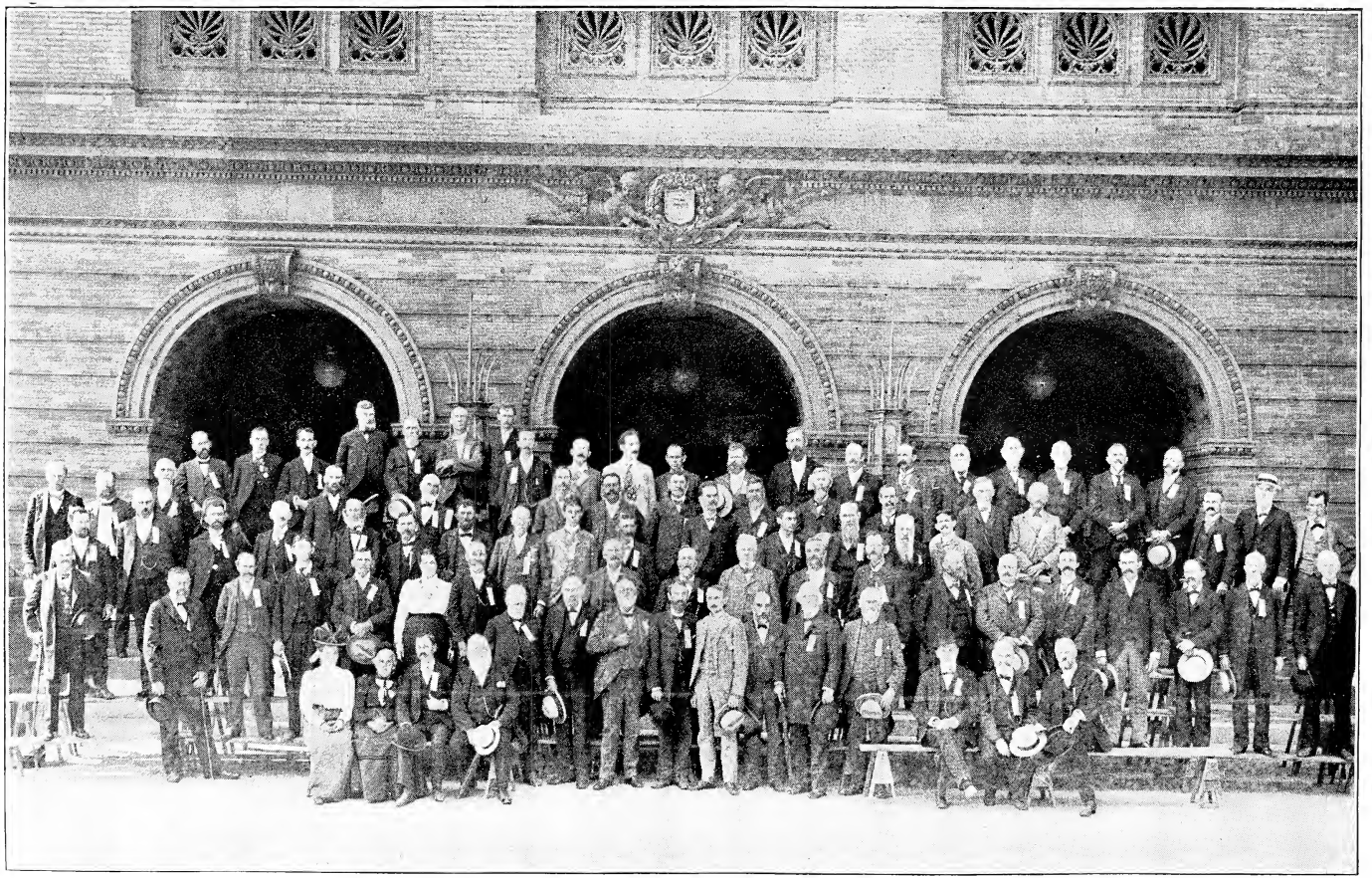
Proceedings

of the

American Pomological Society

Session of 1899



AMERICAN POMOLOGICAL SOCIETY
HORTICULTURAL HALL, PHILADELPHIA,
SEPTEMBER 7, 1899.

PROCEEDINGS

OF THE

TWENTY-SIXTH SESSION

OF THE

AMERICAN POMOLOGICAL SOCIETY

HELD IN

PHILADELPHIA, PA., SEPT. 7-8, 1899.

COMPILED BY THE SECRETARY.

PUBLISHED BY THE SOCIETY.

LANSING, MICH.
ROBERT SMITH PRINTING CO., PRINTERS AND BINDERS
1900.

CONTENTS.

PART I.

PART II.

ILLUSTRATION.

AMERICAN POMOLOGICAL SOCIETY.

Organized 1848.
Incorporated 1887.

ACT OF INCORPORATION.

COMMONWEALTH OF MASSACHUSETTS, 1887.

Section 1. Patrick Barry, of Rochester, New York, Charles W. Garfield, of Grand Rapids, Michigan, Benjamin G. Smith, of Cambridge, Massachusetts, J. J. Thomas, of Union Springs, New York, Prosper J. Berckmans, of Augusta, Georgia, Robert Manning, of Salem, Massachusetts, their associates, the Officers and Members of the Association known as the American Pomological Society, and their successors, are hereby made a corporation under the name of "American Pomological Society," for the purpose of promoting and encouraging the culture of fruit, 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.

Sec. 2. Said corporation may, for the purpose aforesaid, have and hold by purchase, grant, gift or otherwise, real and personal property to an amount not exceeding one hundred thousand dollars.

Sec. 3. Said corporation may hold its annual meeting, or any special meeting in any place, state or country it may determine, provided that due notice shall be given to the members thereof of the time and place of said meeting.

Sec. 4. Any two of the corporators above named are hereby authorized to call the first meeting of said corporation in the month of September next ensuing, by due notice thereof to each member of said Association.

COPY OF BEQUEST FROM THE WILL OF THE LATE MARSHALL P. WILDER.

Eleventh. "I give to the American Pomological Society *one thousand dollars*, the income of which shall be, from time to time, offered in *Wilder Medals* for objects of special merit.

"Also, the further sum of *four thousand dollars*, for the general purposes of the Society."

CONSTITUTION AND BY-LAWS.

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 two dollars for each session, 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 each State, Territory and Province, a Treasurer and a Secretary, who shall be elected by ballot or otherwise at each 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 each biennial meeting; and appoint all committees unless otherwise directed.

2. In the 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. A Chairman of Fruit Committees, for each State, Territory and Province and a General Chairman over all, shall be appointed biennially. It shall be

the duty of such Chairman to appoint four additional members of his committee, and with their aid and such information as he can procure, to forward to the General Chairman one month before each biennial meeting, State Pomological Reports, to be condensed by him for publication.

8. A Standing Committee on *New Fruits of American Origin, 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 *new fruits of American origin, 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.

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* As amended at Philadelphia meeting, Sept. 8, 1899.

OFFICERS AND STANDING COMMITTEES

OF THE

AMERICAN POMOLOGICAL SOCIETY

FOR

1899-1900.

PRESIDENT:

CHARLES L. WATROUS, DES MOINES, IOWA.

FIRST VICE-PRESIDENT:

THOMAS MEEHAN, GERMANTOWN, PHILADELPHIA, PENNSYLVANIA.

STATE VICE-PRESIDENTS:

Alabama	W. F. Heikes	Huntsville.
Arizona	H. W. Adams	Glendale.
Arkansas	Ernest Walker	Fayetteville.
British Columbia	R. M. Palmer	Victoria.
California	Luther Burbank	Santa Rosa.
Colorado	Jno. C. Bell	Montrose.
Connecticut	J. H. Hale	So. Glastonbury.
Delaware	Alexander Pullen	Milford.
District of Columbia	William Saunders	Washington.
Florida	Geo. L. Taber	Glen St. Mary.
Georgia	P. J. A. Berckmans, Jr	Augusta.
Hawaiian Islands	Byron O. Clark	Wahiawa, Oahu.
Idaho	George L. Shoup	Salmon City.
Illinois	H. M. Dunlap	Savoy.
Indiana	James Troop	Lafayette.
Iowa	Chas. G. Patten	Charles City.
Kansas	Wm. H. Barnes	Topeka.
Kentucky	J. J. Payne	Warsaw.
Louisiana	L. T. Sanders	Plain Dealing.
Maine	W. M. Munson	Orono.
Manitoba	Thomas Frankland	Stonewall.
Maryland	J. W. Kerr	Denton.
Massachusetts	Wm. C. Strong	Waban.

Michigan	C. J. Monroe	South Haven.
Minnesota	J. S. Harris	La Crescent.
Mississippi	W. H. Cassell	Vicksburg.
Missouri	J. C. Evans	Harlem.
Nebraska	R. W. Furnas	Brownville.
Nevada	Ross Lewers	Franktown.
New Brunswick	S. L. Peters	Queenstown.
New Hampshire	C. C. Shaw	Milford.
New Jersey	I. J. Blackwell	Titusville.
New Mexico	Parker Earle	Roswell.
New York	F. M. Hexamer, 52 Lafayette Pl.	New York.
North Carolina	J. Van Lindley	Pomona.
North Dakota	C. B. Waldron	Fargo.
Northwest Territories	George Lang	Indian Head.
Nova Scotia	R. W. Starr	Cornwallis.
Ohio	J. J. Harrison	Painesville.
Oklahoma	O. M. Morris	Stillwater.
Ontario	Alex. McD. Allan	Goderich.
Oregon	J. R. Cardwell	Portland.
Pennsylvania	Howard A. Chase, 1430 S. Penn Sq.	Philadelphia.
Puerto Rico	Andres Crosas	San Juan.
Quebec	Robert Brodie, Victoria Ave.	Westmount.
Rhode Island	J. Erastus Lester	Providence.
South Carolina	Charles U. Shepard	Summerville.
South Dakota	H. C. Warner	Forestburg.
Tennessee	John Wieland	Knoxville.
Texas	T. V. Munson	Denison.
Utah	Thomas Judd	St. George.
Vermont	F. A. Waugh	Burlington.
Virginia	Geo. E. Murrell	Fontella.
Washington	N. G. Blalock	Walla Walla.
West Virginia	H. W. Miller	Paw Paw.
Wisconsin	E. S. Goff	Madison.
Wyoming	H. A. Coffeen	Sheridan.

SECRETARY.

WM. A. TAYLOR, 55 Q Street, N. E., WASHINGTON, D. C.

TREASURER.

L. R. TAFT, AGRICULTURAL COLLEGE, MICHIGAN.

STANDING COMMITTEES.

EXECUTIVE COMMITTEE.

Chas. W. Garfield.....Grand Rapids, Michigan.
Wm. C. Strong.....Waban, Massachusetts
L. A. Goodman.....Westport, Missouri.
W. C. Barry.....Rochester, New York.
Wm. B. Alwood.....Blacksburg, Virginia.

FINANCE COMMITTEE.

J. J. Harrison.....Painesville, Ohio.
Chas. W. Garfield.....Grand Rapids, Michigan.
F. Wellhouse.....Fairmount, Kansas.

GENERAL FRUIT COMMITTEE.

Chairman, S. A. BEACH, Geneva, New York.

Alabama	F. S. Earle	Auburn.
Arizona	A. J. McClatchie	Phœnix.
Arkansas	Wm. G. Vincenheller	Fayetteville.
British Columbia	Thos. A. Sharpe	Agassiz.
California	E. J. Wickson	Berkeley.
Colorado	C. S. Crandall	Ft. Collins.
Connecticut	N. S. Platt, 345 Whalley Ave.	New Haven.
Delaware	J. W. Killen	Felton.
District of Columbia	Wm. N. Irwin, 317 V. St., N.E.	Washington.
Florida	W. S. Hart	Hawks Park.
Georgia	Geo. H. Miller	Rome.
Hawaiian Islands	J. C. Lenhart	Kailua, Hawaii.
Idaho	Robert Milliken	Nampa.
Illinois	Geo. J. Foster	Normal.
Indiana	C. M. Hobbs	Bridgeport.
Iowa	Eugene Secor	Forest City.
Kansas	F. Wellhouse.	Fairmount.
Kentucky	C. W. Mathews	Lexington.
Louisiana	F. H. Burnette	Baton Rouge.
Maine	D. H. Knowlton	Farmington.
Manitoba	S. A. Bedford	Brandon.
Maryland	J. S. Harris	Coleman.
Massachusetts	S. T. Maynard	Amherst.
Michigan	Roland Morrill	Benton Harbor.
Minnesota	S. B. Green	St. Anthony Park.
Mississippi	A. B. McKay	Agrl. College.
Missouri	J. C. Whitten	Columbia.
Nebraska	Peter Youngers, Jr.	Geneva.
Nevada	R. H. McDowell	Reno.
New Brunswick	S. L. Peters,	Queenstown.
New Hampshire	F. Wm. Rane	Durham.

New Jersey	D. Augustus Van Derveer	Freehold.
New Mexico	L. Bradford Prince	Santa Fe.
New York	E. C. Powell	Chatham.
North Carolina	Thos. L. Brown	Greensboro.
North Dakota	C. B. Waldron	Fargo.
Northwest Territories	George Lang	Indian Head, Assa.
Nova Scotia	F. C. Sears	Wolfville.
Ohio	W. J. Green	Wooster.
Oklahoma	H. H. Cummins	Bernardi.
Ontario	L. Woolverton	Grimsby.
Oregon	H. B. Miller	Eugene.
Pennsylvania	Geo. C. Butz	State College.
Puerto Rico	John A. Wilson	San Juan.
Quebec	Robert Brodie, Victoria Ave.	Westmount.
Rhode Island	L. F. Kinney	Kingston.
South Carolina	J. S. Newman	Clemson College.
South Dakota	N. E. Hansen	Brookings.
Tennessee	R. H. Garrahan	Knoxville.
Texas	R. H. Price	College Station.
Utah	C. P. Close	Logan.
Vermont	D. C. Hicks	North Clarendon.
Virginia	W. T. Hood	Richmond.
Washington	A. L. Smith	Spokane.
West Virginia	L. C. Corbett	Morgantown.
Wisconsin	B. S. Hoxie	Evansville.
Wyoming	B. C. Buffum	Laramie.

COMMITTEE ON NEW FRUITS OF AMERICAN ORIGIN.

Chairman, JOHN CRAIG, Ames, Iowa.

Districts 1 and 2, L. R. Taft	Agrl. College, Mich.
Districts 3 and 4, H. E. Van Deman	Parksley, Va.
Districts 5 and 7, F. S. Earle	Auburn, Ala.
District 6, G. L. Taber	Glen St. Mary, Fla.
District 8, John Craig	Ames, Iowa.
District 9, E. S. Goff	Madison, Wis.
Districts 10, 13 and 14, C. S. Crandall	Ft. Collins, Colo.
Districts 11 and 12, Parker Earle	Roswell, N. M.
Districts 15 and 16, H. E. Dosch	Portland, Oregon.
Districts 17 and 18, E. J. Wickson	Berkeley, Cal.
District 19, A. J. McClatchie	Phœnix, Arizona.

COMMITTEE ON FOREIGN FRUITS.

Chairman, F. A. KIMBALL, National City, California.

P. J. Berckmans	Augusta, Ga.
J. W. Toumey	Tucson, Ariz.
L. H. Bailey	Ithaca, N. Y.
D. G. Fairchild	Washington, D. C.
B. von Herff, 93 Nassau St.	New York, N. Y.

F. H. Burnette ..... Baton Rouge, La.
Jno. A. Balmer ..... Pullman, Washington.
W. T. Macoun ..... Ottawa, Canada.
N. E. Hansen ..... Brookings, S. D.
W. T. Swingle ..... Washington, D. C.

COMMITTEE ON TROPICAL AND SUB-TROPICAL FRUITS.

Chairman, G. L. TABER, Glen St. Mary, Fla.

Byron O. Clark ..... Wahiawa, Oahu, H. I.
Geo. C. Roeding ..... Fresno, Cal.
H. J. Webber ..... Washington, D. C.
Russel Heath ..... Carpenteria, Cal.
G. Onderdonk ..... Nursery, Texas.
Lyman Phelps ..... Sanford, Fla.
C. P. Taft ..... Orange, Cal.
Chas. H. Shinn ..... Berkeley, Cal.
A. A. Boggs ..... Cocoanut Grove, Fla.
A. J. McClatchie ..... Phœnix, Ariz.

COMMITTEE ON NOMENCLATURE.

Chairman, G. B. BRACKETT, Washington, D. C.

H. E. Van Deman ..... Parksley, Va.
Benjamin Buckman ..... Farmingdale, Ill.
E. F. Babcock ..... Waitsburg, Wash'ton.
Luther Burbank ..... Santa Rosa, Cal.
A. G. Gulley ..... Storrs, Conn.
R. H. Price ..... College Station, Texas.

COMMITTEE ON REVISION OF CATALOGUE.

Chairman, W. H. RAGAN, Greencastle, Ind.

E. J. Wickson ..... Berkeley, Cal.
C. S. Crandall ..... Ft. Collins, Colo.
J. A. Balmer ..... Pullman, Washington.
F. S. Earle ..... Auburn, Ala.
H. E. Van Deman ..... Parksley, Va.
S. T. Maynard ..... Amherst, Mass.

COMMITTEE TO CONFER WITH U. S. DEPARTMENT OF AGRICULTURE.

Chairman, C. W. GARFIELD, Grand Rapids, Mich.

F. M. Hexamer ..... New York, N. Y.
G. L. Taber ..... Glen St. Mary, Fla.

SPECIAL COMMITTEE ON REVISION OF RULES OF NOMENCLATURE.

Chairman, WM. A. TAYLOR, Washington, D. C.

L. H. Bailey ..... Ithaca, N. Y.
F. A. Waugh ..... Burlington, Vt.
Wm. C. Barry ..... Rochester, N. Y.
T. V. Munson ..... Denison, Texas.

LIST OF MEMBERS.

LIFE MEMBERS.

Name.	Address.
Allan, Alex. McD.	Goderich, Ontario.
Allen, Abner.	College Park, Cal.
Allen, Edwin.	New Brunswick, N.J.
*Alwood, Wm. B.	Blacksburg, Va.
Andrews, Frank W.	1761 Mass. Ave., N. W. Washington, D. C.
Appleton, Francis H.	251 Marlboro St., Boston, Mass.
Atkins, Chas. G.	Bucksport, Me.
Austin, Mrs. Helen V.	Winchester, Ky.
Babcock, E. F.	Waitsburg, Wash.
Babcock, J. Lyman.	Norfolk, Va.
*Baird, David	Baird, N. J.
Baker, Chas. R.	Brooklyn, N. Y.
Balmer, John A (For Agr'l College.)	Pullman, Wash.
*Barnes, Wm. H. (For Kan Hort. Soc.)	State Capitol, Topeka, Kans.
*Barry, Wm. C.	Rochester, N. Y.
Beach, S. A. (For N. Y. Agr'l Ex. Station.)	Geneva, N. Y.
Beadle, D. W	307 Givens St., Toronto, Ontario.
Beal, W. J. (For Agr'l College.)	Agr'l College, Mich.
Berryhill, J. G.	Des Moines, Iowa.
*Berckmans, Prosper J.	Augusta, Ga.
*Black, Chas.	Hightstown, N. J.
Blanchard, N. W.	Santa Paula, Cal.
Bliss, B. K.	Boston, Mass.
Bridgeman, Alfred	Newburg, N. Y.
Brill, Francis	Hempstead, L. I., N. Y.
Brown, Chas. E.	Yarmouth, N. S.
Bucklin, Simon S.	Providence, R. I.
Buffum, B. C (For Univ. of Wyo.)	Laramie, Wyoming.
Bush, Raphael	Bushberg, Mo.
Butler, Chas.	Hartsdale, N. Y.
*Butz, Geo. C. (For Pa. State Coll.)	State College Pa.
Calkins, John S.	Pomona. Cal.
Carey, Otis.	Foxboro, Mass.
*Chase, Howard A.	1430 S. Penn Square, Philadelphia, Pa.
Chase, Lewis	Rochester, N Y.
Clapp, Wm. Channing.	Boston, Mass
Clark, Edmund S	141 Essex St., Boston, Mass.
Colman, N. J.	St. Louis, Mo.
Cook, David C	Chicago, Ill.
*Cook, M. S.	Avondale, Pa.
Crandall, C. S.	Ft. Collins, Colo.
Culbert, Wm	Newburg, N. Y.
Cummings, A. P.	New York, N. Y.
†Cummings, Jno.	Woburn, Mass.
Davis, J. C. Bancroft.	1621 H St., N. W., Washington, D. C.
Devol, W. S.	Redlands, Cal.
Durfee, Geo. B.	Fall River, Mass.
Earle, Parker.	Roswell, N Mex
Egbert, Knott C.	Yainax, Oreg.
Ellwanger, George	Rochester, N Y.
Eshleman, John K.	Downington, Pa.
Falconer, Wm (Sup't of Parks.)	Pittsburg, Pa.
Faxon, M. B.	310 Commonwealth Ave., Boston, Mass.
Field, E. T	Middletown, N. J.
Fisher, John	Batavia, N. Y,
†Flint, David B.	Boston, Mass.
Force, T. S., Box 2892.	New York, N. Y.
†French, Jonathan	160 State St., Boston, Mass.
Furnas, R. W	Brownville, Neb.
Gammon, C. W	Walnut Grove, Cal.
Garfield, Chas. W.	Burton Farm, Grand Rapids, Mich.
Gay, Leslie F	Monrovia, Cal.
Gerrish, O. K.	Lakeville, Mass.
*Glen, John G.	Rochester, N. Y.
Goff, E. S.	Madison, Wis.
Gold, T. S.	West Cornwall, Ct.
Goodell, H. H (For Agr'l College.)	Amherst, Mass.
*Goodman, L. A. (For Mo. Hort. Soc'y.)	Westport, Mo.
Graves, S. S	Geneva, N. Y.
Green, S. B. (For Univ. of Minn.)	St. Anthony Park, Minn.
Green, W. J. (For Agr'l Exp. Sta.)	Wooster, Ohio.
Grosvenor, C. E.	Boston, Mass.
Guy, T. W.	Sulphur Springs, Mo.
Hackler, William	161 Wister St., Germantown, Pa.
*Hadwen, O. B.	Worcester, Mass.
Haines, Henry C.	Germantown, Pa.
Haines, John S	Germantown, Pa
Hancock, Caroline G. (For Free Library.)	Sacramento. Cal.
Hansen, N. E.	Brookings, S. Dak.
Harris, Geo. W (For Cornell Univ.)	Ithaca, N. Y.
Harris, James A.	Citra, Fla.
Harris, John S.	La Crescent, Minn.
Harroun, W. S.	Santa Fe, N. M.
Hart, W. S.	Hawk's Park, Fla.
Haskell, George	Ipswich, Mass
Helver, J. W.	Lockport, N. Y.
Herff, B. von	93 Nassau St., New York, N. Y.
*Hexamer, F. M	52 Lafayette Place, New York, N Y.
Hexamer, Mrs. F. M.	52 Lafayette Place, New York, N. Y.
Hoadley, George	22 William St., New York, N. Y.
Hoag, C. L.	Lockport, N. Y.
Holmes, E. S.	Grand Rapids, Mich.
Holton, Warren	Hamilton, Ont.
Hubbard, T. S	Geneva, N. Y.
Hunnewell, H. H	Wellesley, Mass.
Hunnewell, Henry S.	Wellesley, Mass.
Hunnewell, Walter.	87 Milk St., Boston, Mass,
Hunter, John M.	Houston, Texas.
Jeter, Tinsley.	Bethlehem, Pa.
Kendall, Edward	Cambridge, Mass.
Kendall, George F.	Cambridge, Mass.
Kidder, N. T.	Milton, Mass.
King, John A	Great Neck, L I., N. Y.

