta	l.	F.	g.	m. j. r.	s.	M.	F.							
74	Mammoth Free	v. l.	F.												
75	Masicot														
76	Mitchell. *Mitchell's Mammoth*	l.	C.	g. w.	m. j.		L.	Am.							
77	Molden's White	l.	F.	w.	s. j.	r.	L.	Am.							
78	Montgomery's Late	l.	F.	w. r.	m. j.	r.	L.	Am.							
79	Morris' White	m.	F.	w.	m. j. r.	r.	M.	Am.						*	
80	Mountain Rose	m.	F.	w.	s. j.	g.	M.	Am.						†	†
81	Noblesse	l.	F.	w.	s. j.	s.	M.	F.							
82	Nugent's June	m.	C.	y. r.			V. E.	Am.							
83	Oldmixon Free	l.	F.	g.	s. j. h.	g.	M.	Am.						**	**
84	Oldmixon Cling	l.	C.	w.	m. j. r.	g.	M.	Am.						*	
85	Pavie de Pompone	l.	C.	w.	m. j.	r.	L.	F.							
86	Petite Imperial	l.	F.	w.	m. j. v.	r.	L.	Am.							
87	Peen-to														
88	Picquett's Late	l.	F.	y.	s. j.	r.	M.	Am.							
89	President	l.	F.	w.	m. j. r.	g.	M.	Am.						*	
90	Prince of Wales	l.	F.	w.	m j.	r.	M.	F.							
91	Princess of Wales	l.	F.	w.	m. j. v.	g.	M.	F.							
92	Pucelle. *Pucelle de Malines*	l.	F.	w. r.	m. j.	s.	M.	Am.							
93	Raymond Cling	l.	C.												
94	Red Cheek Melocoton	l.	F.	y.	j. v.	g.	M.	Am.						*	
95	Reeves' Favorite	l.	F.	y. r.	m. j.	g.	M.	Am.							
96	Richmond	m.	F.	w.	m. j.	r.	M.	Am.							
97	Rivers. *Early Rivers*	l.	F.	p. y.	m. r.	r.	E.	Eng.							
98	Rodman's Cling	l.	C.	w.	j. v.	r.	L.	Am.							
99	Royal George	m.	F.	w.	m. j. r.	s.	E.	F.							*
100	Salway	l.	F.	y. r.	m. j.	r.	M.	Am.							
101	Scott's October	m.	C.	y.			V. L.								
102	Shockley's Early														
103	Smock	l.	F.	y.	j. v.	r.	L.	Am.							
104	Snow	m.	F.	w.	s. j.	r.	M.	Am.							
105	Snow's Orange	m.	F.	y.	m. j.	r.	M.	Am.							
106	St. Johns														
107	Steven's Rareripe														
108	Stump the World	l.	F.	w.	s. j. h.	g.	L	Am.							*
109	Sturtevant	m.	F.	y.	s. j. h.	g.	M.	Am.							
110	Strawberry	m.	F.	w.	m. h	r.	M.	Am.							
111	Susquehanna	l.	F.	y.	s. j. v.	g.	M.	Am.							
112	Thurber	l.	F.	w.	m. j. r.		E.	Am.							
113	Tillotson. *Early Tillotson*	l.	F.	g.	m. j. r.	s.	V. E.	Am.							*
114	Tippecanoe	l.	C.	y.	j. v.	r.	L.	Am.							
115	Troth's Early	m.	F.	w.	s. j.	g.	E.	Am.							*
116	Tuskena Cling, *Lemon*														
117	Van Zandt. *Van Zandt's Superb*	m.	F.	w.	m. j. r.	g.	M.	Am.							
118	Ward's Late. *Ward's Late Free*	l.	F.	w.	r. j. s.	r.	L.	Am.							†
119	Washington Cling	m.	C.	y. r.	m j.	r.	L.	Am.							
120	Waterloo	l–m.	F.	w.	s. j.	g.	V. E.	Am.							
121	Wheatland	l.	F.	y.	s. j. h.	r.	M.	Am.							
122	Wheeler's Early	s.	F.	w. r.	m. j.		V. E.	Am.							
123	White Imperial	m.	F.	w.	m. j. r.	g.	E.	Am.							
124	Yellow Alberge	m.	F.	y.	s. j.	g.	E.	F.						*	
125	Yellow Rareripe	l.	F.	y.	j. v.	g.	E.	Am.						*	
126	Yellow St. John. *Fleita's, Flaters St John*	l.	F.	y.	s. j.	g.	V. E.	Am.							

76 Resembles Heath Cling, but later.

119 One of the earliest.


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.

XIV.—PEARS.

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. *Beurre d' Amanlis*	l.	r. o. p.	y. g.	g.	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. *Duchesse d' Angouleme*	l.	o. b. o. p	y.	v. g.	F. M.	A.	F.	*		**	*		**	**
6	Anjou. *Beurre d' Anjou*	l.	ob. p.	y. g.	v. g.	F. M.	L. A.	F.	*		**	**	**	**	**
7	Ansault. *Bonne du Puits Ansault*	m.	ob. p.	y. r.	b.	F.	L. S.	F.							
8	Bachman. *Dr. Bachman (local)*							Am.							
9	Bartlett	l.	o. b. o. p.	y.	v. g.	F. M.	L. S.	Eng.	**		*	*	*	**	**
10	Baronne de Mello	m.	r. a. p.	y. r.	v. g.	F. M.	E. A.	B.						*	
11	Bergen	l.	p. y r.	y. g.	g.	F. M.	E. A.	Am.							
12	Beurre Precoce	m.	ob. p.	y. r.	g.	F. M.	S.	F.							
13	Bilboa. *Golden Beurre of Bilboa*	m.	p.	y.	v. g.	F.	E. A.		*					*	
14	Bloodgood	m.	r.	y. r.	v. g.	F.	S.	Am.			*	*	*	*	*
15	Bordeaux. *Duchesse de Bordeaux*	m.	r.	y. r.	g.	M.	W.	F.						†	
16	Bosc. *Beurre Bosc*	l.	p.	y. r.	b.	F. M.	L. A.	B.	*		*	*	*	*	*
17	Boussock. *Doyenne Boussock*	l.	r. o. p.	y. r.	v. g.	F. M.	E. A.	B.	†			*		**	*
18	Brandywine	m.	r. ob.	y. g.	v. g.	F. M.	S.	Am.	*			*		**	
19	Brialmont	l.	ob. p.	y. r.	v. g.	F. M.	A.	B.							
20	Brignais. *Beurre de Brignais, Des Nonnes*	m.	r. ob.	y.	v. g.	F.	E. A.							*	*
21	British Queen	l.	ob. p.	y. r.	v. g.	F. M.	A.	Eng.							
22	Buffum	m.	r o. p.	y. g.	g.	M.	E A.	Am.				*	*	*	*
23	Caen de France	m.	ob. p.	y. r.	v. g.	F. M.	W.	F.						*	
24	Catillac	l.	r. a. p.	y.	g.	K. M.	W.	F.						*	
25	Chambers	m.	ob. p.	y.	g.	F. M.	S.	Am.							
26	Clairgeau. *Beurre Clairgeau*	l.	p.	y. r.	g.	M.	L. A.	F.	*			*		*	*
27	Clapp's Favorite	l.	o. b. o. p.	y. g.	v. g.	F. M.	S.	Am.	*		**	*		*	*
28	Columbia	l.	r. o. p.	y.	g.	M. K.	W.	Am.						*	*
29	Comice. *Doyenne du Comice*	l.	r. o. p.	y. g.	b.	F. M.	L. A.	F.						**	**
30	Dallas	l.	ob. p.	y. g	v. g.	F. M.	L. A.	Am.						*	
31	Dana's Hovey	s.	r. ob. p.	y. g	b.	F.	W.	Am.						*	**
32	Dearborn. *Dearborn's Seedling*	s.	r. p.	y.	v. g.	F.	S.	Am.				*		*	*
33	Diel. *Beurre Diel*	l.	r. ob. p.	y. r.	v. g.	F. M.	L. A.	B.	*		*		*		
34	Dix	l.	ob. p.	y.	b.	F. M.	L. A.	Am.							
35	Doyenne d'Alencon	m.	r. p.	y. r.	v. g.	F. M.	W.							*	
36	Duchess Precoce	l.	p. y. r.	y. g.	g.	F. M.	E. A.	F.							
37	Easter Beurre	l.	r. ob. p.	y. r.	v. g.	F.	W.	B.					*		
38	Eastern Belle	m.	ob. p.	y. r	v. g.	F.	E. A.	Am.			*				
39	Emile d'Heyst	l.	ob. p.	y. r.	b.	F.	L. A.	B.						*	
40	Epine Dumas. *Bell Epine Dumas, Duc de Bordeau*	m.	r. o. p.	y.	v. g.	F.	L. A.							*	†
41	Flemish Beauty	l.	r. ob. p.	y. g.	v. g.	F. M.	E. A.	B.				*	**		
42	Fontenay. *Jalousie de Fontenay Vendee*	m.	r. a. p.	y. r.	v. g.	F. M.	A.	F.							
43	Foster's Seckel	s.	ob. p.	y. r.	b.	F. M.	E. A.	Am.						*	
44	Frederick Clapp	m.	r. ob. p.	y.	b.	F. M.	E. A.	Am.						*	†
45	Fulton	s.	r. ob.	y. r.	v. g.	F.	A.	Am.				*	*	*	
46	Giffard. *Beurre Giffard*	m.	p.	y. g	v. g.	F. M.	S.	F.				*	*	*	**
47	Glout Morceau	l.	ob. p.	y.	g.		L. A.						*	*	
48	Goodale	l.	ob. p.	y. g.	v. g.	F. M.	A.	Am.				*	†	*	
49	Goubaldt. *Beurre Goubaldt*	m.	ob. r.	y. g	g.	F.	L. S.	F.							
50	Gray Doyenne	m.	r.	y. r	b.	F. M.	L. A.	F.							
51	Hardy. *Beurre Hardy*	l.	ob. p.	y. g	v. g.	F. M.	E. A.		**		*	*		*	**
52	Harris	m.	o. b. o. p.	y. r.	v. g.	F.	E. A	Am.						*	
53	Helen Gregoire	m.	r. o. p.	y. g.	v. g.	F.	E. A.	F.							
54	Henkel	l.	r. ob. p.	y. r.	v. g.	F.	E. A.	B.						*	†
55	Hosenschenk. *Moore's Pound*	m.	r. ob.	y.	g.	M.	S.	Am.						*	
56	Howell	l.	r. p.	y. g.	v. g.	F. M.	E. A.	Am	*			*	**		**	*

37 Requires very high cultivation.

45 A hardy, productive tree.

XIV.—PEARS.

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.

	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.
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2		*											*			*	*																	*					*			
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4														*		†			*														*	*						*		
5	*	**	**	**								*	**	**	**	**	**	**	**	*	*	**	**	**	**	**	**	**	*		**	**	**	**				*	**	**		
6	**	**	**	**								*	**	**	*	**	**	*	**	*	*	**	**	**	**	**	**	**	*		*	**	**					*	**	**		
7		*		*																								†													
8																																*									
9	**	**	**	**	*							*	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*		**	**	**	**	*			*	**	**		
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15													†	†				*						†																	
16	*	**	*	*									*	*	*	*	*		*	*			*	*	*	*	**						*							**		
17	*	**	*	*									*	*	**	*	*		**	**	**	*		*	*	*	**	*		*		*						*	*	*		
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27	*	**	*	*	†								*	*	**	*	*	*	*	†	†	*	*	†	*	*	†	**				†	*	*				**	*	**	
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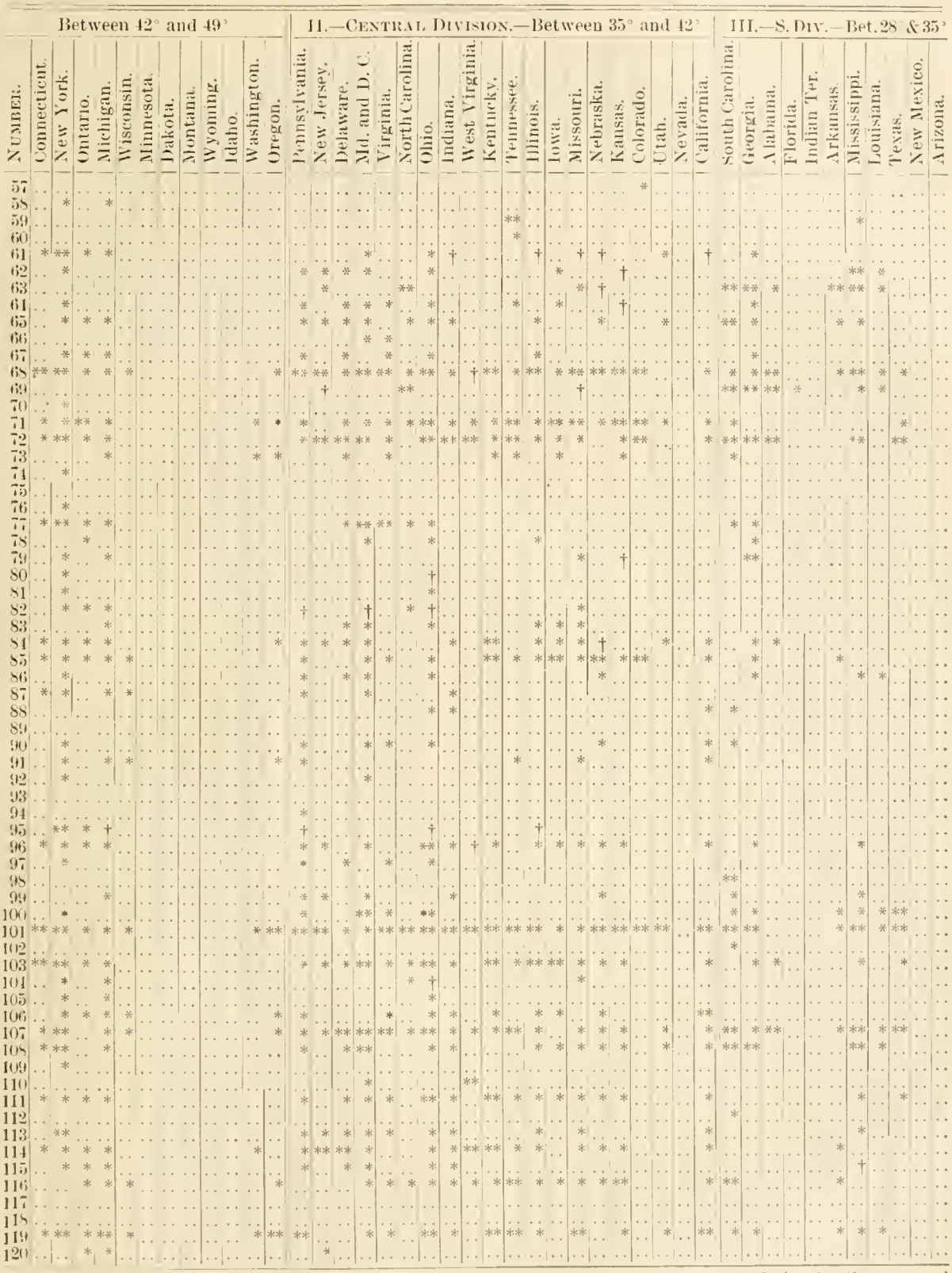
56	*	**	*	*									*	*	**	**	**	**	*	**	*	*	*	**	**		*	**	*		*		*	**	**				**	**	*	**	