* Indicates attendance at Philadelphia meeting.

† These names were erroneously included in list of deceased life members in Proceedings of 1897. Sec'y.

LIFE MEMBERS—Concluded.

Name.	Address.
Kinney, L. F. (For Exp. Station.)	Kingston. R. I.
Kirkpatrick, T. J.	Springfield, O.
Koen, R. B.	Memphis, Tenn.
Lake, E. R	Corvallis, Ore.
Leighton, G. B F.	Norfolk, Va.
Lester, J. Erastus	Providence, R. I.
*Lindley, J. Van	Pomona. N. C.
*Lovett, J. T.	Little Silver, N. J.
Luke, Elijah H.	Cambridge, Mass
Lyman. Henry L.	Charlottesville Va.
Lyon, T. T	South Haven, Mich.
Lyons, Jas. M.	5 Cook St,. Fairhaven, Mass.
McKay, A. B. (For Agr'l College.)	Agricultural College, Miss.
*Macoun, W. T. (For Cen. Exp Farm.)	Ottawa, Canada.
Mann, William R.	Sharon, Mass.
*Manning, Robert.	Salem. Mass.
Masters, James H	Nebraska City, Neb.
Maude, Chas. E.	Riverside, Cal.
McCulloch, J. M.	Cincinnati, Ohio.
McDowell, R H.	Reno, Nev.
MacFerron, David	Alleghany City, Pa.
McLaughlin, Henry.	Bangor. Me.
*Meehan, Thomas	Germantown, Pa.
Miller, F. R..	Sugar Grove. Pa.
Minot, C. W.	17 Park Ave., West Somerville. Mass.
Mudd, Henry T	Pittsfield, Ill.
Munson, D. O.	Falls Church, Va.
Murray, R. D.	Key West, Fla.
Newman, J. S	Clemson College, S.C.
Noble, Samuel W	Jenkintown, Pa.
Orton, J. G.	Binghamton, N. Y.
*Parsons, S. B	Flushing, N. Y.
Pearson, John M.	Godfrey, Ill.
Periam, Jonathan	1044 Rogers Park, Chicago, Ill.
Perot, Wm. H	Baltimore. Md.
Phelps, Lyman.	Sanford, Fla.
Phœnix, F. K.	Delevan, Wis.
Popenoe, E. A (For Agr'l College.)	Manhattan, Kans.
Pullen, Alexander	Milford, Del.
Purington, E. F.	W. Farmington, Me.
Quinn, P. T.	Newark. N. J.
Ream, J. A.	Hustonville. Ky.
Richardson, Chas. E.	101 Tremont St., Boston, Mass.
Riehl, E. A.	Alton, Ill.
Roeding, Geo. C	Fresno, Cal.
Rumph, Samuel H	Marshallville, Ga.
Russell, Gurdon W.	Hartford, Conn.
Sadler, O. W.	Pittsburg, Pa.
Sampson, F. G.	Boardman, Fla.
Saunders, William.	Washington, D. C.
Sawyer, Geo. B.	Wiscasset. Me.
Scarborough, W	Cincinnati, Ohio.
Scott, David A	Newburg, N. Y.
Selover, Edward C.	Auburn. N. Y.
*Shaw, C. C.	Milford, N. H.
Shepard, C. U	Summerville. S. C.
Smith, Erwin F.	1160 Staughton St., Washington, D. C.
*Smith, Geo. W.	Hartford. Conn.
Smith, W.	Geneva, N. Y.
Smith, Wm. Elliott.	Alton, Ill.
Smith, Wing R.	Syracuse. N. Y.
Southworth, C.	Stoughton, Mass.
Stark, Clarence M	Louisiana, Mo.
Stark, Wm. Henry	Louisiana. Mo.
Starr, Robert W.	Cornwallis, N. S.
Stewart, Brice	Clarksville. Tenn.
Stewart, Henry L.	Middle Haddam, Ct.
*Stinson, John T. (For Exp. Station.)	Fayetteville, Ark.
Streator, Geo. J.	Garrettsville, Ohio.
*Strong, Wm. C.	Waban, Mass.
Swan. Robt. J.	Geneva. N. Y.
*Swineford, Howard	Richmond, Va.
*Swingle, W. T.	U. S. Dept. of Agriculture, Washington, D. C.
*Taber, G. L.	Glen St. Mary, Fla.
Taft, Edward P.	Providence, R. I.
Tatnall, Edward	Wilmington, Del.
Taylor, F. W.	728 Ellicott Sq., Buffalo, N. Y.
Taylor, Thomas.	238 Mass. Ave., N. E. Washington. D. C.
*Taylor, Wm. A	55 Q St.. N. E., Washington, D, C.
Temple, F. L.	Boston, Mass.
Temple, John T.	Davenport. Iowa.
Thomas, Geo. B.	West Chester. Pa.
Townsend. B. C.	Bay Ridge. L. I., N. Y.
Trelease, Wm	Botanical Garden, St. Louis. Mo.
Trowbridge, Geo. W.	Crestvue, Ohio.
Uber, Carlton A.	Glencarlyn. Va.
Underwood, J. M.	Lake City. Minn.
Utley, H. W (Public Library.)	Detroit. Mich.
*Van Deman, H. E.	Parksley, Va.
Van Gelder, Jacob	Saugerties. N. Y.
Ware, Benj. P.	Clifton. Mass.
Waterer, Hosea	Philadelphia. Pa.
*Watrous, C. L	Des Moines. Ia.
Watrous, Philip. (For Hort. Library, Capitol Building.)	Des Moines. Ia.
Webber, Wm. L. (For Hoyt Pub. Lib.)	Saginaw, Mich.
Wellborn, Jesse M.	Conyers, Ga.
Wellhouse, F	Fairmount, Kans.
Whitehead, John B.	Norfolk, Va.
*Whitten, J. C. (For Univ. of Mo.)	Columbia. Mo.
*Wickersham, Robt. A.	Winchester, Va.
Wieland, John	Knoxville, Tenn.
Wilder, Edward B.	Dorchester, Mass.
Williams. Henry T.	Colorado Springs. Col.
Wood, Wm. H. S.	New York City, N. Y.
Yeomans, Wm. H.	Columbia, Conn.

* Indicates attendance at Philadelphia meeting.

BIENNIAL MEMBERS FOR 26TH SESSION, 1899-1900.

Name.	Address.
Bailey, L. H., Jr.	Ithaca, N. Y.
Baird, Jno. H.	Fort Valley, Ga.
Barns, W. D.	Middle Hope, N. Y.
*Beach, S. A.	Geneva, N. Y.
Bedford, S. A.	Brandon, Manitoba.
Bell, John C.	Montrose, Colo.
Berckmans, P. J. A., Jr.	Augusta, Ga.
Berney, U. H.	Walla Walla, Wash.
Black. A. S.	Marcus, Iowa.
*Blackwell, I J.	Titusville, N. J
Blalock, N. G.	Walla Walla, Wash.
Boggs. A. A.	Cocoanut Grove, Fla.
Bowman, A. M.	Salem, Va.
*Brackett, G. B.	Dept. Agriculture. Washington, D. C.
Brodie, Robert.	Victoria Ave., Westmount, Quebec.
Brown, Thos. L.	Greensboro, N. C.
Buckman, Benjamin.	Farmingdale, Ill.
Burbank, Luther.	Santa Rosa, Cal.
Burnette, F. H.	Baton Rouge. La.
*Butz, Geo. C.	State College, Pa.
Card, Fred W.	Kingston, R. I.
Cardwell, J. R.	Portland, Oregon.
Carroll, Robert J.	Red Hook, N. Y.
Cassell, W. H.	Vicksburg, Miss.
*Charlton, John.	Rochester, N. Y.
*Chase, R. G.	Geneva, N. Y.
Clark, Byron O.	Wahiawa. Oahu, Hawaiian Islands.
*Clark, V. A.	Dept. of Agriculture, Washington, D C.
Close, C. P.	Logan, Utah.
Coburn, W. S.	Hotchkiss, Colo
Coe, Ernest F. (For Elm City Nursery Co.)	New Haven, Conn.
Coffeen, H. A.	Sheridan, Wyoming.
*Collins, Arthur J.	Moorestown, N. J.
*Collins, John S.	Moorestown, N. J.
Cone, Moses H.	Greensboro, N. C.
*Corbett, L. C.	Morgantown, W. Va.
Corrigan, J. F.	St. Leo, Fla.
*Couch, E. J.	Ridgefield, Conn.
*Craig, Jno.	Ames, Iowa.
*Daniels, Edward.	Gunston, Va.
Davis, Howard.	No. 1, N. Paca Street, Baltimore, Md.
Dean, M. L.	Agr'l College, Mich
*DeCou, Samuel C.	Moorestown, N. J.
Detroit Public Library.	Detroit, Mich
Dosch, Henry E.	Portland, Oregon.
Dunlap. H. M.	Savoy, Ill.
Earle, F. S.	Auburn, Ala.
Emerick, David.	702 N. Central Ave., Paris, Ill.
*Evans, J. C.	Harlem, Mo.
Fairchild, D. G.	Dept. of Agriculture, Washington, D. C.
*Fairchild, H. L.	Bridgeport, Conn.
Farnsworth, W. W.	Waterville, Ohio.
*Faville, E. E.	Doylestown, Pa.
Ferguson, A. McGowan.	College Station, Tex.
*Foster, Geo. J.	Normal. Ill.
Frankland, Thos.	Stonewall, Manitoba.
Gage, John P.	Vineland, N. J.
Garrahan, R. H.	Knoxville, Tenn.
*Gilbert, Orrin.	Middletown, Conn.
Gill, Geo. W.	274 N. High St., Columbus Ohio.
*Glen, J. G.	Rochester, N. Y.
Good, C. W.	Waynesboro, Pa.
*Gould, H. P	College Park, Md.
Green, Calvin.	Lewistown, Pa.
Green, E. C.	Urbana, Ill.
*Greene, Wesley.	Davenport, Ia.
Greening Bros.	Monroe, Mich.
Griesa, A. H.	Lawrence, Kan.
Griffing, Timothy M.	Riverhead, N. Y.
*Gulley, A. G.	Storrs, Conn.
*Haden, Jno. J.	Cocoanut Grove, Fla.
*Hale, J. H.	S. Glastonbury, Conn.
*Halsted, B. D.	New Brunswick, N. J.
*Hanford, J. C. Eaton.	General Delivery, Detroit, Mich.
Harris, Jas. S.	Coleman. Md.
Harrison, J. J.	Painesville, Ohio.
*Hartshorne, C. R.	Brighton, Md.
*Hartwell, Samuel.	Lincoln, Mass.
Heath, Russel.	Carpenteria, Cal.
Hedrick, U. P.	Agr'l College, Mich.
Heikes, W. F.	Huntsville, Ala.
*Hendricks, Howard.	Kingston, N. Y.
Henry, J. P.	Ranisey, Cal.
Hicks, D. C.	N. Clarendon, Vt.
Hiester, Gabriel.	Harrisburg, Pa.
*Hill, Frank.	Little Rock, Ark.
Hobbs, C. M.	Bridgeport, Ind.
*Hobbs, Elon S. (For Fruit Trade Journal.)	78 Park Place, New York, N. Y.
*Hood. W. T.	Richmond, Va.
Hoxie, B. S.	Evansville, Wis.
Hubbard Co., The T. S.	Fredonia, N. Y.
Ilgenfritz, Chas. A.	Monroe, Mich.
*Irish, H. C.	Missouri Botanic Garden, St. Louis. Mo.
*Irwin, Wm N.	317 V. St. N. E., Washington. D. C.
Johnson, J. R.	303 McKenney Ave., Dallas. Texas.
*Johnson, W. B. K.	Allentown, Pa.
Johnson, Sylvester.	Irvington, Ind.
*Jones, H. T.	Ellzabeth, N. J.
*Jordan, A T.	New Brunswick, N J.
Josselyn, Geo. S.	Fredonia, N. Y.
Judd, Thomas.	St. George, Utah.
Katzenstein, Geo. B.	1014 Second St., Sacramento, Cal.
*Kellogg, R. M.	Three Rivers, Mich.
Kelsey, F. W.	150 Broadway, New York, N. Y.
*Kerr, J. W.	Denton, Md.
Kevitt, Tice C.	Athenia, N. J.
*Killen, J. W.	Felton, Del.
Kimball, F. A.	National City, Cal.
Kinney, L. F.	Kingston, R. I.
Knowlton, D. H	Farmington, Me.
*Lane, J. Warren	Riverton, N. J.
*Lazenby, W. R.	Columbus, Ohio.
Lenhart, J. C.	Kailua, Hawaii, H. I.
*Leonard, A. L. and Hampton	Iona, N. J.
Lewers, Ross.	Franktown, Neb.
Lindsey, W. T.	Tryon, N. C.
McClatchie, A. J.	Phœnix. Ariz.
*McFarland, J. Horace	Harrisburg, Pa.
McKay, A. B.	Agr'l College, Miss.
McLaughlin, S	450 East 10th St, Los Angeles, Cal.
*Manning, J. W.	Reading, Mass.
Mathews, C. W.	Lexington, Ky.
Maxwell. Wm. S.	Still Pond, Md.
*Maynard, S. T.	Amherst, Mass.
Mendenhall, E. G.	Kinmundy, Ill.
Meres, Mrs. W. F.	Tarpon Springs, Fla.
*Miles, H. C. C. (For Conn. State Pomological Society.)	Milford, Conn.
Miller, G. H.	Rome, Ga.
Miller, H. B.	Eugene, Oregon.
Miller, H. W	Paw Paw, W. Va.
Miller, Wilhelm	Ithaca, N. Y.
Milliken, Robert.	Nampa, Idaho.
*Molumphy, J. T.	Berlin, Conn.
*Monroe, C. J.	South Haven, Mich.
*Moon, Wm. H.	Morrisville, Pa.

* Indicates attendance at Philadelphia meeting.

BIENNIAL MEMBERS FOR 26TH SESSION, 1899-1900.—Concluded.

Name.	Address.	Name.	Address.
*Morgan, W. H.	Westmont, N. J.	Shinn, Chas. H.	Inspector of Exper. Stations, Berkeley, Cal.
Morrill, R.	Benton Harbor, Mich.		
Morris, O. M.	Stillwater, Okla.	Shoup, Geo. L.	Salmon City, Idaho.
*Munson, W. M.	Orono, Maine.	Smith, A. L.	Spokane, Wash.
Munson, T. V.	Denison, Texas.	Smith, E. L.	Hood River, Oregon.
*Murrell, Geo. E.	Fontella, Va.	*Smith, Theodore J.	Geneva, N. Y.
*Myers, Jno. A.	12 John Street, New York, N. Y.	*Steele, T. E.	Parry, N. J.
Myrick, Herbert	Springfield, Mass.	*Storrs and Harrison Co.	Painesville, Ohio.
N. Y State Library.	Albany, N. Y.	*Stout, W. H.	Pine Grove, Pa.
Offner, W. S.	Walla Walla, Wash.	Sturgus, M. B.	Treas'ry Dept., Washington, D. C.
Palmer, R. M.	Dept. of Agriculture, Victoria, B. C.	Taft, C. P.	Orange, Cal.
*Patten, C. G.	Charles City, Iowa.	*Taft, L. R.	Agr'l College, Mich.
Payne, J. J.	Warsaw, Ky.	*Taylor, Howard G.	Fresno, Cal.
*Pedersen, Peder.	Huntingdon Valley, Pa.	Thomson, A. L	East Avon, N. Y.
*Peters, Chas. M.	Wesley, Md.	Toumey, J. W.	Tucson, Ariz.
Phœnix, F. S.	Bloomington, Ill.	Troop, James	Lafayette, Ind.
*Platt, N. S.	345 Whalley Avenue, New Haven, Conn.	Troyer, A. M.	Calhoun, Ala.
Powell, E. C.	Chatham, N. Y.	*Van Derveer, D. Augustus	Freehold, N. J.
*Powell, G. Harold.	Newark, Del.	*Vincenheller, W. G.	Fayetteville, Ark.
Price, R. H.	College Station, Tex.	Walker, Ernest	Fayetteville, Ark.
Prince, L. Bradford.	Santa Fe, N. M.	*Wallis, Henry.	Wellston, Mo.
*Ragan, W. H.	Greencastle, Ind.	*Ward, Jos. B.	Lyons Farms, N. J.
Rane, F. Wm.	Durham, N. H.	Warner, H. C.	Forestburg, S. Dak.
Repp, John.	Glassboro, N. J.	*Watson, Jno.	Brenham, Texas.
*Rife, Jacob L.	West Fairview, Pa.	*Waugh, F. A.	Burlington, Vt.
*Roberts, Emmor.	Moorestown, N. J.	*Webb, Wesley.	Dover, Del.
*Roberts, Horace.	Moorestown, N. J.	*Webber, H. J.	U. S. Dept. of Agriculture, Washington, D. C.
*Rogers, Jesse B.	Newark, N. J.		
Rolfs, P. H.	Clemson College, S. C.		
*Rosa, John J.	Milford, Del.	*Webster, F. M.	Wooster, Ohio.
*Sabsovich, H.	Baron de Hirsch Sch'l, Woodbine, N. J.	*Wenger, C. D.	Dayton, Va.
		*Whitehead, Mortimer	Middlebush, N. J.
Sage, C. D.	N. Brookfield, Mass.	Wickson, E. J.	Berkeley, Cal.
*Sanborn, Grace P.	Augusta, Maine.	*Williams, Jos. H.	Riverton, N. J.
Sanders, L. T.	Plain Dealing, La.	*Wilson, Silas.	Atlantic, Iowa.
*Sears, F. C.	Wolfville, N. S.	Woods, Samuel B.	Charlottesville, Va.
*Secor, Eugene.	Forest City, Iowa.	Woolverton, L.	Grimsby, Ont.
Selby, A. D.	Wooster, Ohio.	Youngers, Peter, Jr.	Geneva, Neb.
Sharpe, Thomas A.	Agassiz, B. C.	Zimmerman, C. D.	131 Norwood Avenue, Buffalo, N. Y.

* Indicates attendance at Philadelphia meeting.

BIENNIAL MEMBERS FOR 1901-03.

Name.	Address.	Name.	Address.
Fairchild, H. L.	Bridgeport, Conn.	McFarland, J. Horace.	Harrisburg, Pa.
Heikes, W. F.	Huntsville, Ala.	New York State Lib.	Albany, N. Y.

In Memoriam.

This page is dedicated by the Society to the memory of members who have passed away since the Session of 1897 at Columbus.

DECEASED LIFE MEMBERS.

George W. Campbell	Delaware, Ohio.
George S. Conover	Geneva, N. Y.
A. A. Crozier	Agricultural College, Mich.
B. B. Hance	Pullman, Ill.
J. F. C. Hyde	Newton Highlands, Mass.
Joseph H. Kent	Russellville, Pa.
A. M. Lawver	San Francisco, Cal.
F. M. Marble	Worcester, Mass.
J. M. Samuels	Clinton, Ky.
Benjamin G. Smith	Cambridge, Mass.
Frederick Smyth	Manchester, N. H.

DECEASED BIENNIAL MEMBERS.

Isidor Bush	Bushberg, Mo.
Edmond H. Hart	Federal Point, Fla.
R. Maitre	New Orleans, La.
William Parry	Parry, N. J.
Harrison Reed	South Jacksonville, Fla.

PREFATORY NOTE.

The Twenty-Sixth Session of the American Pomological Society was held in Horticultural Hall, Philadelphia, September 7 and 8, 1899, in response to an invitation from the Pennsylvania Horticultural Society, which was accepted by the Executive Committee early in 1899. Announcement of place and approximate date of meeting was immediately made through the press and the several state horticultural societies were urged to select delegates to the Session at their annual meetings. A preliminary program of speakers and subjects issued in July was mailed to the members and to other persons interested in fruit culture.

As the dates selected occurred during the Annual Encampment of the Grand Army of the Republic, many members reached Philadelphia a day or two in advance of the opening of the Session and were on hand to participate in an informal conference held in connection with a meeting of the Executive Committee in the parlors of Wissahickon Inn, on Wednesday eve, Sept. 6. At this conference the objects and methods of the society were discussed with freedom in an informal way with apparent profit to those present and to the Society. The preliminary details of the Session were settled and an evening of social conversation and renewal of acquaintance was enjoyed.

The Session was graced by the attendance of many of the veterans in pomology who were its active members during its early history. Their words of reminiscence and of hope may well encourage the younger members to increased activity in the work which the Society has before it in increasing public interest in fruit culture both for home use and for profit.

The essential features of the Session are included in the following stenographic record of the transactions. Some of the papers and addresses are published in the form of abstracts in accordance with the expressed desire of the authors. Several papers prepared for the meeting by persons not present are included in the published proceedings.

Very respectfully,

WM. A. TAYLOR,
Secretary.

[The Society does not in any way hold itself responsible for, nor endorse opinions or theories expressed in the various papers or discussions found in this volume.]

PROCEEDINGS

OF THE

AMERICAN POMOLOGICAL SOCIETY

AT ITS TWENTY-SIXTH SESSION,

HELD IN

Philadelphia, Pa., Sept. 7-8, 1899.

THURSDAY MORNING SESSION.

Philadelphia, Thursday, Sept. 7, 1899.

The Twenty-Sixth Biennial Session of the American Pomological Society assembled in Horticultural Hall, with more than 100 members and accredited delegates, representing twenty-two States and Provinces, in attendance. Subsequent arrivals increased the total attendance of members and delegates to about 200, representing twenty-six States and Provinces.

Upon calling the Society to order at 10 A. M., President Watrous introduced the Rev. H. C. McCook, D. D., of Philadelphia, who delivered the invocation.

INVOCATION.

Almighty God, we adore Thee as the Author of life. Thou hast filled us with Thy light. Thou hast caused the earth to beat, in its fruitful bosom, with the life that is from Thee; and it brings forth seed for the sower and bread for the eater. The fruits of the field are Thine, Oh Lord God, and we beseech Thee, as in the name of a Society engaged in the cultivation of fruits, that look up to Thee for Thy blessing, that Thou wilt grant such grace, such wisdom, such guidance as may be meet. Let Thy blessing rest upon the officers and all members of this Pomological Society and upon all who are associated with it, in all the relations which they have to the cultivation of the fruits of the field. May the Lord bless all, not only in our own United States but in the Dominion of Canada, who are associated in this work. We pray that this Session may be filled with the spirit of wisdom and of a sound mind, that there may come from it that which will stimulate the improvement of the products of the orchard and the field and that the prosperity of the people may thus be enhanced with the blessing of our God upon all.