17 Unreliable at the North.

50 Fails in Eastern States.

Number.	Names.	Description.							I.—N. Div.—						
		Size.	Form.	Color.	Quality.	Use.	Season.	Origin.	Nova Scotia.	New Brunswick	Maine.	New Hampsh're	Vermont.	Massachusetts.	Rhode Island.
57	Indian Chief														
58	Jaminette	m.	r. ob.	y. r.	g.	F. M.	W.								
59	John Williams	m.			v. g.		W.	Am.							
60	Jonah. *Winter Jonah*	l.			g.	F. M.	W.	Am.							
61	Josephine of Malines	m.	r. ob. p.	y. r.	v. g.	F. M.	W.	F.				†		*	†
62	Julienne	s.	r. ob.	y.	g.	F. M.	S.								
63	Kieffer	l.	r. o. p.	y. r.	g.	K. M.	A.	Am.							
64	Kingsessing	l.	ob. p.	y.	g.	F. M.	E. A.	Am.						*	*
65	Kirtland	m.	r. ob.	y. r	v. g.	F. M.	E. A.	Am.	†		†	*			
66	Knight. *Knight's Seedling*	m.	r. ob.	y.	g.	M.	A.	Am.						*	*
67	Langelier. *Beurre Langelier*	m.	ob. p.	y. r.	v. g.	F. M.	W.	F.						*	*
68	Lawrence	m.	r. o. p.	y. r.	v. g.	F. M.	W.	Am.			*	**		**	**
69	Le Conte	l.	ob. p.	y.	g.	M.	S.	Am.							
70	Lindley. *Dr. Lindley*	m.	r. ob.	y. g.	v. g.	F.	E. A.	F.						*	
71	Louise Bonne of Jersey	l.	ob. p.	y. g.	v. g.	F. M.	E. A.	F.	*		*	**	**	*	*
72	Lucrative. *Belle Lucrative*	m.	ob. r.	g. y.	b.	F.	E. A.	Fl.			**	*	*	*	**
73	Madeleine	m.	p.	y. g.	v. g.	F. M.	S.	F.					*		
74	Madame Andre Leroy	l.	o. b. o. p.	y. r.	v. g.	F.	E. A.	F.							
75	Madame Eliza	l.	r. a. p.	y. r.	v. g.	F. M.	A.	B.						*	
76	Madame Treyve	m.	r. o. p.	y. r.	v. g.	F.	L. S.	F.							
77	Manning's Elizabeth	s.	ob. p.	y. r.	v. g.	F.	S.				*	*		*	*
78	Marie Louise	l.	p.	y. r.	v. g.	F.	A.	B.						*	*
79	Margaret *Petite Marguerite*	m.	ob. p.	y. g.	b.	F.	S.	F.							
80	McLaughlin	l.	ob. p.	y. g.	v. g.	F. M.	W.	Am.			*			*	*
81	Merriam	m.	r. ob.	y. r.	g.	F. M	A.	Am.				**		**	*
82	Mount Vernon	m.	r. o. p.	y. r.	v. g.	F. M.	L. A.	Am.						*	*
83	Napoleon	l.	ob. p.	y.	g.	M.	A.	B.							
84	Onondaga. *Swan's Orange*	l.	ob. p.	y. g.	v. g.	F. M.	L. A.	Am.	*			*	*	*	*
85	Osband's Summer	s.	r. p.	y. g.	v. g.	F.	S.	Am.				*		*	
86	Ott	s.	r.	y. g.	g.	F.	S.	Am.							
87	Paradise of Autumn. *Paradis d'Automne*	l.	r. a. p.	y. r.	v. g.	F.	E. A.	B.	*			**	*	**	*
88	Passe Colmar	l.	r. o. p.	y.	g.	M.	W.	B.						*	
89	Pinneo or Boston	s.	r. ob.	v. g.	g.		S.	Am.						*	†
90	Poiteau. *Nouveau Poiteau*	l.	p.	y.	g.	M.	L. A.	B.							
91	Pound. *Belle Angevine, Winter Bell, Uvedale's St. Germain*	l.	p.	y.	g.	K. M.	W.							*	
92	Pratt	m.	ob. p.	y. r.	g.	M.	E. A.	Am.				†		*	*
93	Quimper. *Supreme de Quimper*	m.	r. p.	y. g.	v. g.	F.	S.	B.						*	†
94	Reading	l.	ob. p.	y. r.	g.	F. M.	W.	Am.							
95	Reeder. *Dr. Reeder*	s.	r. o. p.	y. r.	b.	F.	L. A.	Am.						†	
96	Rostiezer	s.	p.	y. g.	b.	F.	S.				*	**		*	**
97	Rutter	m.	r. ob.	y. g.	v. g.	F. M.	A.	Am.							
98	Sand														
99	St. Ghislain	m.	p.	y.	g.	F. M.	E. A.	B.						*	*
100	St. Michael Archange	l.	r. p.	y. g.	g.	F. M.	A.	F.				*		**	*
101	Seckel	s.	r.	y. g.	b.	F. M.	A.	Am.	*			**		*	**
102	September														
103	Sheldon	m.	r.	y. g.	v. g.	F. M	A.	Am.			*	*		*	**
104	Souvenir du Congres	l.	p. y. r.	y. g.	v. g.	F. M.	S.	F.	*			†		*	†
105	Sterling	m.	r.	y. g.	v. g.	F. M.	E. A.	Am.						*	
106	Stevens' Genesee	l.	r.	y.	v. g.	F. M.	E. A.	Am.	*						
107	Summer Doyenne. *Doyenne d'Ete*	s.	r. o. p.	y. g.	v. g.	F.	S.	B.				*	**	*	*
108	Superfin. *Beurre Superfin*	m.	r. p.	y. r.	v. g.	F.	A.	F.				*		*	**
109	Therese Appert	m.	ob. o. p.	y. r.	v. g.	F.	L. S	F.							
110	Triumph of Jodoigne. *Triomphe de Jodoigne*	l.	ob. p.	y. g.	v. g.	F. M	A.	B.							
111	Tyson	m.	r. a. p.	y. g.	b.	F.	S.	Am.				*	*	*	*
112	Upper Crust (local)	m.	r.	g. rus.	poor		S.	Am.							
113	Urbaniste	m.	p.	y. g.	v. g.	F. M.	A.	B.				*	*	*	*
114	Vicar. *Vicar of Winkfield, Le Cure*	l.	p.	y.	g.	K. M.	W.	F.	*				*	**	
115	Washington	m.	ob. o. p.	y.	v. g.	F. M.	E. A.	Am.						*	*
116	White Doyenne. *Virgalieu*	m.	ob. p.	y. g.	b.	F. M.	A.	F.					*		
117	Wilbur	s.	r.	y. r.	g.	F.	E. A.	Am.						*	
118	Willermoz	l.	ob. p.	y. r.	g.	M.	W.	B.						*	
119	Winter Nelis	m.	ob. p.	y. r.	b.	F. M.	W.	B.	*			*	*	*	*
120	Windsor. *Summer Bell*	l.	p.	g.	g.	M.	S.							*	

58 An old variety; very healthy and productive.
59 Supposed to be Columbia.
61 The finest late winter pear, where it succeeds.
68 A hardy tree; valuable.
71 Very productive and profitable.
72 Not profitable for market.
78 A capital pear but unreliable.
79 Superior to Summer Doyenne.
81 Valuable for market.



95 Delicious, but too small to meet the present market wants.

101 One of the largest and most beautiful melting pears.

111 A hardy tree.

116 One of the best, but variable in the Eastern and Middle States.

119 Of rare excellence; requires age ere profitable.

120 Poor quality; profitable for market in some places.

XV.—PLUMS.

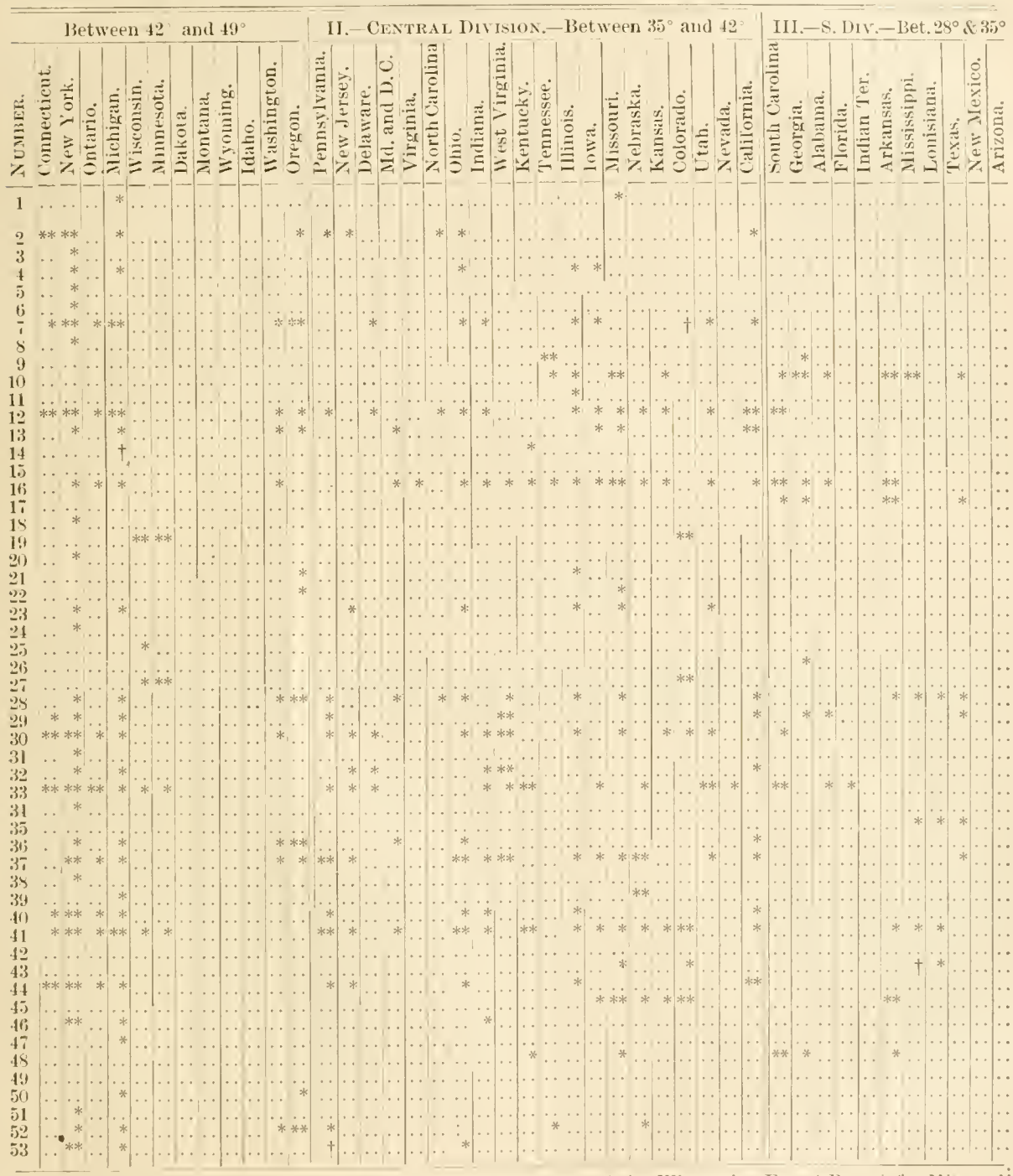
The columns explain: SIZE—l., large; m., medium; s., small. FORM—r., roundish; o., oval; r. o., roundish oval; o. ob., oval obovate. COLOR—p., purplish or very dark; r., reddish or copper color; y., yellow; g. y., greenish yellow; y. r., yellowish with shades or spots of red. QUALITY—g., good; v. g., very good; b., best. USE—F., family; 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 Hampsh're	Vermont.	Massachusetts.	Rhode Island.	
1	Admiral												*			
2	Bavay. *Bavay's Green Gage, Reine Claude de Bavay*	l.	r.	g. y.	b.	F.	L.	F.	*		*	*	*	*	*	
3	Belgian Purple	l.	r. o.	g. y.	v. g.	F. M.	M.	F.								
4	Bleeker's Gage	m.	r. o.	y.	v. g.	F. M.	M.	Am.			*					
5	Blue Imperatrice	m.	o. ob.	p.	v. g.	F. M.	L.	F.								
6	Boddært. *Boddært Green Gage*	l.	r.	g. r.	v. g.	F. M.	M.	F.								
7	Bradshaw	l.	o. ob.	r. p.	g.	M.	M.	Am.?	*		*			*		
8	Bryanstone. *Bryanstone Gage*	m.	o.	y. r.	v. g.	F.	L.	F.						†		
9	Canawa, *Peach Leaved*	m.	o.	r.	g.	F. M.	V. L.	Am.								
10	Chickasaw	s.	r.	y. r.	g.	M.	L.	Am.								
11	Coe's Late Red	m.	r.	p.	v. g.	F. M.	L.	F.								
12	Coe's Golden Drop	l.	o.	y. r.	v. g.	F. M.	L.	F.	*		*		*	*	*	**
13	Columbia	l.	r.	p.	g.	M.	M.	Am.	*		*		*			
14	Copper	m.	o.	p.	g.	F. M.	M.	F.								
15	Cruger's Scarlet	m.	r. o.	r.	g.	F.	M.	F.					*			
16	Damson	s.	o.	p.	g.	M.	L.	Am.	*		*		*			
17	De Caradeuc	m.	r.	y. r.	g.	F. M.	E.	Am.								
18	De Montfort	m.	r.	p.	v. g.	F. M.	E.	F.								
19	De Soto	m.	r. o.	y. r.	v. g.	F. M.	M.	Am.								
20	Denniston. *Denniston's Superb*	l.	r.	g. y.	v. g.	F. M.	M.	Am.								
21	Domine Dull	m.	o.	p.	g.	M.	M.	Am.								
22	Drap d'Or	s.	r.	y.	g.	F.	E.	F.	*							
23	Duane's Purple	l.	o.	r. p.	g.	F. M.	E.	Am.	*				*	*	*	
24	Early Favorite	m.	r. o.	p.	g.	F.	E.	F.					*			
25	Eldridge															
26	Elfry	s.	o.	p.	g.	F. M.	M.	Eng.								
27	Forest Garden	m.	r.	r.	v. g.	F. M.	E.	Am.								
28	German Prune	l.	o.	p.	g.	F. M.	M.	F.	*							†
29	General Hand	l.	r. o.	g. y.	g.	F. M.	M.	Am.								*
30	Green Gage	s.	r.	g. y.	b.	F.	M.	F.	**		*	**	*	*	*	
31	Hudson Gage	m.	r.	g. y.	v. g.	F. M.	E.	Am.								
32	Huling. *Huling's Superb*	l.	r. o.	g. y.	g.	F. M.	M.	Am.			*		*			
33	Imperial Gage	l.	o.	g. y.	b.	F. M.	M.	Am.	*		*		*	*	**	
34	Imperial Ottoman	m.	r.	y.	g.	F.	E.	F.					*			
35	Indian Chief															
36	Italian Prune, *Fellemberg*	m.	o.	p.	g.	F. M.	M.	F.					*			
37	Jefferson	l.	o.	y. r.	b.	F. M.	M.	Am.	*		*		*	*	*	
38	July Green Gage	m.	r.	y. r.	v. g.	F.	E.	F.								
39	Kirke's	m.	r. o.	p.	g.	F.	M.	F.								
40	Lawrence. *Lawrence's Favorite*	l.	r.	g. y.	b.	F.	M.	Am.					*		*	
41	Lombard	m.	r. o.	r. p.	g.	M.	M.	Am.	*		*	*	**	*	*	
42	Long Scarlet. *Scarlet Gage*	m.	r. ob.	r.	g.	F.	M.	F.				*				
43	Mariana							Am.								
44	McLaughlin	l.	r.	y. r.	b.	F. M.	M.	Am.	*		*		*	*	*	
45	Miner	m.	obl.	r.	g.	F. M.	M.	Am.								
46	Monroe	m.	o.	g. y.	g.	M.	M.	Am.								
47	Moore's Arctic	m.	r. o.	p.	g.	F. M.	M.	Am.	*	*	*	*	*			
48	Newman	m.	o.	r.	g.	F. M.	E.	Am.								
49	Nota Bene, *Corse*	l.	r.	r. g.	g.	F.	M.	Am.					*			
50	Orleans, *Red Damask*	m.	r.	r.	g.	F.	M.	F.								
51	Oullin's Golden. *Oullin's Golden Gage*	l.	r. o.	g. y.	v. g.	F. M.	M.	F.								
52	Peach	l.	r.	p.	g.	M.	E.	F.					*	*		
53	Pond's Seedling, *Fonthill*	l.	o.	y. r.	g.	M.	M.	F.	*					*	*	

The following Japan plums are recommended for trial in parts of the South: Kelsey, Botan, Ogon, Simoni, Pisardi.

XV.—PLUMS.

The columns explain: SIZE—l., large; m., medium; s., small. FORM—r., roundish; o., oval; r. o., roundish oval; o. ob., oval obovate. COLOR—p., purplish or very dark; r., reddish or copper color; y., yellow; g. y., greenish yellow; y. r., yellowish with shades or spots of red. QUALITY—g., good; v. g., very good; b., best. USE—F., family; M., market. SEASON—E., early; M., medium; L., late. ORIGIN Am., American; F., foreign.



The following additional native plums are reported: Cheney, * for Wisconsin; Forest Rose, * for Missouri; Caddo Chief, ** for Louisiana.

Number.	NAMES.	DESCRIPTION.							I.—N. Div.—						
		Size.	Form.	Color.	Quality.	Use.	Season.	Origin.	Nova Scotia.	New Brunswick	Maine.	New Hampsh'e	Vermont.	Massachusetts.	Rhode Island.
54	Prince Engelbert	l.	o.	p.	v. g.	F. M.	M.	F.	..	..	..	..	..	†	†
55	Prince's Yellow Gage	m.	o.	y.	v. g.	F. M.	E.	Am.	*	..	..	..	*	*	*
56	Prune of Agen	m.	o.	p.	b.	F.	M.	F.	..	..	..	..	..	..	†
57	Purple Gage	m.	r.	p.	v. g.	F. M.	M.	.....	..	..	*	..	..	..	*
58	Purple Favorite	m.	r. ob.	p.	b.	F. M.	E.	Am.	..	..	..	..	..	..	..
59	Reagles' Gage	m.	r.	g. y.	v. g.	F. M.	M.	Am.	..	..	..	..	..	..	..
60	Richland	m.	o.	p.	g.	F. M.	M.	Am.	..	..	..	..	..	..	..
61	Quackenboss	l.	r.	p.	g.	M.	M.	Am.	*	..	..	..	..	..	..
62	Royale Hative	m.	r.	p.	v. g.	F. M.	E.	F.	..	..	..	..	*	..	..
63	Royale de Tours	l.	r.	r.	g.	M.	E.	F.	..	..	..	..	..	..	..
64	Schenectady Catherine	m.	r. o.	r.	g.	F.	M.	Am.	..	..	..	..	*	..	..
65	Shropshire Damson	s.	o.	p.	g.	F. M.	L.	Eng.	..	..	..	..	..	..	..
66	Smith's Orleans	l.	o.	r. p.	v. g.	F. M.	M.	Am.	**	..	*	..	*	*	**
67	St. Catherine	m.	ob.	g. y.	v. g.	M.	L.	F.	..	..	..	*	..	..	..
68	St. Martin. *St. Martin's Quetsche*	m.	o.	g. y.	g.	M.	L.	F.	..	..	..	..	..	..	..
69	Sharp's Emperor, *Victoria*	l.	r. o.	y. r.	g.	M.	M.	F.	*	..	..	..	..	*	..
70	Temple	..	.....	.....	.....	.....	.....	.....	..	..	..	..	..	..	..
71	Transparent. *Transparent Gage*	m.	r. ob.	g. y.	v. g.	F.	M.	F.	..	..	..	..	..	..	..
72	Wangenheim	m.	o.	p.	g.	M.	M.	F.	..	..	..	..	..	..	..
73	Washington	l.	r. o.	g. y.	v. g.	F. M.	M.	Am.	*	..	*	**	*	*	*
74	Weaver	m.	flat.	r.	v. g.	F. M.	M.	Am.	..	..	..	..	..	..	..
75	Wild Goose	s.	o.	y. r.	g.	M.	M.	Am.	..	..	..	..	..	..	..
76	Wolf	.....	.....	.....	.....	.....	.....	Am.	..	..	..	..	..	..	..
77	Yellow Egg, *White Magnum Bonum*	l.	o.	y.	g.	F. M.	M.	.....	**	..	*	..	*	..	*

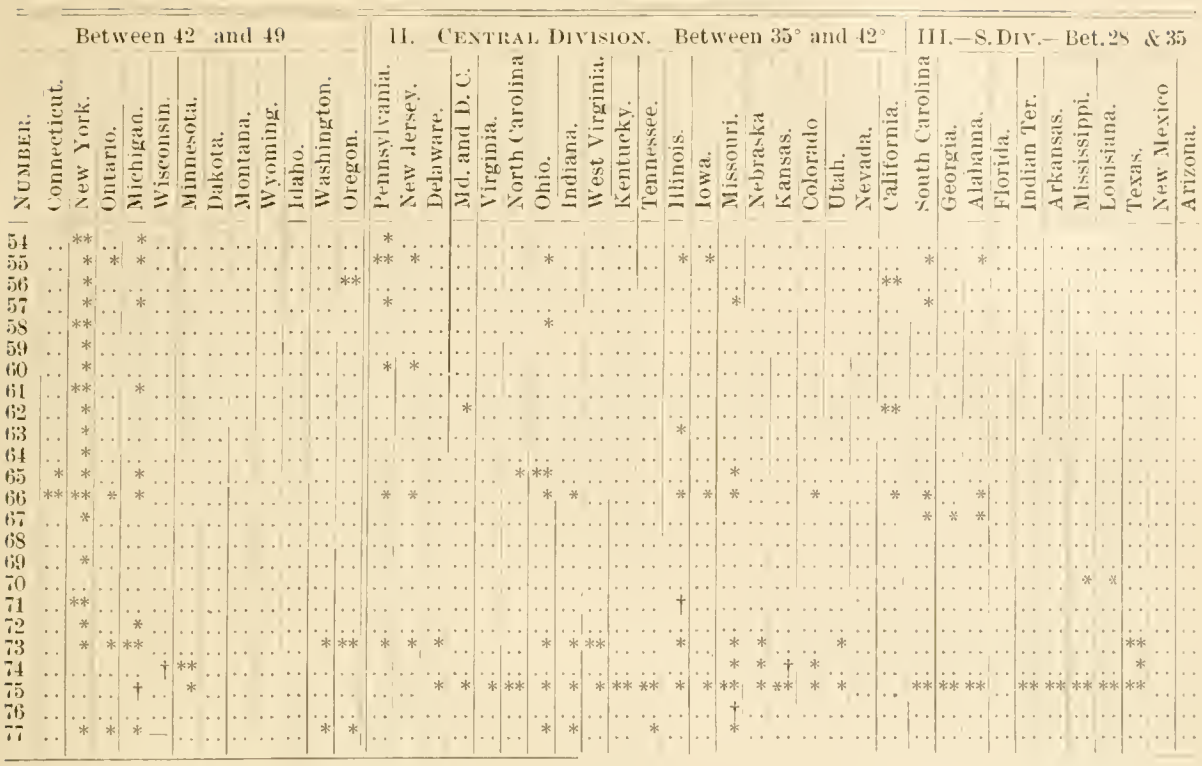
XVI.—QUINCES.