We pray, Almighty Father, that Thou wilt bless Thy servant, the President of the United States, and that Thou wilt fill him and all his advisers with the spirit of wisdom. We pray for the soldiers who are gathered now in our midst, the guests of this great city. May the Lord preserve them from peril of all sorts and bring them—soldiers and sailors—safe to their homes and their desired habitations. Let Thy blessing, we beseech of Thee, rest upon Thy hand-maid, the Queen of England. Preserve Thou her, O God, in life, long to reign over her people in justice, in purity and in humanity. So guide these twin nations, these people from the one stock, that the spirit of the Master may be with us and that in all things the fruits of our lives may grow upon the tree of prosperity and peace.

We ask these blessings, with Thy grace, in the name of Him Who hath taught us to say, "Our Father which art in heaven, Hallowed be Thy name. Thy Kingdom come. Thy will be done in earth, as it is in heaven. Give us this day our daily bread; and forgive us our trespasses as we forgive those who trespass against us. And lead us not into temptation, but deliver us from evil; for Thine is the kingdom, and the power, and the glory, forever. Amen."

ADDRESS OF WELCOME.

Vice President Robert Craig, of the Pennsylvania Horticultural Society,, formally welcomed the Society. After speaking of the pleasant duty assigned him and the gratification of his associates in having the fruit men with them, Mr. Craig assured the visitors of a generous welcome at this time and all other times. He said that his earliest and most pleasant recollections in connection with the Horticultural Society were the displays of apples, peaches, plums and grapes, thirty-five years ago and longer, when as a boy he accompanied his father to the fruit exhibitions. Later these exhibitions became smaller, and for some years there had been no such gratifying fruit display as was to be seen today in the adjoining hall. He continued:

"There is nothing finer than a good fruit. Among the things that minister to the enjoyment of men the result of your work takes a very high place. You are devoting your lives to making fruit better, to improving flavors, sizes and all the other good qualities. We assure you of our cordial sympathy in your work and our coöperation to forward the success of your meeting. Should you desire more space for your Exhibition we will be glad to place the larger halls of this building at your service. Nothing would so well please the members of the Pennsylvania Horticultural Society as, some day, to have the upper hall filled with fruit from all over the land.

RESPONSE.

BY EX. PRESIDENT P. J. BERCKMANS, AUGUSTA, GA.

Ex-President Berckmans, being called upon by President Watrous, made the response on behalf of the Society. He good naturedly explained that he construed the call made upon him by the President as an act of retaliation because of his having, at the Washington meeting, in 1891, called upon Mr. Watrous to make the response to the address of welcome. He said that, unlike that gentleman, who had prepared himself for the occasion, he had been called upon unexpectedly, but had been assured by the President that only three words from him would be sufficient. He continued:

"Gentlemen, it is to me a source of great pleasure to meet so many of you whom I had the pleasure of meeting many years ago. The first Session of the Pomological Society which I attended was in Philadelphia, in 1860. I see gentlemen here today who were present then. Alas, many others have gone from among us. We came together at that time under rather unfavorable auspices, still the organization was a large one and did a great deal of work. Today the conditions are altogether different, and "good will toward men" is the motto of this City of Brotherly Love.

Philadelphia may lay claim to a great deal of the early pomological work. If I am not mistaken, the very first attempt that was made toward an improvement of our native grape by systematic methods was made in Philadelphia. Perhaps some of you may remember a gentleman by the name of Peter Raabe who attempted to improve the native grapes by the infusion of foreign blood. He succeeded. One of the very first was named after one of the most worthy men you had in the pomological world, the late Dr. W. D. Brincklé. The next one was named after his daughter Emily; if I am not mistaken the third was "Clara" and the fourth was "Raabe." That was the beginning of the first era of progressive grape growing in this country.

Perhaps I may antedate these remarks by saying that the pear which is still the standard of perfection originated in Philadelphia—the Seckel. Another, which may not have originated in Philadelphia, but at a point so close to it that Philadelphia may lay claim to it, is the Kieffer; which, as all of you gentlemen who are engaged in pear growing know, has been a God-send as a commercial product. In noticing the display of grapes today I saw rather a smaller quantity than I anticipated from the early beginning which was made here, but the quality seems to be rather good.

In view of the large amount of work before us, as outlined by your President, I am reminded to be brief. It is gratifying to us to have been welcomed here by one of the worthiest men engaged in horticulture in Philadelphia, Mr. Robert Craig. His name is universally known, and he is esteemed as one who stands at the head of his profession.

Mr. President, I will take you at your word; my "three words" have perhaps been multiplied, but with your permission, I will now simply say to Mr. Craig, in behalf of the American Pomological Society, that we thank him most heartily for his generous words of welcome.

APPOINTMENT OF COMMITTEES.

President Watrous here announced that the Committees for the Session had been constituted as follows:

COMMITTEES.

CREDENTIALS—Wm. C. Strong, Massachusetts; Howard A. Chase, Pennsylvania; J. C. Evans, Missouri.

ORDER OF BUSINESS—Wm. B. Alwood, Virginia; Geo. C. Butz, Pennsylvania; L. R. Taft, Michigan.

AWARD OF WILDER MEDALS—F. M. Hexamer, New York; H. E. Van Deman, Virginia; John Craig, Iowa; G. B. Brackett, District of Columbia; A. G. Gulley, Connecticut.

RESOLUTIONS—L. A. Goodman, Missouri; F. A. Waugh, Vermont; Wm. R. Lazenby, Ohio.

MEMORIALS—P. J. Berckmans, Georgia; Robert Manning, Massachusetts; Thomas Meehan, Pennsylvania; W. H. Ragan, Indiana; J. Van Lindley, North Carolina.

THE TREASURER'S REPORT.

Prof. L. R. Taft, Treasurer of the Society prefaced the reading of his report with the following explanation as to the funds of the Society: On the death of President Wilder a bequest of $5,000 was made to the Society, the income of $4,000 to be used at the will of the Society and that of the other $1,000 to be used for Wilder medals. This money is invested in railroad bonds that yield four per cent. interest. We have, aside from that, an income from membership fees, viz., $2 for the biennial and $20 for the life membership. The income of the past year has come from these sources.

The report was as follows:

REPORT OF TREASURER.

Office of the Treasurer, Agricultural College, Mich., Sept. 1, 1899.

L. R. Taft, Treasurer, in account with American Pomological Society.

Dr.

1897.		
Nov. 3.	To cash from Ex-Treasurer Richardson	$282 48
Nov. 3.	To cash from Treasurer pro tem. Campbell	76 00
1899.		
Aug. 31.	To cash from ten life memberships @ $20	200 00
Aug. 31.	To cash from 150 biennial memberships @ $2	300 00
Aug. 31.	To cash from sale of proceedings	34 00
Aug. 31.	To cash from interest on $5,000 bonds, 2 years, @ 4%	400 00
	Total receipts	$1,292 48

Cr.

1897.		
Nov. 3.	By cash paid G. C. Brackett, ex-Secretary, salary	$50 00
Nov. 3.	By cash paid G. C. Brackett, postage and printing	22 49
Nov. 26	By cash paid W. H. Hartsough, reporting at Columbus	28 00
Dec. 13.	By cash paid Robert Smith Printing Company, stationery	4 55
Dec. 13.	By cash paid L. R. Taft, freight and drayage	25 79
Dec. 13.	By cash paid L. R. Taft, postage and sundries	4 75
1898.		
Feb. 28.	By cash paid Chas. E. Richardson, packing and drayage	12 35
Feb. 28.	By cash paid W. A. Taylor, sundries	30 72
Feb. 28.	By cash paid Peter Krider Co., medals	18 85
Aug. 28.	By cash paid Robert Smith Printing Co., Proceedings	230 74
Sept. 23.	By cash paid L. R. Taft, postage and sundries	37 59
1899.		
Feb. 4.	By cash paid W. A. Taylor, postage and expressage	14 21

Sept. 1.	By cash paid Lawrence & Van Buren Co., printing.....	$9 75
Sept. 1.	By cash paid W. A. Taylor, 2 years' salary.....	100 00
Sept. 1.	By cash paid W. A. Taylor, printing and postage.....	50 76
Sept. 1.	By cash paid L. R. Taft, printing and postage.....	15 00
	Total amount of payments.....	$655 55
	Balance on hand	636 93
		$1,292 48

ASSETS.

Bonds of C., B. & Q. R. R. at cost.....	$4,910 43
Accrued interest on bonds.....	66 67
Cash on hand	636 93
	$5,614 03

L. R. TAFT,
Treasurer.

On motion of Mr. C. J. Monroe, the Treasurer's account was referred to an auditing committee of three, to be appointed by the Chair.

Subsequently Messrs. W. G. Vincenheller, Arkansas; F. M. Webster, Ohio, and R. M. Kellogg, Michigan were constituted the committee.

President Watrous called ex-President Berckmans to the chair and delivered his annual address.

PRESIDENT'S ADDRESS.

BY CHARLES L. WATROUS, DES MOINES, IOWA.

Gentlemen of the American Pomological Society:

This day we stand upon the threshold of the second half century of the labor of the most honorable and useful pomological organization known to history. We look with confident eyes into the future, secure in the knowledge that if we and those who are to come after us shall be as wise and patriotic in our work as have been our fellow workers, now happily mustered out and gone over the deep river, the century's work of this Society will have brought such good into the lives of so many people that its name will go down in history followed with blessings, and a man's children shall treasure the record of his membership, as an honor.

It is well known that the people of no other nation are so universally supplied with fruits as ours are, not as an occasional luxury, but as an integral, necessary part of our daily food, from the beginning to the ending of the year. I think the history of the world shows that much of the lives of men depends upon the food they eat and that as their bodies are healthfully nourished, so do their hearts and their brains work strongly and rightly.

Since our last meeting, two years ago, at Columbus, there has happened to us and to our country, that which rightfully makes every American stand a little taller; and as he looks toward the rest of the world, it is with a more confident eye and a prouder gladness, in his right of American citizenship.

Besides this, there has happened a yet more wonderful and fortunate thing among ourselves. Heretofore there has always rested a shadow over the pride of our American citizenship. There was "a rift in the lute" and the tones sometimes failed to come true and clear. For four years, many of us stood with breasts bared to shot and shell and saber stroke of each other. That horrible dream finally came to an end and we met as brothers again, yet the shade of the shadow had not fully past. But since we last looked into each others eyes, the "rift in the lute" has been cemented in the blood of our soldier sons, who have stood shoulder to shoulder against a common enemy. They have risked their lives for each other. They have drunk from the same canteen. They have cheered each other in the hour of victory. They have nursed each other in wounds and sickness and have sorrowed together for their dead. They are now, and will be as long as life lasts, bound together by that tie which binds closer than any other—the tie of comradeship. It cannot fail that the fathers of those sons will meet and will part with a different hand clasp and a different look into the eyes. Thank God, the "rift in our lute" is gone, no more to mar our harmony forever! (Applause.)

The past is finished. United we look into the future to take council together. No other pomological organization ever had such boundless opportunities for usefulness. Heretofore, a new fruit was expected to come from without. Men have been justly honored when they brought new and useful fruits and plants from far countries, but the time now is that a far more promising field is open in the creating of new fruits from those ready to our hands in the different botanical regions of our own country. The beginning of this work, in dividing our country into districts according to scientific biological surveys, instead of according to accidental political divisions, is accomplished. The men represented by this Society, that is, the Pomologists of America, are now in position to work in the closest accord with the men of the national experiment stations. They ought to help lay out the lines of work for these stations. They should furnish the working material for experimentation; and finally, this Society must sit as a supreme court of last resort and pass upon the worthiness of the results.

There are doubtless native fruits in each one of the life regions into which our country is divided, which only await intelligent labor to civilize them into good citizenship and to the production of pomological products, best fitted for those regions.

The work of wine growing has been brought to such development in foreign countries, that the vintages of certain districts have a reputation over the world, and even the wines of certain hillsides. Some day may it not be that in this nation, each life region shall have fruits bred for, and especially suited to itself?

This may be called a dream, but why a dream? The improved breeds of domestic animals have had their origin and development in certain regions, to meet the wants of those regions, while in the realm of fruits, chance has had the center of the stage of action and still holds it, and scientific pomology stands in the entrance, looking on. Yet the vital laws of reproduction of animals and of plants are identical and offer no reason why the next fifty years should not see fruit breeding carried on as systematically as stock breeding now is.

For instance, in the upper Mississippi valley, many hybrids already exist

of cultivated varieties with native plums, apples, mountain cherries and other fruits, and we await the same work with our northern native grapes; so well carried on by Munson in the South. In our national experiment stations, the machinery is already in place for this work.

Another promising field of work in the national experiment stations would seem to be in the investigation of the results of securing the blossoming of different varieties of fruits in proximity, either by planting the trees adjoining, or, if necessary, by uniting the different varieties in the same top by grafting. Many noble fruits are discarded because they bloom and do not ripen sufficient fruit. May not a large part of this be because they are not happily mated with congenial companions?

This problem can best be taken up and carried on by the national experiment stations because, while the young men may leave or grow old, the stations, the records, the trees and the plants will remain if they are such as ought to remain in those regions, and all else is of little consequence.

Pomologists may assist the experiment stations to gather material for garden and pomological herbarias, inclusive of as much as is possible of materials for identification and for a biological record of all useful fruits as well as plants. The foliage, twigs, bloom; the seeds and outline drawings of the fruits and accurate descriptions of the same and of their behavior, would form part of the material for such herbaria. I am told that one already exists in New York State, of many thousand specimens. Such herbaria, would be useful in preventing fraud and to assist in fixing the status of new candidates for public favor in pomology and gardening.

If this Society could impress upon fruit growers generally, that new fruits, originated in their own botanical districts, are much more likely to succeed there, than those originating outside, and that when flaming advertisements come to them from distant regions, they may safely wait until the experiment stations have tested those strangers and ascertain somewhat of their ability to withstand the difficulties of changing from one region to another, much time and money might be saved. Large sums are now wasted each year in indiscriminate testing of new fruits from distant regions, without inquiry as to the soil, the elevation or the range of the thermometer, at their birthplaces. Much of this is worse than wasted.

A whole region in the Northwest has paid tribute to this unfortunate method for twenty years. Multitudes of fruits were imported from a foreign country, thought to be like some portions of America, and confident enthusiasm straightway proclaimed that they must be expected to give wonderful successes. This was written and published and reiterated through a large region, until a sort of religious enthusiasm arose in favor of foreign fruits, and large sums of money were invested in growing and selling young trees and plants in a region at least three hundred miles south of a hopeful latitude. Nearly every orchard and garden near the center of promulgation was invaded, but the end of it all was bitterness.

If the experiment could have had the benefit, at first, of a little scientific knowledge, and afterwards of a trace of the caution resulting from such knowledge, all the good results could have been reached by the experiment stations at an outlay of a few hundred dollars each, instead of the hundreds of thousands which it has cost. A generation of labor will not repair the misfortune.

While such things are possible, this Society has a great work to do.

Very interesting reports have come of the late Hybridization Conference in London, but it would seem that while admirable work has been done, it has been done mostly to produce beautiful things for the few, while our best work must be to produce useful and healthful food for the many. The work in Europe has been for the classes, the work for this Society is for all Americans. May it not be eminently proper that a practical Society like this should undertake the work of spreading such information that when fruits are grown, it shall not remain true that while the many are hungry, certain favored markets are flooded to repletion. The ultimate aim of American Pomology must be that wholesome fruits be brought within the reach of all American citizens, at such prices, that everyone willing to work may eat of them. The task of distribution should be so performed that fruit gluts and famines may be reduced to a minimum.

No state organization can do this. If it is ever done, it must be done nationally. This may be another dream, but if the dream can be made into a business reality, it will bring untold blessings into American homes.

I should like to see a special committee appointed to report at our next meeting, whether, if in their judgment, any means may be adopted to assist fruit growers to accomplish this reform.

In recommending new fruits, neither this Society nor any other can wholly guide the public taste. A brilliantly colored fruit may take the market while a more modest one of better quality brings only loss to the grower, and if Americans are to be fed with fruit, men must grow that which they can turn into money to pay for educating their families and for growing more fruit. If men *will* buy Ben Davis apples and pass by Grimes Golden, that is something which pomologists cannot, at once, cure.

It is said that the love of bright colors is a survival of savagery. That may be true, but if it was a surviving drop of the red blood of our savage ancestors that carried our boys up San Juan Hill and made them eager in Manila Bay and off Santiago Harbor, may it be a long time before the drop of red blood in their livers is changed to milk.

There is abundant work ready and waiting for the hands of this Society. It cannot all be done in one generation, but the womb of time is full of years and every year brings its opportunities.

Men must fall out of the ranks. The last two years have taken some of our best. A Committee on Memorials will relate some of their good works and our volume will preserve the record.

The living must still hold to the paths leading upward and onward. (Applause.)

On motion of Prof. Wm. B. Alwood, the President's Address was referred to a committee of three with instructions to report at such time as they saw fit.

The Chair appointed the following as the committee: Messrs. Wm. B. Alwood, Virginia; Byron D. Halsted, New Jersey, and F. M. Hexamer, New York.

PHILADELPHIA'S CONTRIBUTIONS TO THE HISTORY OF AMERICAN POMOLOGY.

PROF. THOMAS MEEHAN, GERMANTOWN, PENNSYLVANIA.

Prof. Meehan, responding to the call of the Chair, for remarks on this subject, came forward. He was cordially greeted by the Society and said:

Mr. President and Friends—American pomology is the admiration of the world; and I desire to say that, in my opinion, the great eminence to which it has attained is mainly the work of the Americal Pomological Society of which you are members. When foreigners come to America they are surprised at the immense profusion of fruit everywhere; they find that even the poorest can enjoy the best fruits equally with the rich. In the old world it is different; it is only what is known there as "the middle class" or "the better class" that is able to enjoy fruits at all; the vast majority of the people, the masses, scarcely know what good fruits are except as they raise them in the cottage gardens which many of them have. They raise fruits there to a large extent as we do, but those who raise them seldom get the fruits themselves. What they raise others eat; what they produce has to go chiefly in the shape of tithes and taxes. It is only in America, where we are comparatively free from these exactions, that we are enabled to spread over the whole country the successful fruit growing which you see today.

As I have said, you and your Society are entitled to the credit for this. You know all that, but I have a purpose in reminding you of it. We have been going on for the past fifty years, since the origin of this Society, with new ideas, new practices and new methods, until we have reached the eminence of which I have spoken; but it is well, I think, in the case of all progressive bodies, to pause sometimes to take a little breath and, while pausing, to review in a measure what has been done. When we feel that the work which we have been trying to do has been successfully accomplished the feeling leads us to make greater progress. It was with this thought that it occurred to me that, while you are resting, it would be well to call your attention to what Philadelphia has done in connection with this great work—not that Philadelphia has done more than other localities, but because you are here and, as pomologists, naturally would like to know what Philadelphia has done in that line, just as you like to know, when you go to other cities, what has been done there.

A thought that occurs to me here may be worth mentioning, and that is that the efforts of the mass of humanity to attain certain objects often produce results in a direction which they little think of while they are pursuing their projects. Who would have thought that the rush for gold, in California, a half a century ago, would have resulted in making California one of the brightest States of the Union for fruit growing? In like manner, who would have thought that the silver mining enterprise in Colorado would have built up a community there which is already making its agriculture and horticulture scarcely second to its mining interests in value.

So it has been in the past. The desire to get land for vineyards, all over the world, has done as much probably to help us along in the cause of humanity and progress as the rush for gold did in the western States. It was mainly the desire to have vineyards that led to the selection of Philadelphia as a site for the location of a town. I may say that, in the olden times,

wine growing was considered one of the most honorable professions in agriculture and horticulture. Wine drinking was universal. Even those who used wine to excess were not dishonored nor disgraced as they are now. The people who in modern times have sought to inculcate upon the human race to "taste not, handle not" did not exist in those days; and it was a proud boast in those times, that

> "He who shall last by the table fall,
> He shall be king amongst us all."

When William Penn selected this spot for a town it was not merely because the place was situated between two rivers and was possessed of other advantages which he considered conducive to a place of habitation; but it was also because, as we know from some documents which he left behind, that he thought it was a grand place for vineyards. One of the first things he did, after getting a charter for this city, was to send to France to look up vineyardists and grapes with which to plant the vineyards. The first vineyards ever planted in this country were planted on grounds owned by William Penn and which are now a part of Fairmount Park. They found, as we find now, that after a short time the grapes did not thrive as well as they did at first. They could hardly have thought the climate was changing; but eventually the vineyards failed and came to nothing. Penn was persistent and continued to send to France for the grapes and also for vineyardists. His first grapes were planted two years after the beginning of the settlement at Philadelphia. Andrew Doré took charge of his vineyards. Later in the century another Frenchman, Peter Legaux, experimented on a grand scale. Large vineyards were planted, but the results were still unsatisfactory. After a while the belief became general that the foreign grape would not thrive here. Even Penn came to the conclusion that Philadelphia was not hot enough. "In the Carolinas," he declared, "it might do to raise grapes, but it is not warm enough in Philadelphia."

Then they set themeslves to look to the native grape. From the "frost" and "chicken" grapes along the Wissahickon and other varieties which we now class with the Clinton, wine was made in great abundance towards the end of the century. A quantity was sent to Benjamin Franklin, in France, and he thought it was equal to some of the best French wine. Meanwhile they were looking for an improvement on the native grape. The very first was called the "Alexander," after the gardener at the Penn homestead, who found it on the Wissahickon. Although the bunches were small, it was not far inferior to the Concord, and the berries were larger; but it failed eventually. The Alexander ripened very well for years, but finally failed to ripen, and they thought they must get a new kind again.

Then came William Bartram, who thought he would plant a vineyard. He was one of the first to take a great interest in the culture of American grape vines with the idea of making wine from them. He heard of the "Bland" grape, which grew in Virginia, and at some considerable trouble and expense he sent to Virginia and brought that grape here. It was afterwards called the "Powell" grape and was known by other names. In those days, when there was no Society like our own, the same grape was often known by a number of names. The Bland grape was almost equal to the Delaware; I don't know that there was much difference between them. But after a while that also failed, and then they went to the Susquehanna and found varieties quite equal to the Delaware. One of these, called the "Susquehanna," was

introduced. It was just as good as the Delaware is today, and I have never felt certain that the Delaware was not that variety. It was found eventually that neither would quite do. But when the Catawba and Isabella came out it was thought that success had surely come. It was in Germantown, the northern part of Philadelphia, that the first vineyards of these varieties were planted. Germantown as a borough was settled two years after the date of the Philadelphia charter. Daniel Pastorius brought a colony of Germans there. Grape culture was so eminently an object of the settlers that "Vinum, linum, textrum," (meaning "Wine, flax and weaving") was chosen as the Borough Seal. A descendant of one of these settlers, Edward H. Bonsall, planted, in 1823, nearly four acres of Isabella and Catawba on the hillside a little below the Wissahickon Inn, where you are now sojourning. The locality is now known as "Garrett's Hill." He had found that the Alexander did not ripen. But this venture did so well that in 1826 he enlarged the vineyard, and large quantities of wine, as well as the fruit, found ready sale in Philadelphia City. Sad to relate, the grapes failed to ripen in the course of years and the vineyards had to be abandoned. In those days they had not learned, as we have since, about rot fungus and root aphides weakening the vitality of the vines—which was the cause, and not any change in climate, of the non-ripening of the grapes.