The columns explain: Size—l., large; m., medium; v. l., very large. Form—ob. p., oblate pyriform; r., roundish; r. ob. p, roundish obtuse pyriform. Color—y., yellowish or yellowish green. Quality—t., tender, h. t., half tender. Use K., kitchen; M., market. Season—E., early; E. to L., early to late. Origin—Am., American; F., foreign.

Number.	NAMES.	DESCRIPTION.							I.—N. Div.—						
		Size.	Form.	Color.	Quality.	Use.	Season.	Origin.	Nova Scotia.	Newbrunswick	Maine.	New Hampsh'e	Vermont.	Massachusetts.	Rhode Island.
1	Angers	v. l.	ob. p.	y.	t.	M. K.	E. to L.	F.	*	..	†	..	..	*	..
2	Apple or Orange	l.	r.	y.	h. t.	M. K.	E. to L.	.....	*	..	*	*	..	*	*
3	Champion	v. l.	ob. p.	y.	g.	M. K.	L.	Am.	..	..	..	..	..	..	..
4	Chinese	v. l.	ob.	y.	h. t.	K.	L.	F.	..	..	..	..	..	..	..
5	Pear	l.	p.	y.	g.	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.	..	..	..	..	..	..	..

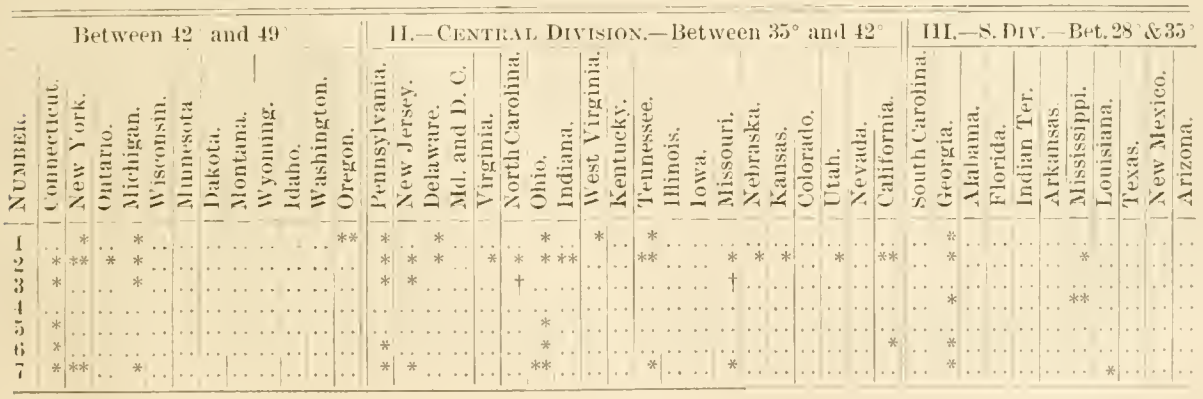
3 A new variety rather late for the North.

4 Large and valuable at the South, in strong soils.



XVI.—QUINCES.

The columns explain: Size—l., large; m., medium; v. l., very large. Form—ob. p., oblate pyriform; r., roundish; r. ob. p., roundish obtuse pyriform. Color—y., yellowish or yellowish green. Quality—t., tender, h. t., half tender. Use—K., kitchen; M., market. Season—E., early; E. to L., early to late. Origin—Am., American; F., foreign.



XVII.—RASPBERRIES.

The columns explain: SIZE l., large; m., medium; s., small. FORM—r., roundish; r. c., roundish conical; c., conical; ob. c., obtuse conical. COLOR—b., black; r., reddish; p., purplish; y., yellow. QUALITY—g., good; v. g., very good; b., best. USE—M., most profitable for market; F. M., of value for family and market; F., mostly valued for the family dessert. SEASON—E., early; L., late; M., medium. ORIGIN—Am., American; F., foreign.

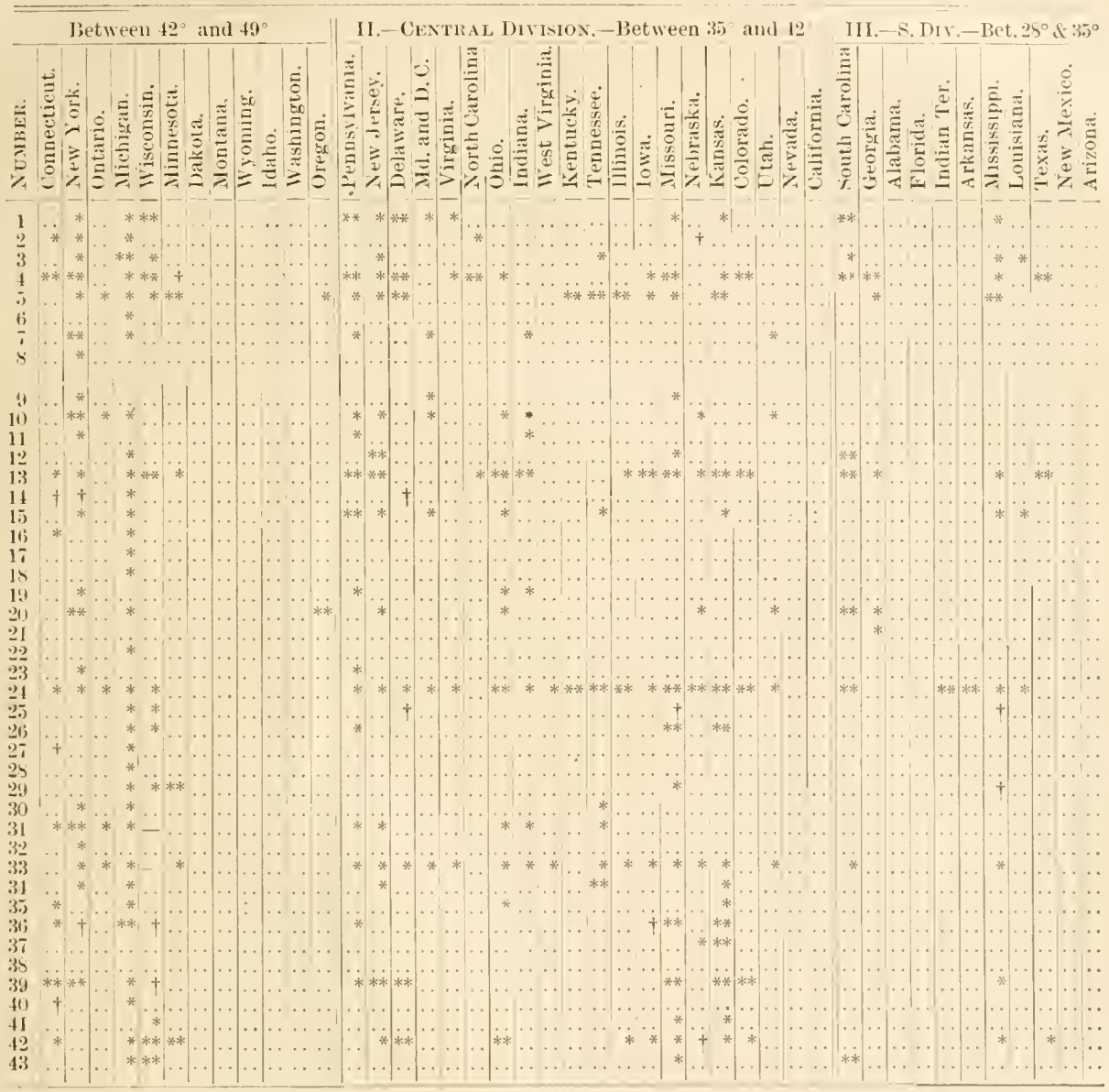
NUMBER.	NAMES.	DESCRIPTION.							I.—N. DIV.—						
		SIZE.	FORM.	COLOR.	QUALITY.	USE.	SEASON.	ORIGIN.	Nova Scotia.	New Brunswick	Maine.	New Hampshire	Vermont.	Massachusetts.	Rhode Island.
1	Brandywine. *Susqueco*	m.	r. c.	r.	g.	F. M.	M.	Am.	..	..	..	..	..	..	..
2	Caroline	l.	r. ob.	y.	g.	F. M.	M.	Am.	..	..	..	..	..	*	..
3	Clarke	m.	r.	r.	g.	F. M	E.	Am.	*	..	**	*	*	*	*
4	Cuthbert. *Queen of the Market*	l.	r. ob. c.	r.	g. g.	F. M.	M.	Am.	..	..	..	..	*	*	*
5	Doolittle (c). *American Black*	s.	r.	b.	g.	M.	M.	Am.	..	..	..	..	*	..	*
6	Earhart (c)	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7	Fastolf	l.	r. c.	r.	v. g.	F.	M.	F.	*	..	..	..	..	..	..
8	Fontenay. *Belle de Fontenay*	l.	c.	r.	g.	F.	L.	F.	..	..	..	..	..	..	..
9	Four Seasons Red. *Merveille de Quatre Saisons, October Red*	l.	r. c.	r.	v. g.	F.	L.	F.	..	..	..	..	..	..	..
10	Franconia	l.	r. c.	p.	v. g.	F. M.	M.	F.	*	..	..	..	..	**	**
11	French	m.	r.	r.	v. g.	F.	M.	Am.	..	..	*	..	..	..	..
12	Golden Queen	l.	r. c.	y.	v. g.	F. M.	M.	Am.	..	..	..	..	..	..	*
13	Gregg (c)	v. l.	r.	b.	g.	F. M.	M.	Am.	..	..	..	..	*	..	†
14	Hansell	m.	r. ob.	r.	v. g.	F. M.	V. E.	Am.	..	..	..	..	..	..	†
15	Herstine	l.	ob. c.	r.	v. g.	F. M.	M.	Am.	..	..	..	..	..	*	*
16	Highland Hardy	m.	r ob. c.	r.	g.	F. M.	E.	Am.	..	..	..	..	..	..	..
17	Hilborn (c)	..	..	..	..	..	..	..	..	..	..	..	..	..	..
18	Hopkins (c)	..	..	..	..	..	..	..	..	..	..	..	..	..	..
19	Hornet	l.	c.	r.	v. g.	F. M.	M.	F.	..	..	..	..	..	*	..
20	Hudson River Antwerp	l.	c.	r.	b.	F. M.	M.	Am.	*	..	..	..	*	..	..
21	Imperial Red	m.	r.	r.	b.	F. M.	M.	Am.	..	..	..	..	..	..	..
22	Johnston's Sweet	..	..	..	..	..	..	..	..	..	..	..	..	..	..
23	Knevett	l.	ob. c.	r.	b.	F.	M.	F.	..	..	*	..	*	*	*
24	McCormick (c). *Mammoth Cluster*	m.	ob. c.	b.	v. g.	F. M.	L.	Am.	..	..	**	..	*	*	*
25	Marlboro	l.	r. c.	r.	g.	F. M.	M.	Am.	..	..	..	..	..	..	†
26	Miama (c)	m.	r.	b.	g.	F. M.	M.	Am.	..	..	..	..	..	..	..
27	Montclair	l.	r.	p.	v. g.	F. M.	M.	Am.	..	..	..	..	..	..	..
28	Nemaha	..	..	..	..	..	..	..	..	..	..	..	..	..	..
29	Ohio (c)	m.	r.	b.	g.	F. M.	M.	Am.	..	..	..	..	..	..	..
30	Ohio Everbearing (c)	m.	c.	b.	g.	F. M.	L.	Am.	..	..	..	..	..	..	..
31	Orange. *Brinckle's*	l.	c.	y.	b.	F.	M.	Am.	*	..	*	..	*	*	*
32	Pallnau	l.	c.	r.	v. g.	F.	M.	F.	..	..	..	..	..	..	..
33	Philadelphia	m.	r.	p.	g.	M.	M.	Am.	..	..	*	..	..	..	*
34	Purple Cane (c)	m.	r.	p.	g.	M.	M.	Am.	..	..	..	..	..	..	..
35	Reliance	l.	r. ob.	r.	g.	F. M.	M.	Am	..	..	..	..	..	..	..
36	Shaffer (c). *Shaffer's Colossal*	v. l.	r.	p.	g. g.	F. M.	M.	Am.	..	..	..	..	..	..	..
37	Smith (c)	v. l.	r.	b.	g. g.	F. M	M.	Am.	..	..	..	..	..	..	..
38	Souchetti	l.	c.	y.	g. g.	F.	M.	F.	..	..	..	..	..	*	..
39	Souhegan (c)	m.	r.	b.	g.	F.	.....	Am.	..	..	..	..	*	**	†
40	Superb	l.	r.	r.	v. g.	F. M.	M.	Am.	..	..	..	..	..	..	†
41	Thwack	l.	r.	p. r.	g.	F. M.	M.	Am.	..	..	..	..	..	..	..
42	Turner	m.	r.	r.	g.	F. M.	M.	Am.	..	..	..	..	..	..	†
43	Tyler	m.	r.	b.	v. g.	F. M.	E.	Am.	..	..	..	..	..	..	†

NOTE—Those designated thus (c) are varieties of Blackcap (*Rubus occidentalis*).

† Valued for bearing late berries on shoots of the current season.

XVII.—RASPBERRIES.

The columns explain: SIZE—l., large; m., medium; s., small. FORM—r., roundish; r. c., roundish conical; c., conical; ob. c., obtuse conical. COLOR b., black; r., reddish; p., purplish; y., yellow. QUALITY—g., good; v. g., very good; b., best. USE—M., mostly profitable for market; F. M., of value for family and market; F., mostly valued for the family dessert. SEASON—E., early; L., late; M., medium. ORIGIN—Am., American; F., foreign.



28 As late and hardier than Gregg which it resembles.

31 Valued for family use.

XVIII.—STRAWBERRIES.

The columns explain: SIZE—l., large; s., small; m, medium. SEX—H., hermaphrodite; P., 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	Bidwell	v. l.	H.	b. s.	c.	f.	M.	Am.							
2	Black Defiance	l.	H.	d. r.	r. o. c.	f.	M.	Am.				*			
3	Bubach No. 5		P.												
4	Captain Jack	l.	H.	d. r.	r. c.	f.	L.	Am.				*			
5	Champion. *Windsor Chief*	l.	P.	d. c.	r.	m.	L.	Am.	*			†			*
6	Charles Downing	l.	H.	d. s.	c.	f.	M.	Am.	*			*	*	**	*
7	Col. Cheney	l.	P.	b. s.	o. c.	f.	M.	Am.	*		*			*	
8	Crescent	l.	P.	b. s.	r. c.	m.	M.	Am.	*			*		*	*
9	Cumberland. *Cumberland Triumph*	v. l.	H.	b. s.	r. c.	s.	M.	Am.	*			†	**	*	†
10	Downer. *Downer's Prolific*	m. l.	H.	b. s.	r. c.	s.	E.	Am.							
11	Duchess	l.	H.	b. r.	r. c.	f.	E.	Am.							*
12	Duncan	m.	H.	b. r.	r. c.	s.	E.	Am.							†
13	Finch	l.	H.	s.	r.	f.	M.	Am.							
14	Gaudy		H.												
15	Glendale	l.	P.	b. r.	c.	f.	L.	Am.	*			*			
16	Great American	l.	H.	d. r.	r. c	f.	M.	Am.							
17	Gypsy	m.	P.	c.		f.	M.	Am.				†			
18	Hart's Minnesota	m.	H.	c.	r.	f.	E.	Am.							
19	Haverland		P.												
20	Hervey Davis	l.	H.	b. s.	o. c.	f.	M.	Am.						**	
21	Hovey. *Hovey's Seedling*	l.	P.	b. s.	r.	f.	M.	Am.	*		*		*	*	
22	James Vick	m.	H.	c.	r. c.	m.	M.	Am.							
23	Jersey Queen	v. l.	P.	b. s	r. c.	f.	L.	Am.				†			*
24	Jessie		H.												
25	Jucunda	l.	H.	b. s.	o. c.	f.	L.	F.	**						*
26	Kentucky	l.	H.	b. s.	r. c.	f.	L.	Am.				†		*	
27	Logan		H.												
28	Lunaxi														
29	Manchester	l.	P.	s.	o. c.	f.	M.	Am.				†		*	*
30	Miner. *Miner's Great Prolific*	v. l.	H.	c.	r. c.	m.	M.	Am.	*			*		*	**
31	Monarch. *Monarch of the West*	v. l.	H.	b. r.	r. o. c.	f.	M.	Am.							
32	Moore		H.												
33	Mount Vernon	l.	H.	l. s.	r. o. c.	m.	L.	Am.							*
34	Neuman. *Neuman's Prolific, Charleston*	l.		l. s.	c.	f.	M.	Am.							
35	Old Iron Clad. *Phelps' Seedling*	l.	H.	s.	o. c.	f.	M.	Am.				†			
36	Ontario		H.												
37	Pearl		H.												
38	Pioneer	l.	H.	c.	r.	m.	M.	Am.						*	*
39	Piper's Seedling	l.	H.	c.	r. c.	f.	E.	Am.				†			
40	Primo	m.	H.	s.	c.	f.	L.	Am.				†		*	
41	Russell's Advance	l.	H.	c.	r.	f.	L.	Am.							
42	Seneca Queen	l.	H.	d. c.	c.	m.	L.	Am.							†
43	Seth Boyden	l.	H.	r.	o. c.	f.	M.	Am.	*					*	*
44	Sharpless	v. l.	H.	b. r.	o. c.	f.	M.	Am.				*	*	**	*
45	Shirts	v. l.	H.	b. c.	c.	f	M.	Am.							
46	Sucker State														
47	Triomphe de Gand	l.	H.	l. c.	o. c.	f.	M.	F.	*		*		*	*	
48	Triple Crown	l.	H.	d. c.	c.	f.	M.	Am.							
49	Triumph														
50	Truitt's Surprise	l.	H.	d. r.	o. c.	f.	M.	Am.							
51	Warrior														
52	Wilder. *President Wilder*	l.	H.	d. s.	r. o. c.	f.	M.	Am.			*			*	†
53	Wilson. *Wilson's Albany*	l.	H.	d. c.	r. c.	f.	E. L.	Am.	**		*	*	**	*	