Just here I would say that, in my opinion, most of the injurious insects and fungi were brought here from the old world. They did not thrive as well there as here because the conditions for increase were not as favorable. We know the history of the potato beetle. It was not indigenous here; it came originally from the Rocky Mountains, where it was comparatively harmless, but increased wonderfully with its migration to the East.

They have the same experience in England today that we have had here. England at one time was covered with vineyards. In London there are localities that are known as "The Vineyards." Vineyards were numerous all over England, and we have inventories of the stock found in the old monasteries, when they were abolished, showing that quantities of wine on hand were made from grapes which ripened well at that time in England. But they do not ripen there now. There is little doubt in my mind that this is because they have not progressed as far as we have today in hunting for causes of failure and applying remedies and that they have not reached a knowledge of the cause of modern failures to succeed with the European grape there.

So far, then, as grape growing is concerned, Philadelphia is the first locality in America to successfully plant the native grape for vineyard purposes. Later along in our history we have many noble men like Dr. Brincklé, Caleb Cope, Dr. Thos. P. James and Robert Buist, who followed successfully in the footsteps of Landreth and of William Bartram, of a generation before, in improving the grape. To be sure, the foreign grape was cultivated here under glass to an immense extent; and with the taste of the foreign grape in their mouths even our own people could scarcely appreciate the modern advance. When the Concord grape was announced, in Massachusetts, as being the great discovery of the century, a committee from Philadelphia was sent, like the Wise Men of old, to examine the new wonder. They returned, protesting they had sore throats for their reward. Attempts were then made to try to further improve the native grape—that was Dr. Brincklé's idea—but the efforts amounted to nothing; the Concord eventually crowded out all the other grapes.

Now a word in regard to pears, which fruit I take to be the next in importance in the history of pomology, so far as Philadelphia is concerned. In olden times nearly all the pears of any value were introduced here from the old world. Of the nurserymen who were conspicuous for their importations in the early days I remember, in my own time, Mr. Buist, John Sherwood and Colonel Carr. The latter succeeded to the management of the Bartram Gardens, he having married the granddaughter of John Bartram, the founder. These men imported continually pears, old and new, as they appeared in the old world; but they had their troubles in those days as we have ours now. The trees grafted on stems four or five feet from the ground, came here in log-like bales, wrapped up in Russian matting, as the bast matting was called at that time; and frequently they were in very bad condition from the ravages made by the rats in the hold of the ship. Sometimes little would be left but saw dust. There was apparently no remedy for the annoyance. I met one of those gentlemen, Mr. John Sherwood, one day, when he was in great tribulation because the pear trees he was importing from France had been eaten up by rats. He went to the agent of the shipping house to inquire what remedy he had. "Well," the official replied, "I believe we had a cat on board." "A cat on board—what has that to do with it," Mr. Sherwood asked. He thought the agent was playing a joke upon him. He went to another agent and the same answer was made, "Well, I think we had a cat on board." He then went to an attorney to see if he could not get some legal redress, and he was asked, "Do you know if they had a cat on board?" Upon further investigation he found that the law was that if the shipping company kept a cat on board their ship, no matter what destruction the rats and mice did, the company were not responsible for the damage done. Although we have our troubles in regard to insects, I believe we have none from rats.

I have here a brief list of the different varieties of fruits for which, I think, Philadelphia may claim credit as the place in which they were first grown. When I speak of Philadelphia I wish to be understood as embracing also a circuit of about twenty or twenty-five miles outside of the city. Perhaps the area ought to be more extended, as there were many prominent nurserymen residing beyond that limit, who did much, in the early part of this century, to promote progress in horticulture in Philadelphia. I might name, as one of those to whom I refer, the father of our ex-President, Mr. Berckmans, whom I remember well—a gentleman of fine presence and great intelligence, who used to come down to us, with his fruits, from Plainfield, N. J., in order to help Philadelphia pomology along. Without wishing to detract at all from the merits of our friend here, I may say that perhaps we had a right to expect from him the great knowledge and enthusiasm he has shown for pomology, considering the father he had before him. There was no more enthusiastic pomologist or finer gentleman than Mr. L. E. Berckmans; and he was one of those whose names must not be forgotten in the history of Philadelphia pomology.

Referring to the list of which I have spoken I find that, as to grapes, the number of new varieties for which we have credit is comparatively small—about fifteen. Of apples we can name thirty-eight; peaches, thirteen; plums, five; blackberries, two; raspberries, thirteen. Of pears there are twenty-five. I will read the list of these as characteristic of what I claim for Philadelphia. They are as follows:

Bartram, Bleecker Meadow, Brandywine, Catharine Gardette, Chancellor, Haddington, Jones, Kieffer, Kingsessing, Lodge, Mather, Moyamensing, Ott, Penn, Pennsylvania, Petré, Philadelphia, President Felton, Rutter, Seckel, Steinmitz Catharine, Steinmitz Spice, Tyson, Washington, Wilmington. Of these the Bartram and Petré are still standing in Bartram's Garden Park. Bleecker Meadow was still in Kensington until improvements carried it down. The original Jones, the Kingsessing and the Kieffer are still standing.

I had to pause over the Seckel, while reading the list for you, as a thought struck me that it is not always the discoverer of a good thing in fruit culture or the man who first finds a seedling of value who should receive all the credit for the thing itself. The credit should be shared by the man who knows the thing to be worthy and who pushes it along and makes it known throughout the world. Now, the Seckel pear was bearing in Philadelphia for years before any one took particular notice of it; and it was not until its worth was appreciated by Dr. Hosack, who owned a garden where Columbia College now stands, that attention was attracted to the Seckel. Mr. Seckel was a resident of the lower part of Philadelphia, where he owned a farm which was afterwards bought by Stephen Girard and part of which has been secured to the city as a public park forever. The tree, I believe, is still standing.

The Kieffer pear is another illustration. Peter Kieffer, a modest Frenchman, a remarkably good gardener and fond of plants, had a relative, the famous Baumann, who continully sent him new and rare plants. The Sand pear of Japan was one. Its branches grew intertwined with a Bartlett pear. From seed of this Sand pear Mr. Kieffer grew a seedling tree and when it produced fruit he found he had something very good, but that was all. He used to give the fruit to his neighbors, and for years those pears were sent around in that way without any one doing more than smacking their lips over them. After a while the Centennial Exhibition came, and some of those pears were exhibited. William Parry, of New Jersey, was one of the exhibition judges. He saw he had a good thing. He gave Mr. Kieffer a trifle for a few grafts; and today, as you know, the Kieffer pear has put thousands and thousands of dollars into the hands of others. But for Mr. Parry's knowledge of the value of the fruit in money and his energy in making it known, it might be yet but a curiosity found only in some Germantown gardens.

In conclusion I would remark that in ancient times it was a custom among the Greeks and Romans, as it is today, to bestrew the graves of their loved dead and heroes with flowers and branches. The custom in Greece was to use for that purpose the olive and the daphne. The branches that they were required to use in decorating were not plucked here and there and everywhere, but messengers were despatched to Mount Olympus, which was supposed to be the birthplace of the gods, to procure from there the branches to be used in the decoration. Philadelphia is the Olympus where your Society was born. In like manner I cut from this city's history the olive and daphne with which to bind garlands for the dead past on this occasion; and having laid them at your feet, and I hope with some degree of honor to our city and with pleasure to you all, I will now retire. (Long continued applause.)

Mr. W. C. Strong asked if Mr. Meehan could give the list of varieties of apples in connection with the list of pears which he had given.

Prof. Meehan: I would be glad to do so; but, on account of the growth of this city, the orchards of first class varieties have disappeared. Even the

great orchards of Noble, of Germantown, who was our leading apple grower and a great authority on apples, have all passed away, and I do not feel that I could now give the list.

CULTURE.

BY J. H. HALE, SOUTH GLASTONBURY, CONNECTICUT.

Mr. Hale, upon the invitation of the chair, spoke as follows upon the subject "Culture."

Mr. President and Gentlemen—When the Secretary of this Society asked me to talk to you, I think I left it with him to say what I was to talk about, and he hit upon one subject with which I am not very conversant, if we are to take "Culture" in its broadest sense, as applied to men and women as well as to seeds, plants and trees. However, though lacking the refinements of culture personally, I am a believer in the necessity of culture, whether it be among human beings or in the soil and the plants that grow therein. One fact with which I have been impressed, in my observations, (though perhaps I may have been looking from the selfish or commercial side of fruit culture) has been this, that with the growth of culture and refinement among the people everywhere there has come a greater and ever increasing demand for and appreciation of, fine fruit as a substitute for the coarser food products. As men and women become more refined they are more appreciative of fine fruits and flowers, and they become better customers of the commercial horticulturist. Perhaps Mr. Taylor, our Secretary, hinted at this fact last night, when he asked me at the conference at Wissahickon Inn to say a word in relation to the effect of exhibitions of fine fruit.

We find that the grower of high grade fruit for the great markets looks to Boston as one of the best markets in America for choice fruit; and this is true of the grower in the central section of the country as well as in the South and West and on the Pacific coast. There, in Boston, the work of the Massachusetts Horticultural Society and its weekly exhibitions of fine fruit, for the last fifty years, have educated the people to an appreciation of variety and quality beyond that which is to be found in any other city of the Union. It is for this reason that Boston is the best market for fine fruit; and I repeat that wherever a knowledge and appreciation of good fruit are disseminated among the people the commercial horticulturist will find there his best market; and proportionally as this knowledge and appreciation are developed will the demand for our fruits and flowers increase. It seems to me that the wonderful increase of culture and refinement among the people of America is of itself a positive evidence to us horticulturists, that the increased demand for all our fine fruits will relatively far exceed that which might be expected from the increase of population and of wealth and that the tiller of the soil will find in fruit culture abundant compensation for his labors besides the pleasure he may find in such work.

One prerequisite to fruit culture is a more frequent stirring of the soil. We hear a great deal of talk about the worn out soil in many sections of our country, about the necessity for the use of plant food and of supplying the land with food necessary to the proper development of trees and plants and bringing out the bright colors; but we little realize the wonderful possibilities to follow from bringing out what is already in the soil by stirring it and bringing new particles of soil together. We see everywhere orchards and

fields suffering from the lack of thorough culture. Did you ever see an orchard or vineyard that had been over-worked or tilled too much? I can think of but very few.

The question of the preparation of the soil for planting, it seems to me, is the first thing to be considered. I am speaking now more particularly of the general commercial planter, who plants on quite an extensive scale. It is the private gardener who digs his soil deep, trenches it, and works it over and over, who can show us all the most magnificent specimens of fruit. In this respect the large commercial planter does not compete with the amateur, for the latter, who works his ground himself and works it over and over, is certain to show the finest results. So that, in our commercial planting, the first thing to be considered is the culture of the soil before planting. That culture begins with drainage. Not every bit of land needs draining, but a great deal more than we have commonly supposed needs thorough preparation, by drainage, at the start; then deep, thorough ploughing, sub-soiling and a stirring of that soil by the implements of culture that are most suitable to the particular spot. Then follows the further preparation by the planting of green crops of some sort, to break up and loosen the soil and give to it a life that comes only from the ploughing under of certain green crops or their culture upon the soil as a preparatory step to orchard planting. With nearly all of our fruits, the best of culture must be given before the plants or trees are put into the ground. The men who get the best results out of the soil are those who give the most thorough preparation for the tree or plant before it enters the ground. It seems to me to be hardly possible to overdo this.

The implements of culture have been wonderfully improved in the last few years, but no rule or law can be laid down as to what particular implements we should use. I would suggest that it is important to own and use all of the best that are made. Among these there are the modern steel plow, the sub-soiler, the gang plow, the cut-away harrows, the smoothing harrows and the Acme. I don't want to advertise any of these things but I would say that Philadelphia has made one thing about which our friend (Mr. Meehan) did not speak but which is one of the best things of its kind on earth, and that is the Plant Jr. Cultivator. The "Morgan hoe" and some one of the so called "Weeders" have their place. The grower of fine fruit should own and use all of these things.

Now, I am thankful that the Creator of all good things and of good fruits has also created weeds, grass and other tormenting things to grow upon the soil, because if it were not for a blessing in disguise like weeds, two-thirds of all the fruit growers of the country would fail to cultivate their soil enough. They do not cultivate it one-half enough now; and if it were not for the blessing of weeds the soil would not be stirred nearly as much as it is. So that the man whose piece of land is the worst infested with weeds, grass and everything he does not want, is the man who will be most likely to give his land the best cultivation, because if he does not do that he must go under. It is that which gives the stimulus to us all. Therefore don't be afraid of weeds, but encourage their growth and then devise ways to quickly kill them.

The advantage of culture have been more forcibly impressed upon my mind this season, than ever before. A large section of the Atlantic coast country has been suffering from drought ever since the opening of Spring work. Not since 1870 has there been such an extreme drought all through the eastern section of the country as has prevailed this year, taking the

country as a whole. In 1870, in my boyhood days of farm cultivation, a new field was broken up to be planted with a couple of acres of sweet corn. That bit of corn happened to be infested with quack grass, the tormenting stuff that has its roots pointed in every direction and which almost goes through stone and stone walls. It is a terrible pest. It took possession of that field and almost drowned out the corn. In an attempt to kill that grass, but with no idea of the value of culture in dry times, my brother and I worked that field over and over again with an old horse and a very poor old cultivator. I rode the horse until I was sore, and the recollection of it makes me say that I almost feel that I am sore yet from the effects of that riding up and down and across those ruts. The result was that through incessant daily and hourly cultivation of that field, over and over again, to kill the grass, the corn grew. It grew in spite of us, and it was the only corn in the neighborhood that came to maturity that season. It was a perfect corn crop and it sold in the market instead of going to the pigs. It laid the foundation for a good commercial market garden business; and it also laid the foundation of a knowledge that stirring the soil would bring about that result in dry times. That knowledge has been exceedingly useful to me, in subsequent years, in the cultivation of orchards and in the cultivation of every field crop.

My own practice and observation in the fields of others, where thorough and incessant cultivation is being given, shows that even on very thin soils, without the application of any plant food whatever, vigorous, healthy and productive plants and trees can be maintained, even better than on richer soils where more plant food is supplied, but there is a lack of thorough tillage.

I believe today that the same thing can be accomplished with a majority of the so called "worn out" soils of the South, that by the most thorough cultivation, at least twice a week thoroughly all over the field, you may grow crops for years and produce magnificent tree and plant growth without the expense of a dollar for fertilizers. I would, however, grow some leguminous crop each year. Just what it should be would depend upon season and methods of culture. I am thoroughly convinced that thorough cultivation gives greater strength and vigor to your trees than will be had by using more plant food and less cultivation.

A most important lesson in cultivation has come to me in the last year, in connection with my peach orchard in Georgia. You know all of the great freeze that came South last February, when trees and plants were in the full vigor of strong growth, and when our peaches and plums were in full blossom. We had a temperature of 80° F., and in a very short time the mercury went to below zero, there being a drop of 84°. Forest trees were killed and many trees of great vigor were apparently killed. The result of that freeze in the peach orchard was the killing of the tips of the branches, but the main branches were uninjured. All around the body of the tree, for two-thirds to three-fourths of the way around there was only an inch of live bark on the northeast side. Nine-tenths of it was dead and only one-tenth, on the northeast side, was alive. We went to work by quickly cutting the tips of the trees away down to the main branches, leaving just stubs; then getting the brush out of the way, ploughing the ground, cross ploughing, harrowing and re-harrowing it; constantly shaking up the soil, week in and week out; (my instructions to the Superintendent being to keep the ground well stirred all the time); putting in the implements of culture and constantly shaking up that soil,

every day in the week, except Sundays, for months, and starting a new growth on those trees. The sap carrying capacity of the trunk up to the buds was very much curtailed. This cultivation created an extra power for forcing the sap into circulation and vigor; it created a force those trees could not have had in any other way. The trees gradually began to put on a new head; and today, less than nine months after the great freeze, there is in that place almost a resurrection from the dead. Eighty per cent of those trees have now a full new head on them, ready for a crop another year. In the adjoining orchards, where the soil has not been cultivated as much, where there have been one or two ploughings and a harrowing, there are sixty per cent of dead trees, and the other forty per cent are not perhaps one-fourth as valuable as those in the orchard which has had this cultivation. Now, there was no extra plant food or extra anything put on the land except extra cultivation, and the result is beyond anything you can imagine. The effect of culture alone has been a source of great astonishment to me and to every one who has seen it. A day or two ago I was in two peach orchards on an identical piece of land except that a fence marks the dividing line between the two properties. It is a broad expanse on the top of a hill. The trees are of the same varieties and out of the same nursery. They were planted eight or nine years ago. One orchard has had its annual Spring ploughing and one or two harrowings through each season; the other has had its annual Spring ploughing and a thorough harrowing or cultivating and a re-ploughing, with a gang plough, through every month from April to August. It has had the most thorough, incessant cultivation that could be given within reason, so that no weeds or grass were allowed to grow and there was no hardening of the soil, but a dust mulch over it all the time. If I had not come away hurriedly I would have gone to that field and brought you specimens of Oldmixon peaches. In one field there are Oldmixon peaches of from three to four inches in diameter, great beautiful specimens; the skin drawn over them smooth, tight and clear, creamy in color on the shady side and with a brilliant blush on the sunny side. Those peaches are selling at prices of from $4.50 to $7.00 per bushel. From the adjoining field (where everything is the same except as to culture) the peaches range from 1¼ to 2 inches in diameter, have a little brilliance on the sunny side and a greenish white on the shady side. They sell at from $1.25 to $1.50 a bushel. This is the same soil, the difference being that one field was stirred and the other was not.

I may cite an instance in regard to plums. I visited two fields, not adjoining, but within a quarter of a mile of each other, on practically the same tract of land. They had been planted with Red June, Burbank and a few other varieties. Both had practically the same treatment except that one of the fields was ploughed last year, early in the season, and was cultivated fairly well, while the other was ploughed early in the Spring and thoroughly cultivated. I know nothing of the cultivation of those two orchards except this year and last year. This year one was ploughed once and allowed to go without any other cultivation; the other was ploughed early in the Spring, then harrowed crossways and up and down the rows at least twice a week throughout the dry season; which furnishes moisture and feeds plant food already in the soil. The one has produced a crop of plums of medium size but of very inferior quality, which have sold at very moderate prices. The other is producing a crop of plums of large size, great brilliancy of color and superior quality. The one has realized an average price of, we will say, $1.00 and the other has brought $1.50 to $2.50 per bushel. The matter is simply one

of culture and nothing more, a simple stirring of the soil. One great thing in this is the bringing of new particles of earth together. It seem to me therefore that this matter of the stirring of the soil is one that should not be lost sight of. When it should be done and what tools you should use are questions of detail which pertain to localities and individuals; but bear in mind to stir the soil, from start to finish, during the growing season of all your plants.

Another point in culture, for the commercial fruit grower and for the consumer also, is that of cultivating a better acquaintance with the market and with the demands of the market. If you want to secure the best results don't be content to give people merely what you think they ought to have but go into the market and find what the people want, why and how they want it, and try to give it to them in that way. Above all things cultivate a more thorough and intimate acquaintance with the men—and with the women, too—engaged in fruit culture. I speak particularly of men and women of ideas. Go to them with ideas and give them ideas. You cannot give them too much. I am glad to know that this Pomological Society and its members are free givers of ideas. What little success I have had in horticultural work has come from association with just such men and women as are here present today. I say you should cultivate the acquaintance of intelligent men and women engaged in this work. Give them all you can of good ideas; and the more you give out the more you will be able to take in and the richer you will be in that which goes to make life worth living.

Mr. John J. Rosa, Delaware, inquired as to the length of time, in a year, for which the cultivation should be continued.

Mr. Hale: I should say not longer than the development of the fruit crop. I would not cultivate an orchard after the crop itself had been developed. But I do think that we have all made the mistake of discontinuing our cultivation altogether too early. We have been fearful (and I speak especially of the northern section of the country, of the section north of the Ohio river) that we would stimulate too late a fall growth and so have too tender wood. I believe we should keep up our cultivation much later than we have been doing. The general practice has been to continue until July or six weeks before the maturity of the fruit. I find from my own experience and observation that those who keep up the cultivation clear to the full maturity of the fruit get the finest fruit and that this also leaves their buds in the best condition for wintering the next year.

Mr. C. R. Hartshorne, Maryland, inquired, in regard to the peach orchard in Georgia, whether any trees had been left where the tops had not been cut back at all, where the cultivation was maintained.

Mr. Hale: There were none, so far as I know. A moderate number of trees in adjoining orchards were cut back, and the ground was not thoroughly cultivated, but they were very little better than those that were not cut back at all.

Prof. H. E. VanDeman spoke of the interest which corn growers in Ohio felt as to the point of time at which the limit of *profitable* culture was likely to be reached. He said that, for one, he did not want to go beyond that limit. He asked, Where is that limit as to fruit?

Mr. Hale: I have not been able to find it yet, brother; but, hoping for the best results, I would not dare to hint that there was not a limit. I presume there is, I know there is; but where you find one man in a million, who may come up to the point of over doing or "slopping over," in this respect, you

will find so many others who will fall far below that point that it would be better to let the one man go on his way to destruction. The men who have bankrupted themselves and ruined their orchards by too thorough cultivation are so scarce that we have not yet been able to find them in America, and it would hardly be worth while for an experiment station to hold out a caution to them. (Laughter.)

Mr. R. M. Kellogg, Michigan, said he concurred fully in what had been said in favor of continuous and thorough cultivation. He recommended thorough cultivation early in the season, litter to supply the humus, and the sowing of cover crops, preferably oats, to protect the soil during the winter and to furnish humus to separate the soil grains of the surface, so as to conserve moisture and produce the major part of the growth before the 15th of August. He continued:

"Then, later on, sow oats again or some other cover crop, so that we may separate the soil grains as before. In that way you secure your growth early in the season, utilizing the most favorable part of the season for the growth and the cool fall months for ripening the wood. The exact time at which these cover crops can be sown must be governed by the moisture in the soil as well as by climatic conditions. I insist that the condition of the fruit buds can be governed by these methods with almost mathematical accuracy. If the buds are perfectly dormant at the time of freezing, only the most intense cold can destroy them; but if they contain any sap they are easily killed.