5 Valuable late sort.

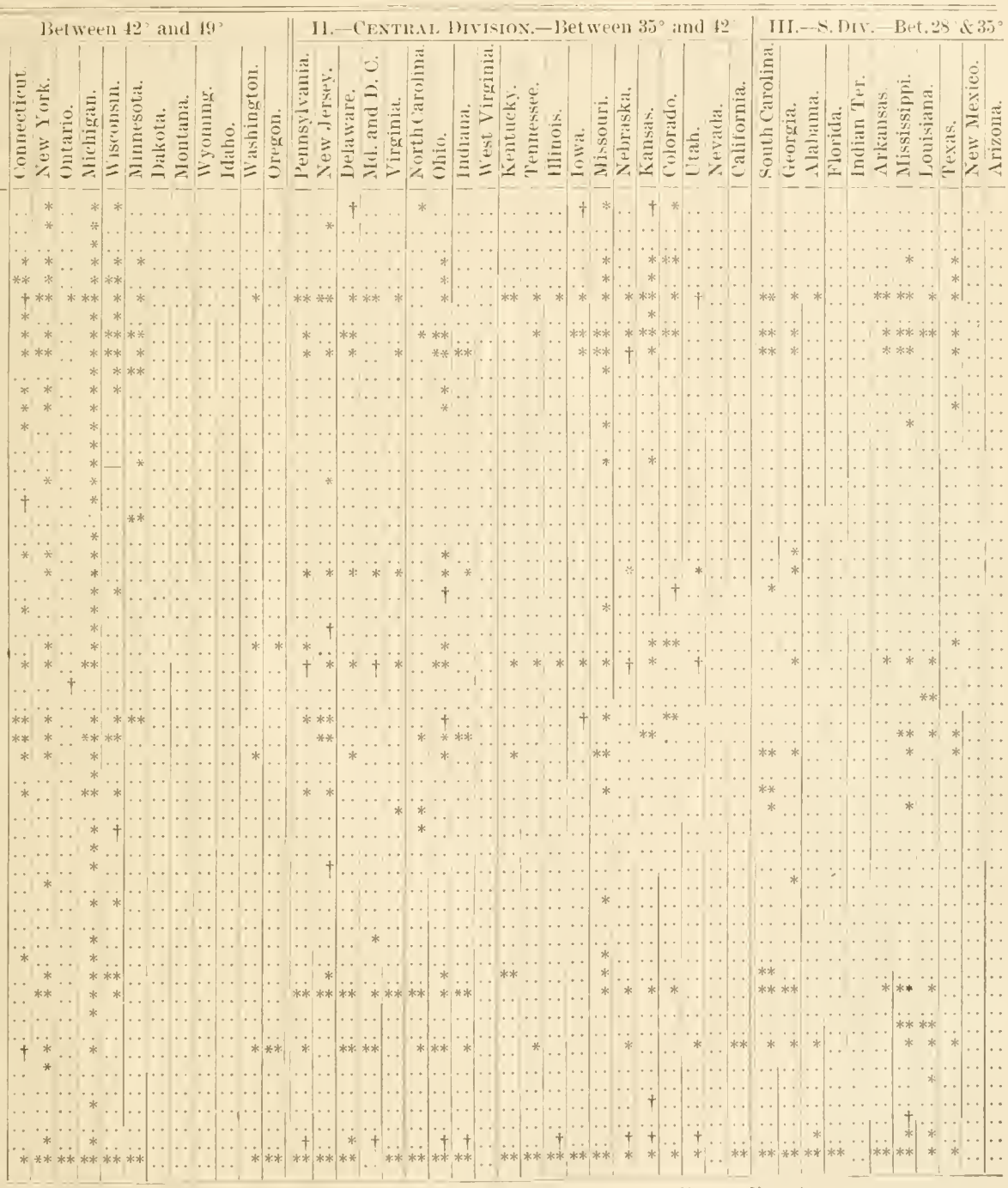
16 Needs good soil and high cultivation.

21 An old and highly valued sort.

32 A Michigan Seedling.

XVIII.—STRAWBERRIES.

The columns explain: SIZE—l., large; s., small; m, medium. SEX—H., hermaphrodite; P., 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.



34 Chiefly grown for market at Charleston and other points South. Quality medium to poor.
44 Has made a first rate record over a large portion of the country.
53 Unrivaled as a market sort in most parts of the country. Quality poor.

CATALOGUE

OF

Native and Introduced Species of Fruits and Nuts,

IN THE UNITED STATES AND CANADA.

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 Hampsh'e	Vermont.	Massachusetts.	Rhode Island.
1	Achras sapota	Sapodilla Plum								
2	Amelanchier Canadensis	Service Berry. June Berry	N.	*	*	*	*	*	*	*
3	Ananassa sativa	Pine Apple								
4	Anona Cherimolia	Chirimoya								
5	Anona squamosa	Sweetsop								
6	Anona muricata	Soursop								
7	Asimina triloba	Pawpaw	N.							
8	Berberis vulgaris	Barberry		*					*	*
9	Cactus (Opuntia)	Indian Fig								
10	Carica Papaya	West Indian Pawpaw								
11	Carya alba	Shell-bark Hickory	N.	*					*	*
12	Carya olivæformis	Pecan	N.							
13	Carya sulcata	Large Shell-bark Hickory	N.							
14	Castanea vesca	European Chestnut								
15	Castanea Americana	American Chestnut	N.	*		*	*	*	*	*
16	Castanea pumila	Chinquipin	N.							
17	Citrus Aurantium	Orange								
18	Citrus Limonum	Lemon								
19	Citrus Limetta	Lime								
20	Citrus medica	Citron								
21	Cocus nucifera	Cocoa-nut								
22	Corylus Americana	American Hazel	N.	*						
23	Corylus Aveliana	Filbert		*						
24	Corylus rostrata	Beaked Hazel-nut	N.				*	*	*	*
25	Cydonia vulgaris	Quince		*						*
26	Cydonia Sinensis	Chinese Quince								
27	Diospyros Virginiana	Persimmon	N.							
28	Diospyros Kaki	Japanese Persimmon, Kaki								
29	Diospyros Texana	Black Persimmon	N.							
30	Eriobotrya Japonica	Loquat								
31	Fagus ferruginea	Beech	N.	*	*	*	*	*	*	*
32	Ficus Carica	Fig								
33	Fragaria vesca	Alpine Strawberry	N.	*						
34	Fragaria Virginiana	American Strawberry	N.	*	*	*	*	*	*	*
35	Fragaria Chilensis	South American Strawberry	N.	*						
36	Gaylussacia resinosa	Black Huckleberry	N.	*						
37	Gaylussacia frondosa	Blue Dangleberry	N.							
38	Grias cauliflora	Anchovy Pear								
39	Juglans cinerea	Butternut	N.			*	*	*	*	*
40	Juglans nigra	Black Walnut	N.							*
41	Junglans regia	European Walnut								
42	Laurus Persea	Avocado, or Alligator Pear								
43	Mespilus Germanica	Medlar		*						
44	Morus rubra	Red Mulberry	N.	*					*	*
45	Morus nigra	Black Mulberry								
46	Morus alba	White Mulberry								
47	Musa paradisiaca	Plaintain								
48	Musa sapientum	Banana								