"Continuous cultivation binds the vegetable matter of the soil and brings the soil grains close together so that the conservation of moisture is rendered exceedingly difficult. The great want of the soil today is humus or decayed vegetable matter."

Prof. VanDeman: Perhaps one of the most notable instances we have of the good effects of thorough cultivation is the one of which Mr. Kellogg reminded me last evening. I refer to the orchard of Mr. Morrill, at Benton Harbor, Mich. Now, we know that the peach crop of the United States, this year, is a failure except in California and in a very few orchards here and there in the Eastern States. Mr. Morrill is one of those who have been successful. He is rejoicing in a crop of ten or twelve thousand bushels of peaches this year, which he is selling for five, six and seven dollars a bushel. This is all the result of his thorough cultivation. I am speaking from actual knowledge, for I have been over his orchard, every acre of it. He has cultivated it from the time it was planted until the present time, more thoroughly perhaps than nine hundred and ninety-nine out of every thousand of the gardens of this country are cultivated. Walking over it is just like walking over a feather bed. The gentlemen here who have been over that ground will bear me witness that they never saw a piece of ground better cultivated than that. The result is, this year, that those trees did not winter kill, their fruit buds did not winter kill, because they were in such a good state of vigor. And that is why Mr. Morrill has a fruit crop this year, when others have failed.

Prof. Taft: I have a number of photographs of Mr. Morrill's orchard and also some fruit from it. They will be on the tables in the adjoining exhibition room. I have also a memorandum of his sales, showing that he is receiving $7.50 for some of his peaches, wholesale.

Prof. Alwood: I know that culture will help to restore plants that have been injured by climatic conditions, but will culture prevent winter killing?

Several members: Yes, sir.

Prof. Alwood: Was it not the climatic conditions surrounding Mr. Morrill's orchard that saved his buds?

Prof. VanDeman: Mr. President, let me answer that question. One person may be attacked by a contagious disease while another, who has a vigorous constitution that enables him to ward off the silent enemy, will not be affected by the disease; and the same thing is true of this orchard and the others. As a rule, the better the cultivation the better the orchard is able to withstand climatic conditions. What is the cause of the destruction of orchards? It is to be found in the evaporation, not in the degree of cold. The latter may intensify the evaporation but, whether the orchard is in my friend Alwood's neighborhood or in North Dakota, it will be found that the fundamental trouble is in the evaporation. Winter killing is the effect of evaporation. Where the soil is so moist and so well mulched with loose soil on top that the moisture cannot escape from below then it does not winter kill.

Prof. Alwood: I take exception to the statement that culture alone will enable a plant to withstand a severe temperature. There is a critical point at which plants of various kinds will be absolutely killed. If, however, the physical conditions are somewhat different, through the use of cover crops or any other factor which tends to reduce the effect of the temperature, then it is very easy to see how the result mentioned might obtain. The comparison with the forest trees will not hold, as they have been developed under the conditions there present and are in their native habitat, while fruit trees are purely artificial products, developed and transplanted by man, and not natural products of the neighborhood in which they stand.

Mr. Kellogg: Mr. Morrill is surrounded by peach orchards without number. Why is it that he has an enormous crop of peaches, year after year, while the other orchards are failures? In the fall of 1885, after traveling several hundred miles through Michigan and seeing the trees drying up, I visited Mr. Morrill's orchard and took particular pains to note that not a single yellow leaf could be found. He has caused his orchard to fruit heavily year after year, by simply manipulating the soil in the manner described here, so as to bring his buds into perfect condition through the winter. He uses a cover crop every season, the soil being sown in oats. All around him, where these requirements have not been met, the orchards have proved frequently unproductive and practically failures. This is not the result of climatic conditions but purely of cultural methods.

Prof. Alwood: The fact of the orchard having a heavy cover of crimson clover or any other cover crop materially modifies the effect of temperature. It also modifies the statement that culture alone preserved the trees over those in adjacent orchards.

Mr. C. G. Patten, Iowa: I believe the practical point in this question is a valuable one. To my mind the question is one of latitude and climatic conditions. When you reach a northern latitude you must fix upon some time in the year at which you shall discontinue cultivation. I agree in what has been said in reference to the cultivation up to a certain period, but that period is reached on parallel 43 N. L., in all the northwestern country, about July 20th. Thorough culture extended beyond that date, in that section, would be at the risk of serious loss.

Mr. Hartshorne suggested that an arbitrary date would not be applicable to the whole country and that the better plan would be to continue cultivating until the time came for sowing the cover crop, which is usually about the

first of August. He said he thought it useless to suggest anything with respect to lessening the amount of cultivation that is usually given because there was not one man in ten thousand who would ever cultivate too much; the trouble was the other way; and if there was any recommendation of a date he thought it should be one that would cover the whole country.

Mr. Hale: This is a broad question and one that is governed by local conditions. Our friend from Iowa (Mr. Patten) stated the point very clearly. You must use a little horse sense and be governed by your own locality and your own climatic conditions. Many a plant has failed to fruit in the following year because cultivation ceased too early and the wood and fruit buds ripened too soon. Many a peach bud has been killed in the winter because cultivation stopped early, buds ripened up in September or October, then were swollen by warm, wet weather in Novemeber and then killed in December; while the trees that did not form their buds until later were all right. Up to 42° N. L. at least, on the Atlantic coast, we have been ceasing our cultivation too early. The question is a local one and we must all act according to our conditions. Only remember that early ripened wood and loss of foliage is not always a good omen of winter hardiness.

Mr. Geo. E. Murrell, Virginia: I have a peach orchard on a mountain ridge, and all of it has had the same cultivation and care. One portion of that orchard is on richer land than the other portion, and the trees on the richer land necessarily made the more vigorous growth. Two years ago last Spring, while those trees were in full blossom, the temperature dropped to 17°. Those trees on the richer land and with the most vigorous growth brought through a full crop, those on the thin land did not. In the Spring, a year ago, we had an intensely cold winter and the buds were entirely dormant; the trees on the thin land perfected the crop and those on the rich land did not. Thus the conditions were exactly reversed. We could not always depend upon cultivation or mulching to give so decided a result.

The Secretary read an invitation from Dreer's Nurseries for members to visit their place at Riverton, N. J., and the Society adjourned to meet at 2 p. m. Immediately after adjournment a goodly number assembled in front of the building where a group photograph was taken. (See frontispiece).

THURSDAY AFTERNOON SESSION.

September 7, 2 o'clock, p. m.

At the afternoon session, (President Watrous in the chair,) the presentation of reports from committees was the first business.

Prof. Wm. B. Alwood, Chairman of the Committee on Order of Business, reported that, as all the gentlemen to whom specific subjects had been assigned for discussion at the afternoon session were present, the program as previously arranged by the Secretary would be followed; also that printed programs, giving the business of the different sessions of the Convention in detail, would be promptly distributed among the delegates. He added that the Committee recommended that the hour of adjournment and the place of meeting in the evening be determined forthwith.

Dr. F. M. Hexamer moved to hold the evening session at Wissahickon Inn, the hotel headquarters; but objection being made that this would interfere

with arrangements already perfected for the stereopticon lectures, in the evening at Horticultural Hall, he withdrew his motion and intimated that he would renew it later for the meeting on Friday evening.

On motion of Prof. Alwood, the hour of adjournment was fixed at 5 o'clock p. m., and the time and place of reassembling at 8 o'clock p. m., at Horticultural Hall.

Mr. W. C. Strong, from the Committee on Credentials, reported that certificates had been received showing 129 delegates present. By way of verifying the list he read the number reported by each State delegation.

Several delegates called attention to omissions in the list and mentioned additional names, which increased the total number reported by the Committee.

Dr. F. M. Hexamer, Chairman of the Committee on Awards, requested that each exhibitor in the fruit display promptly hand to the committee at once a memorandum of his exhibit, in order that the exhibits might be identified by the Committee.

President Watrous called attention to the presence of Mr. Samuel B. Parsons, of Flushing, Long Island, N. Y., who, he said, had been present at the birth of the Society fifty years ago, and who, having helped to rock its cradle in infancy, train it up in its youth and labor with it in its manhood, was still with it at the beginning of its second half century of existence.

REMINISCENCES.

BY SAMUEL B. PARSONS, FLUSHING, N. Y.

Mr. Parsons (upon the invitation of the President) came forward and responded as follows:

"Gentlemen—The past fifty years seem to me like a day that is past. Looking back upon its beginning, I can recollect with great pleasure that day on which, at Clinton Hall, New York, with Colonel Wilder and many others, we held the first meeting of this Society. It is one of the pleasant things which one likes to remember. All along the vista of the past come the figures of those whom I have known so well; Colonel Wilder, with his eminent personality; Mr. Walker, with his fine, genial nature; Patrick Barry, with his strong character; and many others whom I can recollect. They are strewn along the shady pathway of that vista of fifty years; and they shine in my memory like diamonds on the emerald green of the plants they loved so well. There are many things connected with them that I could relate if time permitted. I feel that they were my valued friends; and like all solitary old men, I miss the "touch of the vanished hand and the sound of the voice that is still." Yet there are many left whom I knew as connected with this Society in those early days. With some of them I would like to mingle more but we have been separated by long distances. I can perhaps speak more particularly of one of the number, who, thinking that this rigorous climate of ours was not just the place for him, went to a southern land and there found a temperature like that of the Isles of Avalon, and there evidently drank of the Fountain of Youth.

Among the questions that we took up in those early days was the one,—What should we do first,—whether we should select the best varieties or try to weed out the bad; that is, whether we should try to get rid of the rocks

before we attempted to make fair sailing. It was concluded that it would be better to try to get together all the good varieties, thinking that the bad ones in contact with the good would be, as bad always is in contact with good, conquered. So we went on for successive years until there was developed the catalogue you now have, containing many varieties, some of which are good everywhere, while some are good in some places and bad in others.

It was a great pleasure to me this morning, to listen to the remarks on "Culture" and to realize how far you are in advance of the old system of cultivating fruits. I think we will benefit by what has been said. I think that the future is promising except for those annoyances which come upon us from time to time. We men think ourselves full of power (and our race has accomplished wonders in the world), and yet we are conquered by little insects that are scarcely visible to the naked eye. They come upon us in all shapes. When I was young we had, in the locality in which I lived, plenty of plums, peaches, cherries, apricots and nectarines. At this day the apricots and nectarines there are things of the past entirely; they might as well be classed as forgotten fruit; and this is largely true as to plums and cherries also. To be sure we have not been so apt in resources as our Rochester friends, who conquer the insects by shaking them off. The people generally through our country will not do that. These pests have affected the growth of fruit; and growers, those who buy trees, have not the knowledge which would enable them to deal with the evil successfully. Now, after the fruits of pears, apples and some other fruits, have escaped in a great measure, there comes along a scale which destroys the life of the tree. The growers are fighting to get rid of it, and some are desirous of taking more serious measures than have been taken; but there it is and we are in this bad condition. Some say they will not plant trees because they are troubled in this way. But that is all wrong. They must plant them and they must get rid of these insects. I know it is not possible to get rid of them entirely, but we are compelled to fight them all the time. I suppose, however, that if they should be conquered, some other pest would take their place.

Once I had a great fondness for owning an orange grove. I thought it would be a grand thing to have one in Florida, where I could spend my winters and repose in the shade of my trees. I bought a grove and grew oranges for some time; but I found there were three kinds of scale that I had to fight in various ways. Then I encountered the ants, which girdled the tree near the root, about an inch from the ground. Next there came a large grasshopper which would cut off half the leaves; and so it went on with insect after insect until I became so tired of them that I sold out. So it is all the way through, as the world goes on. With all the nice things and all the blessings there are in the creation that God has made for us, our life is a continual struggle; we have to contend against and fight evils of all kinds and will continue to do so during our natural lives. I suppose that every struggle we make gives us greater strength and power to fight still harder. The future is encouraging; the existence of this Society and its growth are evidences that we are destined finally to succeed and that we will overcome all these troubles as surely as the sun rises. (Applause.)

President Watrous: Another gentleman who labored all through the past and, I believe, from the beginning of the fifty years of this Society, is Mr. George Ellwanger, of the great nursery firm of Ellwanger & Barry, the most famous on the American continent. We have here a letter from Mr. Ell-

wanger, who was prevented by infirmity from being present. It will be read by the Secretary.

The Secretary read the following letter:

LETTER FROM MR. GEORGE ELLWANGER OF ROCHESTER, N. Y.

Rochester, N. Y., September 1, 1899.

Wm. A. Taylor, Esq.,
Sec'y American Pomological Society,
55 Q St., N. E., Washington, D. C.

Dear Sir:

I sincerely regret that I will be unable to be present at the forthcoming meeting of the American Pomological Society—an organization which has done so much since its inception for the advancement of one of the most useful of the arts. If we look back fifty years to the session of the North American Pomological Convention at Syracuse and note the strides that have been made in pomology and its allied branches since that time, we may well congratulate ourselves on the excellent work of the Society, to which no little of the progress is due.

Today the raising of fruits has become a most important and widespread industry. The orchard and the grain field go hand in hand, ministering alike to the wants of grower and consumer. Nurseries and specimen orchards have increased, and horticultural societies now abound throughout the land. In no other country are hardy fruits to be met with in such perfection, variety, and profusion.

It is just such organizations as the American Pomological Society that intelligently discuss and pass upon new methods and varieties, which help to elevate the calling of the fruit grower, and render his profession so useful. May the Society continue its good work, and still further lend its spirit and knowledge to an art so deserving as that of pomology.

Again regretting my inability to be with you, please believe me,

Cordially and fraternally yours,

GEO. ELLWANGER.

Dr. F. M. Hexamer remarked that Mr. Robert Manning, another of the members who was present at the first meeting of the Society, was in attendance at the present Session but had temporarily left the Convention hall.

President Watrous replied that, upon that gentleman's return, he would ask Mr. Manning to say a word of encouragement.

Dr. L. O. Howard, of the United States Department of Agriculture, Washington, D. C., responding to the call of the Chair, read a paper entitled "The Present Status of the Caprifig Experiments in California."

The paper was heartily applauded. It was as follows:

THE PRESENT STATUS OF THE CAPRIFIG EXPERIMENTS IN CALIFORNIA.

BY DR. L. O. HOWARD, ENTOMOLOGIST, U. S. DEPT. OF AGRICULTURE, WASHINGTON, D. C.

As late as 1895 a writter in Garden and Forest (June 26) gave expression to the following statements, which appear to accurately sum up California conditions with regard to the fig crop down to the present season:

"As a commercial factor the fig has been of little importance among California fruits, although it has been an incumbent of almost every rancher's door yard since the Padres taught their Indian peons horticulture. As a fresh fruit it is luscious and invaluable for its medical qualities. Eaten with sugar and cream, it is as grateful for dessert as the strawberry, and more wholesome; but it is good only when perfectly ripe. It will not bear transportation under existing conditions, and the fresh figs offered in eastern markets are a delusion and a snare. As a dried fruit it has also been a failure in the market. Quantities of dried figs are sold in California, although they are usually small and shriveled in appearance and lack the rich aromatic nutty flavor of the imported fig. The latter commands in California, as everywhere, a high price, usually 25 cents per pound. The home product sells at 10 cents. It has been the dream of fig culturists for years so to improve the quality that the California fruit may compete with the imported. To this end soils, climates, and varieties have been patiently studied."

What this says of California may also be said regarding our Southern States, except that the energetic attempts of Californians to improve the output have not been elsewhere emulated. It is now a generally accepted fact that the Smyrna fig, the fig of commerce, owes its peculiar flavor to the number of ripe seeds which it contains, and since the days of Pliny and Plutarch it has been known that in the Oriental regions it has been the custom of the natives to break off branches of the wild or caprifig, bring them to the edible fig, and tie them to its limbs. From the caprifigs thus brought in there issues a minute insect which crawls into the flowers of the edible fig and fertilizes them, thus producing a crop of seeds and bringing about the subsequent ripening of the fruit. The careful investigations of Count Solms-Laubach and Fritz Muller in the early eighties, and later those of Dr. Paul Mayr have shown that the varieties of the wild or caprifig are the only ones which contain male organs, while the varieties of the Smyrna fig are exclusively female. In the caprifig there exists three crops of fruit, the first known as "profichi," the second as "mammoni," and the third as "mamme," the latter remaining upon the trees through the winter. The fig insects (the Oriental species being known as *Blastophaga grossorum* Gravenhorst) over-winter in the mamme, oviposit in the profichi, develop a generation within it, each individual living in the swelling of a gall flower (a modified and infertile female flower), and issue from it covered with pollen, from which they make vain efforts to relieve themselves, enter the young flower receptacles of the Smyrna fig, which are at that time of the proper size, and make an attempt to oviposit in the true female flowers, fertilizing them at the same time by means of the pollen adhering to their bodies, and thus bringing about an extensive production of seed. The life history of the insect from that time on is not well understood. Even Paul Mayr has failed to discover

what has become of the Blastophaga during the generation of the second crop of caprifigs known as mammoni. In the development of the third or over-wintering crop, the Blastophaga is again present and is thus carried through the winter in condition to oviposit in the profichi of the following spring.

As early as 1880 Mr. Gulian P. Rixford, of California, introduced three varieties of Smyrna figs and a single caprifig tree into that State. In 1885 Mr. E. W. Maslin, of California, planted Smyrna seeds taken from figs imported by the great wholesale grocery house of H. K. Thurber & Co., of New York, and presented to Mr. Maslin for experimental purposes. He grew in four years large and flourishing trees, the trunks of which had in 1889 reached a diameter of from 4 to 6 inches. In 1890 the Division of Pomology of the United States Department of Agriculture imported cuttings of the wild caprifigs from Smyrna, which arrived in excellent condition, a few even retaining and maturing fruit which had set before shipment. These immature fruits all contained caprifying Blastophagas, and the cuttings were distributed to twenty-seven persons in Florida, California, Texas, Mississippi, Louisiana, New Mexico, and Arizona, those in California at least taking root and growing with extraordinary rapidity.

Several persons in California were already, or soon after became, vitally interested in the subject of fig caprification and in its absolute importance to the fig industry of California. Dr. Gustav Eisen, at that time connected with the Fancher Creek Nurseries, of Fresno, and later curator of biology in the California Academy of Sciences; Mr. E. W. Maslin, above mentioned; Mr. J. C. Shinn, of Niles; Mr. John Rock, a well-known nurseryman of Niles; Mr. Frank A. Kimball, of National City, and Mr. George C. Roeding, of Fresno, were especially interested. Mr. Shinn, through the assistance of a missionary in Syria, imported caprifigs containing Blastophagas and endeavored to establish them, but without success. Dr. Eisen studied the subject with great care, corresponded with Count Solms-Laubach, imported with his help cuttings of a number of varieties of both Smyrna and caprifigs, and with the help of Mr. Rock, at Niles, established and has now growing several hundred Smyrna figs of large size and a number of caprifigs, while Mr. Rock has accomplished the interesting result of grafting several varieties of the Solms-Laubach cuttings of caprifigs upon a single Smyrna fig tree" thus producing a tree of great horticultural interest and possibly in the near future of much practical importance. Dr. Eisen prepared and published in 1896 an important paper, entitled "Biological studies on figs, caprifigs, and caprification." in the Proceedings of the California Academy of Sciences, Series II, volume 5, pages 897-1001. Mr. George C. Roeding, at Fresno, in the meantime had started a large orchard of Smyrna and caprifigs, comprising roughly more than 500 trees, of which about 70 were caprifigs. In 1895, through European correspondence, Mr. Roeding introduced caprifigs from Europe containing Blastophaga, but failed to bring about its establishment or even, as in former experiments, to secure the production of a single individual offspring from the imported stock on California soil.

From the beginning of the work, the United States Department of Agriculture had been thoroughly alive to the importance of the possible practical outcome. The importation of the caprifig cuttings mentioned above, in 1889-90, was done after consultation between Prof. H. E. Van Deman, then pomologist, and Prof. C. V. Riley, then entomologist, of the Department, for the purpose of establishing the proper host plants in the best possible condi-

tion in order that the subsequent importation of the Blastophaga by the Division of Entomology would have a reasonable chance of success. (See Annual Report Secretary of Agriculture, 1890, page 414.)

During the winter of 1897-98 the writer, after extensive correspondence with the board of trade of San Francisco, with Dr. Eisen, Mr. Roeding, and Mr. Maslin, decided that the time had come to make a serious and well-organized attempt to bring about the desired result. He, therefore, laid the matter before the Secretary of Agriculture and was authorized to undertake the work. He had first thought of having Dr. Eisen, so well qualified by virtue not only of his scientific attainments but also on account of his especial interest in this subject and his well-known investigations and conclusions, commissioned to visit Mediterranean regions for the purpose of collecting additional varieties of caprifigs, of sending over ripe gall figs, and of bringing to this country, if necessary, an entire transplanted and healthy caprifig tree. But it happened that about this time Mr. Walter T. Swingle, a well-known botanist in the employ of the Department, was in south Europe, at his own expense, studying at the International Zoological Station at Naples. It happened also that Mr. Swingle was greatly interested in the study of the caprifig and in the caprification by Blastophaga. It was decided, therefore, to save the expense of sending a man from America by asking the assistance of Mr. Swingle. The latter, at some personal expense, began in the spring of 1898 to send a number of caprifigs containing gall insects to the Department in Washington for shipment to California, and made a careful study of the question of the different varieties of caprifigs. In April of that year the writer, under commission from the Secretary of Agriculture, visited Mexico on an investigating trip and came northward through California, visiting all of the localities to which caprifig cuttings had been sent by the pomologist in 1890. On reaching Fresno he was at once greatly impressed by the conditions existing at Mr. Roeding's place, and with the energy, intelligence, ability, and general interest in the subject shown by Mr. George C. Roeding himself. Figs growing there, although only six years old, impressed the Eastern visitor with a belief that they could not be less than twenty years old, so extraordinary had been their growth. They were large, healthy, and luxuriant trees. Right through the center of the Smyrna fig orchard ran a long row of caprifigs, the branches of the two varieties almost interlocking. Moreover, Mr. Roeding had planted in the foothills of the mountains, some miles away, other caprifig cuttings in order to simulate as nearly as possible the climatic conditions under which the caprifig grows most successfully in the Orient. Communicating with Washington, the first shipment of caprifigs from Mr. Swingle fortunately arrived at Fresno while the writer was there. They had been sent from Naples, the locality in which Dr. Paul Mayr had made his studies. Mr. Swingle had adopted an ingenious and eminently successful method of packing. Each green caprifig was carefully and closely wrapped in tin foil, the end being covered with wax. On arrival at Fresno the female Blastophagas were seen to be emerging from the gall figs. Unfortunately, however, with them were a number of specimens of *Philotrypesis caricæ* Hasselquist, the one figured and described by Paul Mayr as *Ichneumon phycarius* Cavolini. Mr. Roeding readily distinguished between the female Blastophaga and this parasite and destroyed all the parasites noticed. By the writer's advice a caprifig tree was inclosed in a thin cloth tent and subsequent sendings of caprifigs were placed in this inclosure and the Blastophagas were liberated.

Then a year elapsed without result. None of the caprifigs on the inclosed tree were stung by the Blastophagas, or if stung no larvæ developed so far as Mr. Roeding could observe, although subsequent developments would seem to indicate that there is a possibility of a partial establishment of the species from the spring of 1898.

In the meantime Mr. Swingle had been transferred to the Section of Seed and Plant Introduction of the Division of Botany, and commissioned as an agricultural explorer to work on the introduction into the United States of desirable plants, with all traveling expenses paid. In the course of his work he went to Greece, and from there sent additional varieties of caprifigs to this country, which were forwarded to Mr. Roeding and planted under differing conditions.

In the winter he went to Algeria and sent other cuttings and one large caprifig tree 10 feet or more high and perhaps four inches in diameter. This was also sent to Mr. Roeding, and, although the long journey had apparently reduced its vitality so much that Mr. Roeding feared that it would not live, it was planted, and at latest advices is in excellent condition. As the spring opened Mr. Swingle again began his sendings of the gall figs, packed as before, and which as before were placed by Mr. Roeding under the artificial enclosure. On March 31, 1899, six boxes of caprifigs were received by the writer and forwarded to Mr. Roeding; on April 5 one more box, and on April 6 the eighth and last. On April 6 the first boxes were received by Mr. Roeding. The fruits seemed to be in excellent condition. He cut several open and found them full of Blastophagas in the pupa condition, All of the figs were cut open and placed under the covered tree.

It must here be said that none of the persons connected with the work had much hope of the establishment of the fig insect by this method on account of previous failures. It was tried because the opportunity offered and because of the variations referred to in the method of packing and the careful tenting of the single tree, in the hope that some might succeed in finding fruit of the right size for entering and for oviposition. Mr. Roeding, in acknowledging the receipt of the sending of March 31 and promising to cut them open and put them under the covered tree, said: "But I anticipate no results, and I do not think a success will be made of this matter until fig trees with the figs attached are sent out here during the winter months." Most of the figs shipped from Washington on the 5th and 6th of April arrived at Fresno in a decaying condition.

In view of everything which has so far been said in this paper, the pleasure of the writer on receiving the following telegram from Mr. Roeding will readily be understood:

Fresno, Cal., June 23, 1899.

Dr. L. O. Howard, Chief Entomologist, Washington, D. C.:

Great surprise. Blastophaga developed in caprifigs. Send instructions.

GEO. C. ROEDING.

This was followed on the next day by the following dispatch:

Fresno, Cal., June 24, 1899.

Dr. L. O. Howard, Chief Entomologist, Washington, D. C.:

Twenty figs tented tree; insects pupa state; one fruit outside; winged insects now escaping; fruit hanging Smyrna tree; letter and fig mailed.

GEO. C. ROEDING.

The letter referred to contained the interesting statement that the figs with the insects in them were discovered by accident. One of Mr. Roeding's men was engaged in gathering caprifigs and extracting the pollen for the purpose of artificially pollinating Smyrna figs by means of a blowpipe. He ran across one fig which apparently contained seeds, but which Mr. Roeding found were in reality galls. The fig was taken from the covered tree, and about the 24th of June all of the figs on the same tree had dropped and shriveled up, with the exception of about twenty, which were still green and plump, and which subsequent evidence showed contained developing Blastophagas. Another fig outside of the covered tree was found later in the same day, from which a winged Blastophaga was in the act of emerging. This fig was immediately tied on one of the Smyrna fig trees. A day later ten more figs on an outside tree were found to contain the Blastophaga. The penetrating power of the female Blastophaga was shown by an interesting experience of Mr. Roeding. On June 29 he picked half a dozen caprifigs and, placing them in a glass jar covered with cheese cloth, started for his foothill farm, where he has some caprifigs growing. On the journey about one hundred Blastophagas emerged, and were quite lively, flying around in the jar. On arrival he found upon examining the cheese cloth that at least a half dozen of the insects were forcing their way through the cloth, and some were crawling on the outside.

On June 29 all the wild figs left under the tented tree and those on the outside tree, with the exception of one, were picked and hung in other wild fig trees upon which young fruits, presumably mammoni, were beginning to develop. On the 30th of June a most interesting discovery was made. A tree 1,500 feet away from the tented tree was found bearing two caprifigs containing galls and male insects.

About the middle of July Mr. Roeding found Smyrna figs which had been fertilized by the Blastophaga. By July 19 not only was the difference between these figs and the unfertilized Smyrna figs most striking, but the difference between them and those which had been artificially pollinated was also very marked. The unfertilized Smyrna fig is hollow, can easily be squeezed together by the fingers, and drops to the ground before it is more than three-fourths of an inch in diameter. The figs which Dr. Eisen and Mr. Roeding have been able to artificially fertilize by collecting pollen from the caprifigs and introducing it into the orifice of the Smyrna fig by means of a toothpick or blowpipe become rather firm, and on reaching maturity contain many ripe seeds, probably not more than half, however, of the number of ripe seeds that may be found in the average imported Smyrna fig. Those found by Mr. Roeding which had been pollinated by the Blastophagas, however, were by the 19th of July more than twice as large as the unfertilized ones, were solid and firm, and literally packed with ripe seeds surrounded by tissue of a beautiful pink color. On the same date (July 19) caprifigs were found full of what seemed to be galls. Dissection, however, showed that all of the seed-like objects which were cut open were really seeds and not galls. The precise variety of caprifig in which this phenomenon was noticed is not known to Mr. Roeding. It contains male flowers, however, and is with little doubt a caprifig. The mammoni flowers, as is well known to investigators, occasionally develop a certain number of ripe seed.

What the outcome will be from this time on is difficult to predict. The Blastophaga has been successfully introduced and has bred profusely for one generation. Whether it will breed in the mammoni caprifigs we can not tell as yet. It has not been found to do so in Europe, as previously stated.

The third crop of caprifigs in Mr. Roeding's home orchard, near Fresno, invariably drop during the winter, but he has found that in caprifigs growing at his foothill place the figs hang on during the winter. He has made every effort to introduce Blastophaga at that place also, and it is very possible that the insect will successfully hibernate there, if it does not do so at the valley place. There is even a strong possibility that no more importations may be needed. There is also a possibility that the insect will die out owing to variation in season of blooming of the caprifig, and owing to the fact, perhaps, that the right varieties are not growing at Fresno. The present year's experience, however, has shown that the insect can be brought over and can establish itself. We know the proper date and we know where to get the Blastophagas at the proper date. Thanks to Mr. Swingle's idea of sending over the mamme, or over-wintering caprifigs, instead of those of the profichi or spring crop, which were the ones invariably sent in the earlier private attempts which we have mentioned, and thanks also to his excellent method of packing, the successful introduction for a season at least may be repeated indefinitely and with certainty. Efforts will now be made to introduce and to grow in different parts of California every possible variety of caprifig, and it is safe to say that what once seemed so difficult, if not improbable of accomplishment, is now comparatively certain, and there is every reason to believe that in the near future California will be growing and marketing dry figs which will rival the commercial product of Oriental regions.

President Watrous announced that the extremely interesting and gratifying paper just read was open for discussion.

Mr. Berckmans: We have tried in the South to cultivate White Smyrna figs as a commercial product for many years. I would be glad to learn what is the exact variety cultivated in Smyrna for commercial purposes and marketed in this country. Can Dr. Howard inform me?

Dr. Howard was understood to reply that he was unable to give that information.

Mr. Berckmans: In my travels through the south of Europe I investigated the fig question. Many varieties which I found to be quite distinct, in Italy, were always called under a generic name, hence the utter inability to arrive at a correct varietal nomenclature.

I also had this matter as a subject for conversation, in California, with Dr. Eisen, who could not give me the information upon the subject that I desired. I have under cultivation upwards of forty varieties of figs; but out of that number not more than four or five could be recommended for general cultivation. They are as follows: Celestial, Brown Turkey, Green Ischia, Black Ischia and Brunswick. We have also frequently endeavored to dry these but never succeeded in producing a bright colored article; the product being always dark, not equal in color to the ordinary grades which we find in the market. With improved drying apparatus no doubt a better article can be produced.

Dr. Howard's remarks refer to the caprification of figs in California, but fig culture to a certain extent is possible here. In the years of my annual pilgrimage to my friend, the late Mr. Downing, during the month of September, he invariably had a basket of ripe figs for me. These were produced in open ground, the branches being pegged down at the approach of cold weather, then covered with litter and in the spring uncovered. In this way he never failed to produce a good crop of fruit. But I would suggest to those who intend to grow figs in this latitude to use mainly what are called

bi-ferous varieties, such as Brown Turkey and Green Ischia. In this way fig culture may be possible here.

I merely make these remarks by way of showing that it is a possibility for you here to cultivate figs quite advantageously as an amateur product, not as a commercial product. You cannot expect the latter in this climate, I think.

Mr. Parsons: I may perhaps supplement what has been said by stating my recollection of the experience of Mr. Benner of Astoria. He planted fig trees in his garden and succeeded for many years in getting a very satisfactory crop. He would grow them until they became of bearing size. Each year after that, he would cut all the roots right down through the ground, on one side, close to the stem, then lay the tree flat on the ground and cover it with earth. The next year he would repeat the process on the other side, leaving the previously cut roots to make new ones. In that way he protected them thoroughly against the cold.

Prof. Van Deman: It certainly is very gratifying to me, and I know it must be to others, to hear of the successful outcome of this caprification of the fig; which of course, as has been so clearly stated here, is absolutely necessary to the production of the choice figs that are grown in the vicinity of Smyrna and in other regions in that part of the world, where the finest figs known in the market are produced.

As Dr. Howard has stated with regard to the attempt that was made at Washington, many years ago, by Dr. Riley and myself, to bring about this state of things, I may say that one leading idea (and it was the main idea that I had when I organized the Division of Pomology) was to enable our people in this country to produce everything that could be produced on this side of the ocean and to quit sending their money away to foreign countries for things that they could just as well produce at home. That was the idea that was in my mind when this importation was made of the cuttings, from Smyrna, of these caprifigs; and I am not astonished at all upon hearing that these can be grown.

The suggestion with regard to setting the fig trees in the canyon or hilly parts of the country back of Fresno is one that I made to Mr. Roeding, many years ago; the idea being that in case they did not succeed on the lower valley land on which Fresno is located they might be successful back in those ravines. In fact, that is what is done in Turkey, as I found by correspondence with our consuls there, they often have just such natural conditions there and they depend upon those wild caprifig trees that are among the hills. I am sure that if this idea is followed up the time will not be far distant when we will have as good figs in our market here as any that we can import from Smyrna or any other part of the world.

With regard to fig culture in general, of course most pomologists know that figs can be grown almost anywhere if they are only protected in the winter time. I have plenty of them in my place in Virginia; we have an abundance of figs there. Last winter most of them were killed to the ground. We have several kinds there, including the Brunswick and the Brown Turkey. The Brunswick does exceedingly well. Any one who takes the pains to grow them as stated by Mr. Parsons and others can grow figs for his own use.. I remember seeing them growing in Southern Ohio when I was a child; and I saw them growing at the experiment station at Mr. Lyon's place in Michigan, within the last year. It is a matter of interest chiefly to amateurs, of course, to grow these things.

I think it is true that all these varieties of figs that we grow in this country are not up to the true standard of the fig; that is, they are not high in quality because they lack the perfection of the seed, which seems to have a very decided effect upon the flavor and even upon the size and the general development of the fruit. If we could get the Blastophaga or some other species of the same genus to pollenize these figs that we grow in this country, and in that way increase the size of the common figs grown here, I think we would make a very considerable advance in ordinary fig culture the country over.

NOMENCLATURE AND SYSTEMATIC POMOLOGY.

BY PROF. F. A. WAUGH, UNIVERSITY OF VERMONT, BURLINGTON, VT.

Prof. Waugh, of the University of Vermont, to whom the treatment of this subject had been assigned, was called upon by the Chair.

Prof. Waugh said:

The subject of Nomenclature has been threshed over, time and again, in perhaps every meeting that this Society has ever held; and I doubt that the discussion will ever come to an end. I think there is as much to be said upon it now as has been said at any time, and I approach the discussion of it with a feeling that I can contribute my share, this afternoon, without depriving any other member of the opportunity to speak upon it next year. I should like to present it, however, from a standpoint which I think has been somewhat neglected. The necessity for a rational nomenclature has been insisted upon, and we have been told how desirable it would be to have a systematic nomenclature to which we could adhere. Of course when a man finds five or six different names for the same apple tree, after he has been paying for the same tree, under different names, at so much a piece, he is anxious for some system of nomenclature, and the matter becomes one which appeals to his pocketbook. The force of that appeal has always been appreciated by me.

It seems to me there is another equally forcible consideration that ought to appeal to us in behalf of a stable nomenclature in pomology, although it is one that has not been so often urged; and that is that upon a stable and satisfactory nomenclature depends any progress in systematic pomology. Now, while we deprecate the necessity of bringing scientific matters into these discussions, we cannot fail to recognize that this is a scientific subject. I cannot speak upon it from any other standpoint. You understand that much of our advance in pomological matters, as in all others, depends upon placing pomology on a scientific basis; and the first step to that end is to secure a suitable nomenclature; that is, we must have a nomenclature before we can have a scientific pomology. In this respect we can draw many very valuable lessons from experience in respect to the other sciences. There was no such science as systematic botany until we had a botanical nomenclature. It was indispensable to have some sort of names by which the plants should be called. The botanists have spent much time upon this matter of nomenclature; they have learned many lessons; and we can profit by their experience by avoiding errors. They are classifying the plants which they have defined but are still quarreling over them and yet constantly learning something in regard to them. But we cannot say that our classification of fruits,

as a system, is to be compared at all with a scientific classification of plants as indulged in by the scientific botanists.

Then the plea I would make in favor of a systematic nomenclature is this, that it is the beginning of a scientific pomology; that upon this basis of a scientific nomenclature our advancement in that direction must depend. I am appealing, then, for a scientific pomology; and let me pause a moment to explain what I mean by that. There are so many varieties in almost every class of fruit that no one man can be acquainted with them all, and a man is at a loss to keep track of any one branch. No botanist pretends to know all the plants in the world; he may not even know all the plants in his own State; but by having them classified he is able to learn more about them in a general way than he could otherwise, though he may not have the time to become acquainted with the plants individually. In this way we are able to know about certain groups and types of fruits. A man can learn these types, can become acquainted with them and thereby have a broad, stable, useful knowledge of pomology in general, without being obliged to study each variety by itself. This is what I am talking about when I speak of systematic pomology and when I say that systematic pomology depends upon a stable nomenclature.

The question arises, what is required in a stable nomenclature. It has been thought that a certain set of rules was necessary. I suppose it is true that we will need some rules, but I think that, to a great extent, an erroneous view has been taken in regard to rules. As we are now taking lessons from the botanists we might profit by looking at the history of their work. When Alphonse De Candolle read the preamble and a large part of the rules before the Paris Congress, many years ago, one of the first statements he made was this, that rules should not be arbitrary nor imposed by authority; and in another paragraph he declared that the rules should be so reasonable that they would appeal to the understanding of everybody. These two statements mean practically the same thing; that is to say, the American Pomological Society could go ahead here and make a long string of rules; but if those rules are arbitrary and are merely the dictum of this Society, they would not be observed to any great extent and would therefore be valueless in attaining the objects sought to be accomplished by a system of nomenclature. There are certain fundamental necessities which must be satisfied in rules of nomenclature; and, as I look upon it, all that can be done in framing a series of rules is merely to formulate the necessity, so that we can all agree upon some expression of certain fundamental principles of nomenclature.

In what I may say here I shall refer, from time to time, to a series of rules quite widely published through the country last winter, under the name of "The Lazy Club Rules." The Lazy Club, having nothing to do for a time, fought over this plan, last year, at Cornell University, and made it a source of much amusement. They developed at that time a system or formula which appeared to embrace the fundamental principles of nomenclature. The first principal is, "Priority of publication;" and the rule as formulated here is this, "No two varieties in the same group shall have the same name" (that is half the rule), "and the name first published for a variety must be used to designate it." Another rule is, "All names subsequently published must stand as synonyms." It seems to me that that rule is not one that is open to any exceptions. I am aware that, like every other arbitrary rule, it will work some injustice; and in certain cases it would be well if we could work around it; but, so far as the rule is concerned, it is not possible,

I believe, to make any exception to it without destroying altogether the force of all rules. It is one, I say, that is open to discussion and objection; the objections to it may be serious; but I think that the principle itself is unassailable.

Now, with regard to the form of the names, certain principles are to be observed but these are not so fundamental as the priority rule. They are more of an arbitrary nature and are of such great importance in making up a nomenclature that it seems to me worth while to call them fundamental principles. In the first place it is required that the variety of a fruit shall consist of one word or, at most of two words. The botanists have adopted some such rule as that, and it works fairly well. I think it necessary to have some such rule for pomological nomenclature; and I think we are coming very rapidly to recognize the justice and propriety of such a rule and to live up to it more and more. Several suggestions are made here in connection with this rule but I do not deem it necessary to read them to you.

In the second place it is stated in these rules, in connection with specifying the form of a name, that in the formal citation of a variety there shall always be given the name of the author who first published it. It is not understood that this shall be done except in cases of necessity, where one is publishing an entire group or where there is some doubt about it. For instance, when you speak of the *Gold* plum, it is necessary for you to specify whether you mean Mr. Terry's *Gold* or Stark Brothers' *Gold*.

A rule of priority brings up the question of publication. It seems necessary to formulate this matter of publication into a sort of a rule. I have said that priority of publication should be the supreme rule in nomenclature. Now, what is the publication? According to the formula which is given here, publication consists first in "the public distribution of a printed name with a description, the latter giving the distinguishing character of the fruit," etc.; or second, "in the publication of a new name for a variety which is fully described elsewhere." Then, in an explanatory way, it is stated here that such a publication may be made in any bulletin, report, trade catalogue or periodical, provided such publication bears the date of its issue and is generally distributed. It is necessary that it should bear the date of its issue in order that you may determine which publication has the priority. It seems to me necessary that we should include in this list trade catalogues and everything of that sort. I think that the way to introduce varieties now is through the trade catalogue, and it probably will be so for years to come. Mr. Burbank has a variety for sale; he sends it out in his new catalogue; and that is the first time the description is given and the first time it is introduced to the horticultural public. Or if a man has a strawberry which he wants to name "Dewey," as was the fashion last spring, he may make a rush for the newspapers and try to get the description into the newspapers under a prior date and attain priority in that way. I think we should cut it down to some such rule which will require us to depend upon this as a mark of authenticity.

One more rule is this: "No one is authorized to change a name for any reason except when it conflicts with these rules." Of course that is a mere addition and intended to guard against mistakes. Some persons may say, in regard to the name "Transparent," for instance, "This is not satisfactory; it indicates that the variety is transparent but it is not transparent at all; we will call it 'mud' or something more nearly descriptive of the variety." At any rate you should understand that the name is not the description of

the variety but merely something by which to handle it and by which you can get at a reasonable system of names.

A practical question comes up in connection with any such proposition as this; and that is, What shall be done to make it effective? I have heard that question discussed a good deal in the last few months. It seems to me it would be very desirable for the American Pomological Society to agree upon a formulation of the fundamental principles of nomenclature—not upon new legislation, for I do not believe that this or any other Society is big enough to enforce an arbitrary rule upon America. If such a system of rules can be agreed upon. I am sure it will be accepted very readily by the various horticultural societies and organizations throughout the country; and I believe that under the present circumstances we would come very rapidly to a fairly well settled plan of nomenclature in pomology. I believe that through this means we shall see, in the next few years, a wonderful advance in the nomenclature of our American fruits. It seems to me we have been getting further and further from that because new varieties come in in such profusion that we are losing sight of them all the time. To overcome that we need to have some classification of them. I think it more necessary now than ever before in order to arrive at an agreement in regard to these rules of nomenclature. (Applause.)

President Watrous (when Prof. Waugh had concluded) called attention to a contribution on the subject which had been received by the Secretary.

The Secretary stated that he had received a paper from Prof. T. V. Munson, of Denison, Tex., whom he had requested to discuss the subject from the standpoint of the man who has had experience in the naming of new fruits. The paper was then read as follows:

THE REVISION AND CONTROL OF HORTICULTURAL NOMENCLATURE.

BY PROF. T. V. MUNSON, DENISON, TEXAS.

So long as there is no legally authorized standard of horticultural nomenclature in this country, accessible to the general planters of vines, shrubs, trees, fruits, vegetables and flowers, nor laws against false descriptions, illustrations and representations of varieties for sale, so long will there be inconvenient, inappropriate, confused and deceiving nomenclature.

So long as a large nursery, or any nursery can wilfully rename old varieties and sell them at extortionate prices, under trade-marked, new names, all over the country by agents claiming patent privileges of exclusive propagation, sale, use of names, etc, as is the case with a number of Arkansas varieties of apples ten to forty or more years old (See Bulletin No. 49, of the Arkansas Experiment Station, Fayetteville, Ark.), and the people have no means provided by which to readily detect the fraud, nomenclature will remain confused, confusing and a means of deception and extortion, as in the "Jumbo," "Columbian" and "Columbian Imperial" grape, one and the same variety, under three names, the latter trade-marked, and claimed as having exclusive rights to propagate and sell, and threatening prosecution, in case the claim (which is false) is violated.

Outside of such designed change of names for deception in order to monopolize or sell old kinds at high prices, there are many local and ignorant

nurserymen, who know little even of the common standard varieties; and finding such growing in old orchards, and the owners not knowing the names, the varieties are often propagated and sold under new names; thus giving rise to almost innumerable synonyms, especially so of very popular varieties.

The same variety thus going under so many names, frequently causes planters to set many more of certain kinds than they intended, or than are profitable to them.

There are many other channels through which poor and erroneous names become attached to varieties, not necessary to enumerate here. What is of more importance to know is, how we can best revise and control horticultural names.

After studying the problem considerably, the following appear to me the best and most efficient means: Place the whole matter in the hands of the Divisions of Pomology, Forestry, Agrostology, Botany, Seed Distribution, and other sections of the Department of Agriculture, having to do with horticultural affairs. There is large room for revision, and much need of control over names of vegetables, flowers, shrubs, etc., which go out annually to the people. But I must confine my attention here to pomology. Can we not secure action on the part of the Secretary of Agriculture, to direct the pomologist to prepare a thoroughly exhaustive descriptive catalogue of all American varieties used in horticulture and especially in pomology?

This should be known as the legally authorized National Pomological Catalogue.

At the head of each description should be the legalized name in bold type, which all nursery catalogues published in the country should be required thereafter to use in designating such variety when offering for sale, before they could circulate through the mails. Below should be the list of synonyms of the variety which have been used, stating as well as possible, where each is mostly known.

A system of outline illustrations, or better, half-tone cuts, where allowable, giving the special features best identifying each variety, should be used in connection with the text descriptions.