CATALOGUE

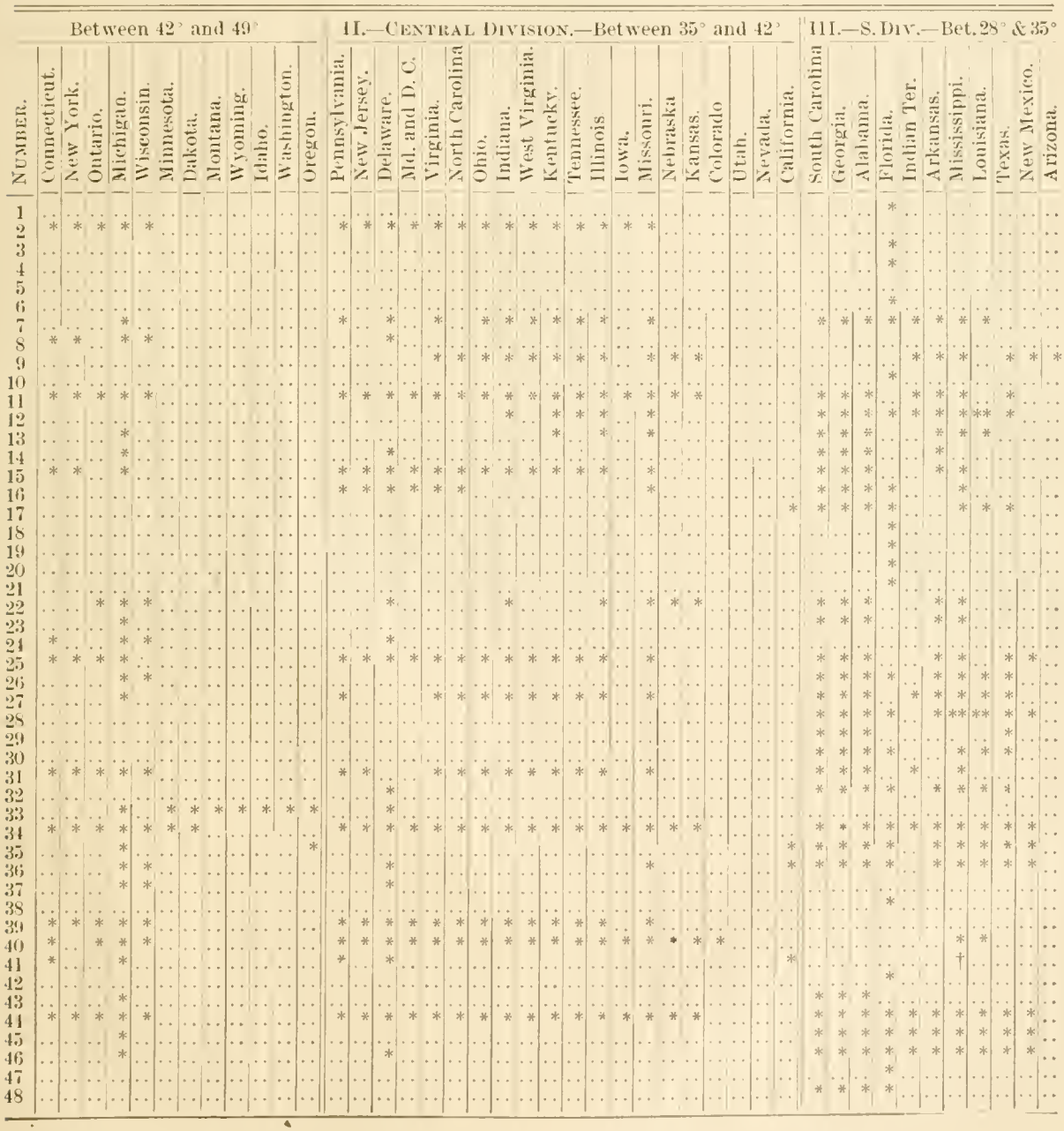
OF

Native and Introduced Species of Fruits and Nuts,

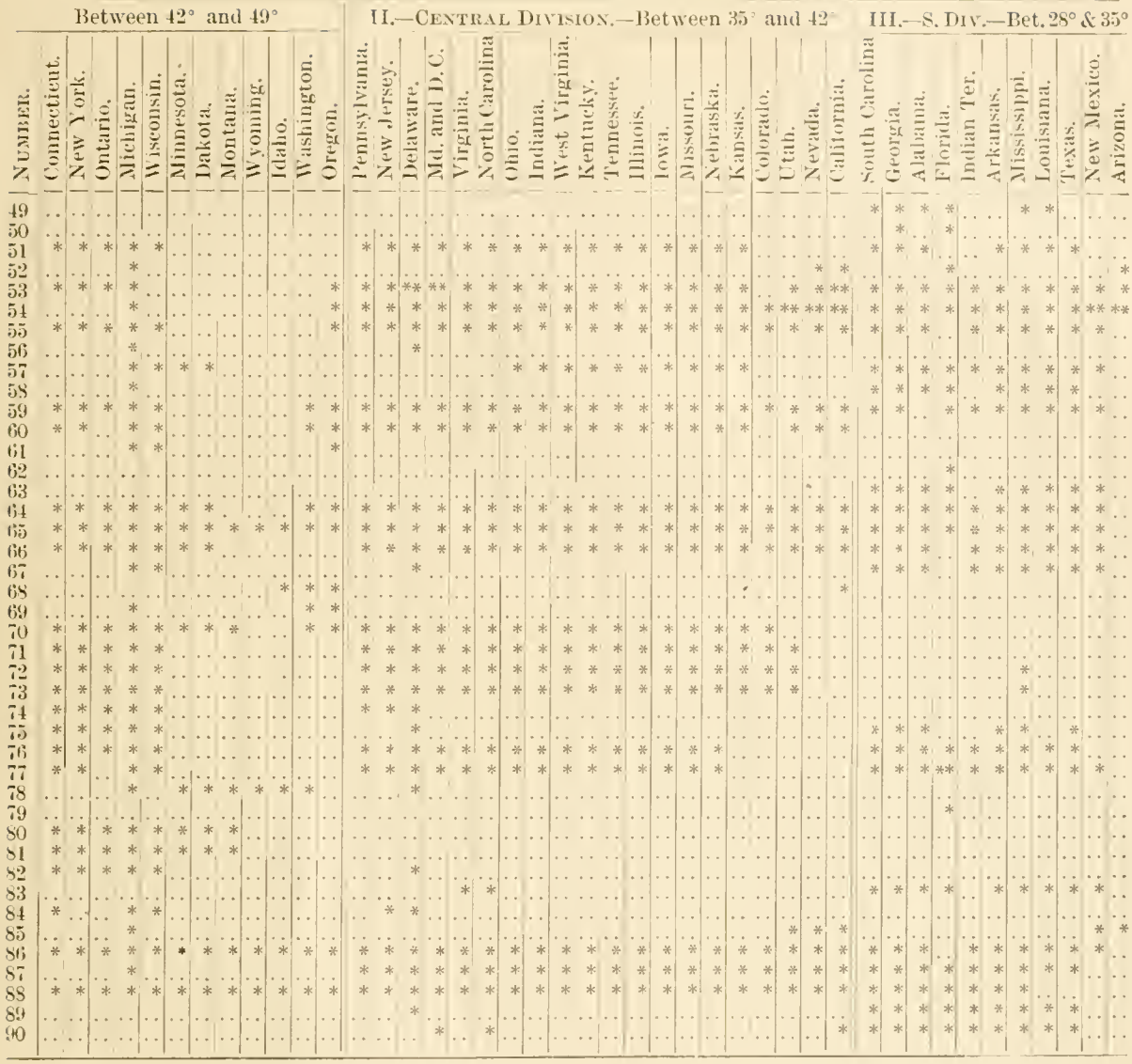
IN THE UNITED STATES AND CANADA.

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 promised 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 to make additions to the list itself will be thankfully received.



Number.	Names. Botanical.	Names. Common.	Origin.	I.—N. Div.— Nova Scotia.	New Brunswick	Maine.	New Hampsh're	Vermont.	Massachusetts.	Rhode Island.
49	Olea Europea	Olive								
50	Phœnix dactylifera	Date Palm								
51	Podophyllum peltatum	May Apple, Mandrake	N.						*	*
52	Prunus (Amygdalus) communis	Almond								
53	Prunus (Amygdalus) Persica	Peach		*					*	*
54	Prunus Armeniaca	Apricot		*						
55	Prunus domestica	Garden Plum		*	*	*	*	*	*	*
56	Prunus maritima	Beach Plum	N.	*						
57	Prunus Americana	Wild Red and Yellow Plum	N.	*						
58	Prunus Chicasa	Chickasaw Plum	N.	*						
59	Prunus cerasus	Garden Red Cherry (Morello, etc.)		*	*	*	*	*	*	*
60	Prunus avium	Bird Cherry (Heart, etc.)		*				*	*	*
61	Prunus pumila	Dwarf Cherry, Sand Cherry	N.	*						
62	Psidium pyriferum	Guava								
63	Punica Granatum	Pomegranate								
64	Pyrus communis	Pear		*		*	*	*	*	*
65	Pyrus Malus	Apple		*	*	*	*	*	*	*
66	Pyrus prunifolia	Siberian Crab		*	*	*	*	*	*	*
67	Pyrus coronaria	American Crab	N.	*						
68	Pyrus rivularis	Oregon Crab	N.							
69	Ribes Grossularia	English Gooseberry			*	*				
70	Ribes hirtellum	Houghton Gooseberry, etc	N.			*	*	*	*	*
71	Ribes rubrum	Red Currant	N.	*	*	*	*	*	*	*
72	Ribes nigrum	Black Currant	N.	*	*	*	*	*	*	*
73	Rubus occidentalis	Black Cap Raspberry	N.	*	*	*	*	*	*	*
74	Rubus Idæus	European Raspberry		*	*	*	*	*	*	*
75	Rubus strigosus	Wild Red Raspberry	N.	*	*	*	*	*	*	*
76	Rubus villosus	Blackberry	N.	*	*	*	*	*	*	*
77	Rubus Canadensis	Dewberry	N.	*					*	*
78	Shepherdia argentea	Bulfalo Berry	N.							
79	Tamarindus Indicus	Tamarind								
80	Vaccinium Pennsylvanicum	Dwarf Early Blueberry	N.			*	*	*	*	*
81	Vaccinium Canadensis	Canada Blueberry	N.	*		*	*	*	*	*
82	Vaccinium corymbosum	Swamp Blueberry	N.	*		*	*	*	*	*
83	Vaccinium tenellum	Southern Blueberry	N.							
84	Vaccinium macrocarpa	American Cranberry	N.	*						
85	Vitis vinifera	European Grape								
86	Vitis Labrusca	Northern Fox Grape (Concord, etc.)	N.		*	*	*	*	*	*
87	Vitis æstivalis	Summer Grape (Herbemont, etc.)	N.							
88	Vits cordifolia	Winter Grape (Clinton, etc.)	N.	*	*	*	*	*	*	*
89	Vitis vulpina	Bullace Grape (Muscadine, etc.)	N.							
90	Zizyphus sativus	Jujube								


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.

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 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.

INDEX.