An appendix list to include new varieties and corrections should be added each year.

The National Catalogue should be kept perpetually in stock, at all experiment stations, and supplied at cost to all applicants.

Then, the various States should enact laws, with penalties attached, for violation, prohibiting any person or persons, from offering for sale varieties under over-drawn descriptions and illustrations to such an extent that it is clear that such are designedly deceptive; and in case of varieties described in the National Catalogue, the use of the authoritative name should be required as the correct name, in connection with the sale of the varieties both in tree and fruit.

In the case of new varieties, Congress should require that before they can be disseminated through the mails and interstate channels of commerce, they must be submitted to the Pomologist for description and recording of name, which must appear in that year's report of the Division.

It would seem that the correct name of a fruit could be legally required to be attached in its sale, as well as in the case of butter, oleomargarine, etc.

Whether or not it is practical to secure and carry out these legal enactments successfully, I leave wiser heads to decide.

The creation, however, of the "National Descriptive Catalogue," and keeping it up to date and well distributed, would undoubtedly go far toward cor-

recting the evils attending erroneous and fraudulent nomenclature and description.

The State experiment stations, as illustrated in the Bulletin 49 of Arkansas, could greatly aid the reformation, by working up the varieties in the States respectively.

The general inauguration of such catalogue work, in connection with the present recommended conformity to the rules of the American Pomological Society on nomenclature, would be a large blessing in many ways to American Pomology.

The National Catalogue should also contain the select recommended lists of the American Pomological Society, for each particular region of the country, and also the different State Horticultural Societies' lists where such have been adopted and kept revised up to the times.

We no longer have a Charles Downing to revise and publish "Fruits and Fruit Trees of America." We have as yet no "Cyclopedia of American Horticulture," but we hope we soon shall have it, as Prof. L. H. Bailey has undertaken it, and he does nothing by halves. But such works are not planned to meet the broad popular want that I have had in mind, to educate and control the masses in horticultural nomenclature. It must not be voluminous, nor expensive, but must be clear, concise, accurate, pointing out conspicuously the essential differences of similar varieties, and the most determinative characters in all. No individual can find profit in such a work, nor afford to collect and arrange such a vast multitude of facts, and if he could arrange an adequate catalogue, he could not long continue it. So if we ever have it the government must furnish it.

Mr. S. B. Parsons: I am perhaps more directly interested in the nomenclature of ornamental plants that of fruits but, though my experience has been more in ornamental plants, it may apply to the question here. The point is as to priority; and the question arises, what publication is required to secure it. Relating to ornamental plants, injustice has been done in many cases, because the publication has been confined to botanical societies. Some twenty-five years ago there were sent to this country, by a gentleman who had lived a long time in Japan (Dr. Hall), several plants which were of great value. One was a double flowering apple, and the nurseryman to whom it was given by Dr. Hall to propagate called it *Malus Halleana.* It was also presented by Dr. Hall to an amateur and the friends of that gentleman named it *Malus Parkmani.* It was cultivated by him, for he was a great lover of plants. Justice would have required that the naming of the plant should have been made by those who had published it the most widely. I am very glad to hear the suggestion made here to constitute, as the authority, the published catalogue of any nurseryman. There is the first publication, and that should constitute priority.

In another case a magnolia called *Magnolia parviflora* (which, I think, had been sent by Dr. Hall in the same shipment with the other) was cultivated, and copies of the nurseryman's catalogue in which it was placed were sent to Europe. It was known to England as *Magnolia parviflora,* but it was not found in the botanical publications of England or in botanical publications anywhere. Many years later it was named by one of the societies *Magnolia Watsoni.* It bore a beautiful flower but not the name which justly should have been given it. Then came the *Magnolia Halleana,* which was grown and published by the same nurseryman, but it was not known in Europe, although first seen in Asia by Fortune and named by him *Magnolia stellata.*

These things give one an idea that there ought to be something more absolutely true and just than the botanical catalogue; the botanists are a most excellent class of people, but they are a small part of the community; and the very large class of people who purchase trees never see a botanical catalogue. I make these suggestions because they seem to bear on the question of the authority which is claimed for this nomenclature of fruit.

Mr. G. B. Brackett here suggested that it would be impossible to arrive at any definite settlement of the pending question at this time and that, as it was an important one and should be carefully considered before being acted upon, he believed it would be best to have it referred to a special committee rather than to the regular committee.

He moved to refer the subject to a special committee of five, to be appointed by the Chair, to formulate and report a plan at the next meeting of the Society.

Mr. C. R. Hartshorne suggested that it might be well to instruct the special committee, if there were going to be any cast iron rules, not to have *ex post facto* rules because, if the position taken by Prof. Waugh was maintained, the Bartlett would have to go, as "Williams' Bon Chretien" was the original name of the Bartlett when it came over to this country.

Mr. Strong: I do not like the idea of our being bound by arbitrary rules which cannot be varied in such a matter; I think we should have the liberty to change them. In regard to one fruit that we all know of I think it unfortunate that it should have been given a vulgar name. I refer to the navel orange. There are reasons why that name ought not to have been given it, and it is to be regretted that so good a fruit should be perpetuated under such a vulgar name. I only throw out this suggestion as a caution against binding ourselves by fixed rules. The originator of a fruit, having a new variety, has a right of priority that ought to be respected but, on the other hand, the public have rights and he is not entitled to fix forever an unfortunate and unworthy name upon a good product. I believe most heartily that there ought to be a body which would have control and which would have authority over even the originators of fruits.

Mr. Berckmans: As one of the members of the original committee to submit rules and regulations for the Society, I am willing to vote to refer this matter to a special committee. When we prepared those rules we were laboring under some difficulty; since that time we have made some progress; but what we considered advisable then we think should be revised later. Therefore I am willing that this should be referred to a committee for revision.

Col. Brackett's motion was then adopted by a unanimous vote.

Prof. Wm. R. Lazenby, of the Ohio State University, Columbus, Ohio, presented the following paper:

THE DEVELOPMENT OF THE BUDS IN SOME OF OUR COMMON ORCHARD FRUITS.

BY PROF. WILLIAM R. LAZENBY, OHIO STATE UNIVERSITY, COLUMBUS, OHIO.

Buds have been defined as "the germs of stems." They contain embryo axes with undeveloped appendages. Structurally buds are of three kinds, viz.: (1) *Leaf buds*, or those devoted wholly to the vegetative functions of the

plant, and whose parts or some of them develop leaves. (2) *Flower buds*, which consist wholly of unexpanded blossoms. (3) *Mixed buds*, or those which contain both undeveloped foliage and blossoms.

Figuratively speaking, the leaf bud devotes its whole attention to the temporal and physical development of the individual plant, while the flower bud looks to the future and devotes its attention to life beyond the individual, life which may be manifested through untold generations.

The object of the flower is to produce seed. A seed is an undeveloped plant produced by the agency of the sexes. A leaf-bud may be regarded as an undeveloped plant produced asexually, or without the agency of the sexes.

The seed propagates the species. The leaf-bud propagates the individual.

It is this individuality of leaf-buds that is the cardinal point about which turn many of the most important horticultural operations. In fact every form of propagation except by seed.

For some years past I have been making observations upon the development of the buds on our more common fruit plants, and in this paper I present a simple record of some of these observations.

The common orchard and garden fruits way be grouped according to their flower-bud development into two classes: (1) Those which bear fruit from buds formed the previous year. (2) Those which bear fruit from buds formed the same year.

Each of these classes may be divided according to the position of the flower-bud, into two subdivisions, which may be termed: (1) Lateral-bearing. (2) terminal-bearing.

The lateral-bearing fruit plants of the first division are the peach, nectarine, almond and apricot. These do not develop fruit spurs. The terminal-bearing fruit plants of those which produce spurs are the apple, plum and pear. The lateral-bearing fruit plants of the second division, those which bear fruit from buds formed the same year, are the grape, blackberry and raspberry. The only common terminal-bearing fruit plant of this class, cultivated in our latitude, is the quince.

Let us now briefly present some of the observed points in the development of the buds in the different groups of fruit plants just named.

Peaches.—These are devoid of spurs, the bud being borne directly on the shoot or branch. If we examine the lower part of the shoot of the present year's growth, we shall find that the buds sometimes appear singly, sometimes in twos, and often in threes, there being no definite number. On the upper part of the stem or shoot there is usually but one bud in a place, and these are often, perhaps usually, flower buds. In the climate of Central Ohio these flower-buds rarely live through the winter, and if they do live and expand rarely produce fruit. Sometimes all the buds at one node may be flower-buds, or there may be two flower-buds with a leaf-bud between, or where there are two buds one may be a flower and the other a leaf-bud.

Although three buds at a node is not uncommon, I have never found more than one of them to expand into a leaf in any healthy peach growth. Unlike the general rule, the most vigorous peach buds are not at the distal end of the shoot, but on the part first formed, or the lower half. It often happens that some of the peach buds will begin to grow the same season they are formed, and this growth is not confined to the point alone, but is seen at the base as well.

The flower-buds of the peach are quite prominent from about February 1st in the vicinity of Columbus, and are often one-eighth of an inch long, with a nearly equal diameter.

One who has not carefully observed the buds of peach trees would not be conscious of the differences between buds of different varieties.

A close observer, however, can readily determine varieties by the buds alone. But this requires a degree of familiarity with the peach of which few can boast.

It is interesting to note that certain individual trees, and even certain varieties have a marked tendency to produce about the same number of flower-buds each year, and that these flower-buds bear a definite proportion to the number of leaf-buds. Careful estimates, including several distinct varieties, showed that the number of leaf-buds was from 35 to 46 per cent of the total number of buds. The average, 39 per cent shows that the number of leaf-buds is considerably less than the number of flower-buds.

It should be remembered, however, that in a short time after blooming there are many more leaves than there were flower-buds, because a blossom bud produces but one flower, while a leaf-bud may produce one or more leaves.

The Apricot.—The fruit of the apricot tree is usually borne on spurs formed the previous season. The spurs are numerous and mark the position of a flower-bud the year before the spur started.

In late summer and early fall all the buds on shoots of the present season's growth are flower-buds which expand the following spring.

In the fall and early winter small buds begin to be seen by the side of these flower-buds, and in the spring they develop quite rapidly. This is the beginning of the spur.

On the lower part of the shoot two flower-buds usually occur in a place, and in such cases no leaf-bud forms. Sometimes three buds start from the same point, all of which are flower-buds.

Whenever two or more flower-buds are found together, it is seldom that more than one ever expands into a blossom. The others drop off. In the apricot as in the peach only one blossom is found in a bud, while in the plum, pear, apple and cherry there may be two or more.

The Apple.—Although the apple is the "world renowned fruit of temperate zones," and more generally grown than any other tree fruit, very little has ever been published concerning the growth and development of its buds.

During the growing season it is not easy to distinguish between the leaf and flower-buds of the apple. At this time neither position, shape, size, color, or any other characteristic is well marked.

Later in the season, however, some differences appear. As a rule all rapid-growing shoots of the apple bear only leaf-buds. The flower-buds are almost invariably borne on the extremities of spurs or short twigs. These terminal buds change each year. That is, they are alternately leaf and flower-buds, elongating the spur or twig one year, and producing fruit the next.

By this alternation of wood producing and fruit-bearing years, one can determine with considerable accuracy how much fruit any particular tree, or any branch of a tree, has produced during a series of years.

Whenever an apple has matured there is an enlargement of the stem. This is also quite pronounced in the pear. By carefully noting the size of the enlarged spur, and the scars at the end, one can tell with a fair degree of confidence whether the fruit reached maturity and the number there were in each individual cluster.

The terminal buds of the apple are considerably larger than the lateral, and are more globular in shape.

The flower-buds are but little larger than the leaf-buds, but they are more regular in shape and usually a trifle longer.

The Plum.—The two classes of buds of the plum are quite similar in shape and appearance.

The flower-buds are usually a trifle the larger, and more oval, while the leaf-buds are slightly smaller and a little more conical.

The buds are borne as a rule, on spurs from one to several inches long, and on one spur there may be from two to twenty buds.

Nearly always there is a leaf bud on each spur as a terminal, but occasionally the spur terminates in a flower-bud. Spurs occur on wood one year or more old, and are seldom found on the last year's growth. The leaf and flower-buds on the previous season's growth are readily distinguished. The flower-buds are on the lower portion of the shoot and stand out at an angle of about thirty degrees from the stem. The leaf-buds on the upper portion are more closely appressed to the stem and are somewhat narrower and more pointed.

In some varieties of the plum, as Coe Golden Drop, buds occur three in a place on the proximate half of the last year's growth and all of these are flower-buds. The middle bud usually contains three flowers and the side buds two. The distal half of the stem bears one bud in a place and this is usually a leaf-bud.

The Pear.—The so called blossom buds of the pear are not strictly or exclusively flower-buds. Each one contains a cluster of flowers, but it also contains in addition, the embryos of five or six leaves which develop and form a whorl around the flower cluster. Until the time of blossoming these leaves are scarcely perceptible, and the buds bear the general characteristics of all flower-buds in a marked degree. No one could fail to note the difference in size and shape between these terminal mixed buds and the lateral leaf-buds.

The number of flowers in a terminal bud varies from six to nine, and this together with the unusual size make these buds very interesting objects of study at any time during the winter.

As early as November first, a miscroscopical examination will reveal the little nodules in which may be seen the minute pistils and stamens. The leaf-buds of the pear are somewhat uniform in shape, but their size is variable for different varieties. The material fruits of certain varieties are no more distinct than are the buds of these varieties.

Perhaps there is a more constant difference in the buds than is ever seen in the fruit. Probably the Bartlett and Kieffer present the extremes in bud variation. The flower-buds of the former are of medium size, short and thick, with a blunt or rounded apex. As a rule each bud contains nine flowers, and the scales are thickly lined with bronze-colored hair.

The flower-buds of the Kieffer are large, long and pointed. Each bud contains eight flowers, and the scales are lined with a short pubesence. The outsides of the scales have a faint, red blush.

The Cherry—Belongs to that class of fruit which produces buds one year and flowers the following.

The buds are borne either on spurs or branches. Some varieties produce all their buds directly on the branches and have no spurs.

Each flower bud has from two to five blossoms. There are often from three to eight flower-buds on a spur, with a leaf-bud as a terminal.

The flower-buds of the *grape*, *blackberry* and *raspberry* originate the same year the fruit is borne and from lateral buds. That is, all fruit buds are borne on wood of the present season's growth and unless growth takes place no fruit can be expected.

The Quince—Produces its fruit on terminals of the present season's growth, and when the flowers appear the growth of the shoot is at an end.

Later in the season leaf-buds appear which give rise to new shoots the following year.

The observations made show beyond doubt that leaf-buds change to flower-buds and that flower-buds may change to leaf-buds during almost any period of the growing season.

Florists hasten or increase the blooming of plants by limiting the root development. The fruit grower may do the same by root pruning, and it has been repeatedly shown that trees which have been making vigorous growth and developing few fruit-buds may be forced into greater productiveness by this process.

The formation of flower-buds appears to depend upon a somewhat rapid development of food material with a lessened growth or multiplication of new cells.

Summer pruning, drouth, the cutting or removal of the bark, the bending of a branch, these and other agencies tend to produce this result.

It is only by observation and careful experiment that the fruit culturist can tell which operation can be practiced with the most satisfaction and profit.

The Society was then addressed by Professor J. C. Whitten of the University of Missouri:

THE RELATION OF COLOR TO THE GROWTH OF FRUIT BUDS OF THE PEACH ON SUNNY DAYS IN WINTER.

BY PROF. J. C. WHITTEN, UNIVERSITY OF MISSOURI, COLUMBIA, MO.

The relation of color to the growth of plants has been given some attention by students of vegetable physiology. It has been observed that many species of plants take on a reddish or purplish tinge upon the approach of cold weather, and that their purple coloring matter becomes more and more abundant as the cold becomes greater. The fact has been recorded by Kerner that many species of Alpine plants are green when grown at a low altitude, but that the same species become much darker colored when grown at a higher altitude, where they receive less warmth. It has further been shown that if some of these green colored plants are removed to a higher and colder locality, they have the power of quickly taking on the dark purple color customary to the species in cold places; and that, conversely, if the purple specimens are removed from the colder places to the warm valleys below they soon lose their dark coloring matter and become green like adjacent plants of the same species. In many cases plants that bear white flowers during warm weather, produce flowers of a purplish tinge upon the approach of autumn. These and numerous similar phenomena led to the conclusion that this purple coloring matter in plants served the purpose of absorbing heat, thus facilitating growth at low temperatures, and Kny and others, have by direct experiment, proven this supposition to be true.

While these facts have been established by the vegetable physiologist, the horticulturist seems not to have given the matter very much direct attention in studying the management of cultivated plants. During the past few years the writer has conducted some experiments at the Missouri State University, which indicate that their color bears a very important relation to the winter killing of peach buds, and to possible methods of its prevention.

It is a well known fact that while flower buds of the peach are sometimes able to endure a temperature of 20 degrees or more below zero, without injury, they are at other times killed even at temperatures much higher than this, and have been known to be destroyed at temperatures above zero. During the past winter flower buds of the peach were killed in some orchards in Missouri during December, when the mercury registered 12 degrees below zero. On the other hand, some peach trees in the same state endured a temperature of 26 degrees below zero, during February, without injury to their buds, and they are now carrying a good crop of fruit.

Observations during the past four or five winters convince me that the condition of the buds has much to do with their ability to safely endure cold. Perfect maturity of the buds in autumn seems to favor their safe wintering; while imperfect maturity of the tissues, from lack of moisture, or on the other hand, from excessive and prolonged growth during a warm, moist autumn, seems to oppose their endurance of severe cold. If peach trees prematurely approach a dormant condition during a dry time in late summer, and are subsequently stimulated into autumn growth by warm rains, as is sometimes indicated by the blossoming of the trees in autumn, the remaining buds are usually very liable to injury in winter.

Again, peach buds often grow perceptibly during mild weather in winter. We are in the habit of thinking of peach buds as being dormant during winter. As a matter of fact in this climate, they grow perceptibly during the winter months. The most frequent cause of winter killing in this section is severe freezing of the buds after they have been rendered liable to injury by making too much growth on warm winter days.

The swelling or growth of peach buds in winter is due to the heat they receive, is independent of root action and may take place when the roots are frozen. Considering the fact that the purple coloring matter of plants is admirably adapted to absorbing heat, the idea suggested itself that if the twigs were whitened to *reflect* rather than *absorb* the heat, during bright sunlight, there would be less danger of swelling of the buds on warm winter days, and consequently less danger of subsequent winter killing.

During the winter of 1895-6 peach trees of several varieties were whitened by spraying with lime whitewash. In order to thoroughly encrust the twigs with lime, two sprayings were necessary, just as two coats of paint are necessary to cover wood. Whenever this was washed off to any extent another coat was applied.

The winter was marked by changeable temperatures. During February whitened and unwhitened buds were examined weekly under the microscope. Sections of whitened buds revealed the fact that they were not growing perceptibly, while sections of unwhitened buds showed that they were swelling more or less every week. At the time of blossoming it was found that the pistils had been killed in 80 per cent of the unwhitened buds while only 20 per cent of the whitened buds had been destroyed. Warm weather came on very suddenly and most fruit trees blossomed at about the same time. There was a difference of about one day in the time of blossoming of whitened and

unwhitened trees. The whitened trees remained in bloom longer than those that were not whitened and set more fruit.

During 1896-7 the same and also additional trees were whitened. The same marked effect was noted in retarding the swelling of the whitened buds during warm days in winter. The winter was mild and there were very few peach buds killed. The following table shows the comparative time of blossoming of whitened and unwhitened peaches:

Variety.	Color.	First flower.	Full bloom.	Last flower.
Heath Cling	Whitened	April 13	April 21	April 29*
	Not whitened	" 11	" 18	" 27
Wonderful	Whitened	" 14	" 22	" 29*
	Not whitened	" 11	" 18	" 25
Rivers Early	Whitened	" 13	.....	" 29*
	Not whitened	" 9	" 21	" 27
Silver Medal	Whitened	" 13	" 18	" 28
	Not whitened	" 7	" 13	" 21

*On April 29 a hailstorm took off the remaining flowers, so this date does not correctly represent the date upon which the flowers would have shed normally.

It will be observed that whitened trees blossomed from two to six days later than those which were not whitened.

During the winter of 1898-9 twigs were cut from various varieties of peaches and forced into growth, from time to time, in vases of water in the greenhouses. One-half the twigs of each variety were whitened and one-half were left natural. In all cases the buds of the unwhitened twigs began to swell and grow perceptibly, before the whitened ones did, and a similar difference was noticed in their time of blossoming. There was a much greater difference between the time of blossoming of whitened and unwhitened twigs taken early in the winter than between those taken late in the winter. There was also a greater difference in the number of days between their blossoming in a cool house than when kept in a warm house.

In order to measure the difference in temperature between whitened and unwhitened buds some very slender thermometers were made and tested for accuracy, for measuring the temperature of the twigs. Twigs of the past summer's growth and bearing fruit buds were cut off at points where their diameter was uniform and tunneled for about four inches of their length. The thermometers were inserted in these tunnels and the twigs were tied so they would stand vertically, in order to receive the sun's rays at the same angle. One of these twigs was whitened and the other left natural. It was found that during sunny weather the natural twig registered a higher temperature than the whitened one. The following table shows the comparative temperature of the whitened and natural twigs as compared with the atmospheric temperature as revealed by hourly readings on March 4, 1898:

Time—A. M.	Exposed thermometer.	Whitened twig.	Natural twig.	Weather conditions.	Time—P. M.	Exposed thermometer.	Whitened twig.	Natural twig.	Weather conditions.
7....	35°	33°	33°	Cloudy.	1....	63°	60°	72°	Clear.
8....	47°	38°	41°	Hazy.	2....	61°	60°	71°	Slight haze.
8....	55°	48°	55°	Slight haze.	3....	63°	60°	75°	Clear, sunny.
10....	56°	51°	64°	Clear, sunny.	4....	58°	55°	68°	Clear, sunny.
11....	59°	54°	69°	Clear, sunny.	5....	47°	48°	50°	Haze.
12....	64°	59°	73°	Clear, sunny.	6....	48°	46°	46°	Sundown.

Reference to the table will show that during very bright sunlight at midday the natural twigs were 15 degrees warmer than the whitened twigs. The whitened twigs were of nearly the same temperature as the atmosphere. When the sun came out suddenly bright, however, the whitened twig did not warm up so rapidly as did the atmosphere. This difference of 15 degrees in temperature explains why natural twigs may swell perceptibly on warm days in winter, when whitened twigs do not swell enough to endanger themselves to subsequent injury from cold.

Comparison showed that naturally light colored twigs do not absorb so much heat as the dark purple twigs. Varieties of the "Snow" type do not reach so high a temperature by several degrees as do varieties that have darker twigs.

Whether or not whitening will prove commercially profitable remains for the practical grower to work out. Its profitableness will no doubt depend largely upon climatic conditions. In districts where there is an intensely bright winter sunlight it will probably have greater value than in districts where the winters are more cloudy. Where winter rains are abundant they may too frequently wash off the lime, rendering frequent application expensive. It is not improbable, however, that a wash may be discovered that will stick more effectively, rendering repeated application unnecessary.

The fact that light green twigs absorb less heat than purple ones suggests the advisabilty of selecting for light twigs, in originating new varieties for those regions where whitening has a beneficial effect.

The President invited discussion.

Mr. M. S. Cook, Pennsylvania, said that in his experience with whitewashing he had found that by the addition of a pound of pulverized glue, adding the slackened lime, the whitewash would stick very well.

Mr. H. J. Webber, Washington, D. C., remarked that possibly Prof. Whitten might cheapen his process by combining the whitewash spray with the fungicide, Bordeaux mixture, which of course is used for the *monilia* or rot of the peach. He inquired whether the addition of the blue vitriol would make the whitewash too dark in color to answer the purpose intended.

Prof. Whitten replied that, in his experiments, blue vitriol had been tried in the wash and it had been found that it could be used in sufficient quantity to answer the purpose of the fungicide without detracting from its effect in reflecting the heat. The additional result had been shown that even the pure lime, without the blue vitriol, would almost entirely prevent leaf curl but he was not able to say what would be its effect upon *monilia*. The amount of blue vitriol used was about six pounds to fifty gallons of white-

wash. He added that it had been found that the purple coloring matter of the peach absorbed a great amount of heat, almost as much as would carbon, which is one of the best absorbents known. Twigs covered with carbon or lamp-black registered a temperature only two degrees higher than the natural purple twigs.

Prof. John Craig, Iowa, said he was glad to corroborate Prof. Whitten's statements regarding the efficacy of the whitewashing as a preventive of leaf curl. His own experience had given results exactly in line with those stated by that gentlemen. He asked as to what care Prof. Whitten had taken, in examining fruit buds, to distinguish between the injured blossoms and the sound blossoms within the same bud.

Prof. Whitten replied: I have made no attempts at microscopic examinations of buds of the plum and other fruits which have multiple flower buds. My observations have been almost entirely confined to the buds of the peach; and, as these have but one flower to the bud, it is very easy to tell whether or not the flower has been injured.

Mr. W. B. K. Johnson, Pennsylvania, said that about four years ago an investigator in California sent out circulars for the purpose of having tests made to ascertain whether the "curl leaf" could be prevented. Upon making a test he found that his peach trees were entirely free from "curl leaf." He had been putting on Bordeaux mixture pretty strongly in the winter time, when the trees were not in leaf; using about five pounds of sulphate of copper to the barrel. He had had great success with the mixture.

Mr. W. T. Macoun, Ontario, spoke of experiments he had made at the Central Experimental Farm, Ottawa, Canada, at about latitude 45°, in order to see whether his experience would corroborate Professor Whitten's. Not having peaches he made the trial with cherries and plums and to a small extent with apples. He said the result corresponded with that attained by Prof. Whitten. The buds were retarded to a large degree until the warm weather came on. As soon as the atmosphere became warm there was very little difference between them and they blossomed at about the same time. He had noticed, however, in regard to the plum trees, that the whitewashing apparently killed a considerable number, probably one-third, of the buds. He inquired whether or not the whitewash would prevent sun-scald on fruit trees.

Prof. Whitten replied that he had no personal experience in the use of whitewash to prevent sun-scald, but that several fruit growers in Ohio and one or two other states had written to him that they had been using whitewash to prevent sun-scald for years and that, until they read his publication, it had not occurred to them why it was that it should so thoroughly prevent sun-scald on the trunks of the trees.

Mr. Macoun mentioned, as another point, that, in an examination of the bark and limbs of the trunks of his trees, this summer, he had found that the trees which had been whitewashed were entirely free from the oyster shell bark louse, while those that had not been whitewashed had it upon them. He thought it quite apparent that the whitewash was the preventive.

COMMITTEE ON NOMINATION OF OFFICERS.

President Watrous reminded the Society of the usual custom for the State delegations to create a committee, consisting of one from each delegation, for the nomination of officers of the Society for the ensuing year. He suggested that this requirement should be complied with during the afternoon,

so that the committee could meet at nine o'clock the following morning and perfect their report. He said it was also expected that the committee would appoint a State Vice President for each delegation.

GENERAL BUSINESS.

Prof. Wm. B. Alwood, of the Committee on Order of Business, suggested for discussion the question whether it is advisable for the Society to revise its system of awards of Wilder medals and also provide for the award of gold medals. He said that the question had been discussed at an informal meeting of about forty members, at the Wissahickon Inn, on the previous evening, when the suggestion was made that a considerable sum had accumulated in the hands of the Society, which could be used for medals only; and that its use in this way would stimulate an interest in the Society among the best amateurs as well as professional growers throughout the country.

Mr. Berckmans said he thought Prof. Alwood was in error as to the amount of money available for medals. The Society had for this purpose only the income of $1,000, which was $40 per year.

Prof. Alwood replied that, according to his understanding, there had been some accumulation of the income for twelve years.

Mr. Berckmans said it had not been customary for the Treasurer to keep a separate account of the medal fund but that he had allowed that money to be absorbed in the general fund, and that it had been in part expended to defray general expenses. Therefore no expenditure should be permitted which would exceed the amount of the income from the $1,000 fund.

Treasurer Taft explained that the income of $40 per year for medals had in twelve years aggregated $480, of which amount about one-half ($240) had been expended and about $240 remained on hand. He gave the expenditures for medals as approximately as follows: In 1891 about $60; in 1893, nothing; in 1895, $40; in 1897, $18.

Prof. Alwood remarked that he thought it was well understood by the Executive Committee that the necessary money was in the Treasurer's hands and could be spent for medals only. Therefore he suggested that the only question to be determined was whether the Society would increase the expenditure for medals to attain a worthy purpose.

Mr. L. A. Goodman, Missouri, advocated the proposition, contending that the medal fund should be used in the purchase of medals. He said that the Treasurer's accounts showed that the ordinary funds of the Society had been kept distinct from the medal fund. He thought that the distribution of Wilder medals would have a beneficial effect. He added that the fact that medals were given by the Society was little known in the west.

He moved to refer the matter to the Executive Committee with instructions to look into it, and after examination, to take such action in the use of the money to the best advantage as might seem justified.

The President stated the question on the motion.

Mr. Goodman: Will it be necessary to add the words, "with power to act?"

The President: That will be understood, that the committee will have power to act.

The vote was taken and the motion was carried without objection.

Mr. Wm. C. Barry, who had been absent during the discussion on Nomenclature, asked leave to speak for a few moments. He said: A most important work before this Society is that of solving the problem of nomenclature.

If the Society has any influence whatever it should exert that influence toward securing decent names for the fruits we send out. All of us are open to receive information regarding the best system for accomplishing this object. Its importance cannot be overestimated, and I believe that unless this Society takes some steps to reform the old methods, we are going to be placed in a bad way. We have all made mistakes, and it is urgently necessary that those mistakes be corrected. I do not want to be placed on the committee that has been ordered on this subject but I urge upon that committee to take up this question in a practical way and bring in such a report as will reflect the sentiment of this Society in favor of a radical change in pomological nomenclature. We have given such names to fruits as it was thought would help their sale, regardless of other considerations; but no one of us would give a discreditable name to a child of ours, and it is equally incumbent upon us to avoid giving a repulsive or unsatisfactory name to a product which we send out. It is our urgent duty to consider this question in the near future and take decisive action upon it.

President Watrous good humoredly remarked that he desired to serve notice, in view of what Mr. Barry had said, that that gentleman would be asked to serve on the committee that had been authorized.

Upon motion the Society adjourned to meet at 8 p. m.

THURSDAY EVENING SESSION.

Thursday, Sept. 27, 1899.

The Society reassembled in Horticultural Hall at 8 o'clock p. m.; President Watrous in the chair.

The first business was the reading of a paper on the "Importance of the Plant Individual in Horticultural Operations," by Prof. G. Harold Powell, of Delaware College, Newark, Del.

THE IMPORTANCE OF THE PLANT INDIVIDUAL IN HORTICULTURAL OPERATIONS.

BY PROF. G. HAROLD POWELL, DELAWARE COLLEGE, NEWARK, DELAWARE.

The observing fruit grower cannot walk through his orchard without being impressed with the individuality expressed by the trees of a single variety. The little differences that distinguish one Bartlett pear tree from every other one may find expression in slight variations in the form of the foliage, or in its resistance to fungous attacks; in the early or later blooming of the flowers; in the early tendency of the tree to fruitfulness, its prolificacy, or its hardiness; in the size, the color, or the quality of the fruit.

I have been observing and recording the personal traits of a dozen Crandall currant bushes for a number of years. Two bloom a week in advance of the others; two begin to ripen their fruit in advance, some bear small berries, others berries twice as large, some are enormously productive, others only one-fourth as heavy, and one appears to have a scarcity of foliage on account of its long internodes.

Similar differences may be discovered in the trees of an apple or a pear orchard. I will give you the yields from three Winesap apple trees since 1895. The trees stand together, resemble each other closely and have always received similar treatment. They differ chiefly in their fruitfulness.

The trees may be numbered one, two and three. The figures represent the percentage of the total amount of fruit produced annually by each tree:

	No. 1.	No. 2.	No. 3.
1895	46	21	32
1896	48	17	35
1897	47	9	44
1898	41	10	49
Average	45.5	14	47

A number of interesting things are indicated by these figures. First it is seen that trees 1 and 3 are uniformly heavy bearers and that tree 2 is a uniformly light bearer. It is seen also that tree No. 1 is approximately stable, varying not more than 7 per cent in four years, tree No. 3 is increasing in fruitfulness, while tree No. 2 has been decreasing in fruitfulness. These figures indicate that the individuality of a tree can be established only by recording its behavior for a number of years. The practical question is are these differences attributable to individuality, or to some unknown physical cause and will the bearing tendency of these trees be transmitted through their buds?

Throughout the South the Le Conte pear is notorious for the variability of its individual trees which are grown from cuttings. The variations have therefore arisen as cutting or bud variations. At the Florida Experiment Station there are two distinct strains in the same orchard, one a prolific, the other a light bearer. Professor Rolfs, formerly at the Florida Station, informs me that light and heavy bearing strains are common in the Le Conte orchards throughout the South. A similar condition is equally true of the Kieffer orchards in the east.

A Spitzenburg apple orchard has been under my observation for many years. Under intensive cultivation, fertilization, and spraying, it had produced ten consecutive crops of fruit up to 1898, when on account of continuous rains in the spring, the orchard could not be sprayed. The apple-scab fungus swept through the orchard and blasted the fruit in the blossom on every tree but one, which bore a large crop. The foliage was injured so severely that no fruit buds were formed for the crop of 1899 except on this one tree, which is again filled with apples. Here is a striking case of strongly marked individuality in a single tree. The practical point is, could this tree be used as the starting point for the development of a strain of Spitzenburg apples less susceptible to the apple scab?

Let us see what bearing these isolated cases have upon the discussion. They establish first of all this important fact, that the plants or trees of a given variety present endless variations, some of which may be useful in the highest degree to the fruit grower.

The query that naturally follows is, Are these differences hereditary? For if they are, a basis is established on which the systematic improvement of a given variety may proceed. For all of organic nature has evolved by the accumulation of beneficial differences in successive generations.

The plant is made up of a collection of individuals or buds growing upon themselves, and varying amongst themselves just as seedlings do, though to a lesser degree. The plant individual is the single bud, and an important problem for modern horticulturists to solve is whether the differences observed in trees or in parts of trees can be transmitted through the buds taken from these parts.

While it is not possible to answer the problem from direct pomological experiments, considerable light may be thrown on the question from the behavior of a large number of bud variations known as sports, or of minor varietal variations known as strains.

Varietal strains are the result of bud differences, and their hereditability by budding, or other asexual means of propagation, cannot be questioned. The various strains of King, Rambo, and Baldwin apples, Kieffer and Le Conte pears, and other fruits are positive evidence of the fact.

Bud sports differ from the smaller variations within the variety only in degree; their divergence from the type is more marked. They are frequently propagated by budding, and when meritorious like the Banks apple of Canada, the Pierce grape of California, and the Cannon peach of Delaware, are introduced as new varieties.

The florist, however, can throw more light upon the subject. Galloway and Dorsett, of the Division of Vegetable Pathology, of the Department of Agriculture, have increased the number of flowers per plant in a house of 90,000 violets from fifty to eighty-six by the careful selection of plants from those producing an unusually large number of flowers. They have built up strains of plants that were less susceptible to the violet disease; they have made flowers with longer or shorter stems, and I am told by Mr. Galloway that the habit of flowering was changed so that the plants produced the maximum number of flowers in the months when violets bring the highest prices.

These scattering examples indicate the preeminent importance of aristocratic blood in fruit propagation. Unfortunately for horticulture, little attention has been paid to the aristocracy of the trees from which the orchard fruits are multiplied. Nurserymen supply the demands of trade and a large, well grown tree has been the desideratum with fruit growers. Vigor, rapid growth, well formed trunks and tops have been the controlling factors in propagation. The little variations of larger fruitfulness, finer quality, larger size and better foliage have played a minor part in the selection of buds or cions.

During the last few years a discussion has arisen over the merits of so called pedigree plants. We would express our appreciation of the efforts of those nurserymen who have been studying the individuality of given plants within a variety and whose records of hardiness, fruitfulness and resistance to disease have become well established. The buds from the Winesap apple No. 1 would be expected to excel those taken from No. 2 in fruitfulness, but there would be no justification in calling the buds from tree No. 1 "pedigree buds." They might be called with propriety "selected buds." The pedigree of an individual embraces its genealogy, which, as generally understood, consists in the history of its ancestors for a number of generations. It is important, not by virtue of a large number of generations through which it can be traced, but by virtue of the quality of the individuals in the ancestry. Do not be deceived by the term "pedigree." The term is appropriate only when the record of a tree has been recorded through several generations, and it is valuable only where the generations have shown a tendency to vary into

trees of uniform excellence. Without this tendency, a pedigree is a delusion. Better adopt the term "selected," for plants whose genealogy has just begun. The use of the term "pedigree" for such plants will bring the efforts of plant breeders into disrepute.

The limits of this paper are too restricted to allow of a more extended treatment of the subject in hand. The breeding of plants is a complicated subject, but none the less fascinating or promising for the diligent plant breeder. And one of the promising fields that is unexplored is the improvement of varieties through the continued selection of individuals of superior merit. The field is before us. It awaits the efforts of the skillful, patient pomologist.

Mr. W. B. K. Johnson inquired as to how the apple trees referred to were planted.

Prof. Powell: They are in the midst of a block of Winesaps and stand in a row. The trees were taken from a whole group of trees.

The Society was next entertained and instructed by a stereopticon lecture on "Systematic Plant Breeding," by Mr. Herbert J. Webber, of the Division of Vegetable Physiology and Pathology, U. S. Dept. of Agriculture.

SYSTEMATIC PLANT-BREEDING.

BY HERBERT J. WEBBER IN CHARGE OF PLANT BREEDING LABORATORY UNITED STATES DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C., SYNOPSIS OF LECTURE. ILLUSTRATED WITH FIFTY LANTERN SLIDES.

The speaker explained that his object was not so much to outline a system of plant-breeding, as to emphasize, by a few examples, the desirability and necessity of having a definite aim in view in all breeding work, if anything of practical value is expected to accrue from the experiments. Since Thomas Fairchild made the first plant hybrid, about the middle of the last century, many thousands of hybrids have been carefully made, yet only a few of these have yielded valuable results. A very large number of them were made in a purely haphazard way, evidently with no definite aim in view other than to produce a hybrid and see what freak would be exhibited. The extensive experiments of Koelreuter and Gaertner in this direction, comprising the production and study of many thousands of hybrid plants were mainly of scientific value, as throwing light on the general principles of plant-breeding.

Systematic plant-breeding, having in view the production of improved sorts of our cultivated plants, may be said to have begun with the work of Thomas Andrew Knight in the beginning of the nineteenth century. Knight first brought hybridization into use in the practical improvement of our cultivated plants, and obtained very valuable results. About the same time, a Belgian horticulturist was working on the improvement of the pear, and certain other fruits, and demonstrated what could be secured by the principle of selection. Since that time various experimenters have employed the principles they discovered, and have added numerous other principles of importance till now the plant breeder largely follows well known laws.

In studying the literature of plant breeding, no one feature is more impressed upon the reader than the necessity of having a well defined aim in

view, and bending all efforts toward its accomplishment. The fruit or cereal with which the breeder is working must be thoroughly familiar to him. The characteristics of the varieties grown must be understood, in order that the most desirable improvements may be comprehended and the best means of obtaining them recognized. The wild species related to the plant which he is studying to improve must be known, so that the operator can judge whether or not the desirable feature exists in a wild species in a greater degree than in any cultivated sort. Should a wild plant show the desired character, it probably can be introduced into a cultivated sort by hybridization.

The speaker emphasized the necessity of working with large numbers, both in selection and in hybridization experiments, insuring thereby a greater opportunity of securing the feature desired in the most marked degree. The choice of parents in hybridization and selection experiments is also of primary importance. If endeavoring to increase the size or yield, the individuals showing these features in the very highest degree should be selected for the parents. The larger the numbr of individuals one has to select from the greater will be the probability of securing the desired result.

As illustrating the desirability of having a definite aim in view and the general plan of work, the speaker described the experiments in orange breeding now being conducted by the Agricultural Department. The principal improvements here sought are, first, to obtain hardy varieties of the orange and lemon; second, to obtain a common sweet orange with the loose, easily removable skin of the Mandarin or Tangerine; third, to obtain new types of fruit by crossing distinct species like the orange and the pomelo; fourth, to improve the general quality and extend the season of ripening by crossing the best varieties.

No problem in orange and lemon culture in this country is of such importance as the securing of hardy sorts which will not be injured by the occasional freezes which so frequently cause great losses in the sub-tropical regions of the United States and the most attention has thus been directed toward this end. The plan followed has been to use the Japanese Trifoliate orange (*Citrus trifoliata*), which is deciduous and perfectly hardy as far north as Philadelphia, in crossing with the various varieties of the orange and lemon. A number of these hybrids have been produced and some of them have very interesting intermediate characters. Where the Trifoliate orange was used as the mother parent, the hybrids all have trifoliolate leaves, but some of them have the central leaflets much larger than in the typical Trifoliate orange and are apparently evergreen in habit instead of deciduous.

Quite a number of the hybrids of this combination do not show any intermediate characters, and it seems probable that such seedlings may be developed from some of the so called adventive embryos which are developed from the tissue of the mother parent, and thus could not be expected to show any influence of the hybridization. The fact that the common orange and many other species of the genus Citrus are polyembryonic is well known. A single seed of the common orange has been known to produce as high as thirteen different seedlings, although it is seldom that more than three of the embryos are capable of development. Strasburger in his study of the polyembryony of this group found that the embryos other than that developed from the egg cell proper, are developed from certain cells of the nucellus lying near the embryo sac wall, which become specialized, develop rapidly and form a tissue which pushes out into the embryo sac and forms an embryo similar to that formed in the normal way from the egg cell. The embryos

formed in this way are termed adventive embryos, and, as will be seen from the method of their development, cannot be expected to show any signs of hybridization.

In a number of cases, the speaker found that two or more seedlings were developed from the same seed, one of which clearly showed the effect of the male parent while seedling the others resembled the mother parent entirely. It is evident in such cases, that the showing characters from the male parent is the true hybrid, and that the others are false hybrids, being developed from the adventive embryos derived directly from the mother tissues.

In attempting to obtain sorts having the quality and flavor of the common sweet orange with a loose, easily removed rind, like the Mandarin type of orange, numerous hybrids have been made between the best varieties of the common sweet orange and the Tangerine, China Mandarin and Satsuma. Many of these hybrids also show interesting intermediate characters and are of considerable promise. The Mandarin type of orange or kid glove orange, as it is commonly called, is highly prized for the ease with which the skin can be removed and the segments separated. The quality however, is very distinct from that of the common orange, and is generally thought to be much inferior. If by crossing the Mandarin and the common orange, a sort can be obtained having the loose rind and easily separable segments of the Mandarin, combined with the quality, flavor and texture of the best varieties of the sweet orange, it will prove of the greatest value as a market fruit.

Similar problems to these confront the growers of all fruits. The production of varieties of apples and plums for the cold prairie regions of the Northwest is being accomplished along similar lines, by using hardy wild native species and Russian sorts in hybridization with our best improved varieties.

The speaker also described certain problems in corn and cotton improvement which are being considered by the Department of Agriculture.

A paper on "The Blueberry, its Past, Present and Future," was presented by Prof. W. M. Munson, of the University of Maine, Orono, Me.

THE BLUEBERRY—ITS PAST, PRESENT AND FUTURE.

BY PROF. W. M. MUNSON, UNIVERSITY OF MAINE, ORONO, ME.

The blueberries of America have been strangely overlooked alike by horticulturists and by historians; yet there are no less than six or seven distinct species which furnish fruit of considerable value, and as many more which, though of less importance, furnish fruit which may be eaten.

Despite the great use that must have been made of the berries by the Indians and by the colonists in New England there are but few records referring to this point. Parkinson tells us that Champlain, in 1615, found the Indians near Lake Huron gathering blueberries for their winter store. Kalm speaks of the Indians drying the berries in the sunshine or by the fire for winter use. Roger Williams mentions "Attitaash (whortleberries) of which there are divers sorts; sweet like currants—Sautaash are these currants dried by the natives, and so preserved all the year; which they beat to powder and mingle it with their parched meal, and make a delicate dish which they call Sautauthig, which is as sweet to them as plum or spice cake to the English."*

*Roger Williams Key, p. 231, cited by Tuckerman, foot note in Josselyn's New England's Rarities, p. 92.

Josselyn seems not to have been impressed with this fruit since, in his "New England's Rarities" but one reference is made to the subject: "Bill Berries, two kinds, Black and Sky Coloured, which is more frequent." (p. 59 of the original.)

The only other records which I have found are in the various floras and botanies which have been published since the beginning of the present century.

Doubtless the reason for this apparent neglect is largely due to the abundance and excellence of the wild plants. There seemed to be no reason for the exertion incident to cultivation in order to procure a liberal supply of fruit. An occasional article in a newspaper has mentioned the wonderful productiveness of the blueberry plants and suggested the practicability of cultivation, but very little has ever been attempted along these lines.

In New York and in Michigan abortive attempts at cultivation have been made. In 1882 Professor Goff then of the New York Experiment Station, called attention to the fact that in the wild state the blueberry is superior to many of our cultivated plants, and a study of the subject was inaugurated. Pressure of other work, however, soon crowded the blueberries out. At the Michigan Experiment Station a considerable area was planted to high bush blueberries in 1887, but the work was afterwards abandoned.

At the Arnold Arboretum, Jackson Dawson has grown many seedlings and has learned some valuable lessons regarding methods of culture. At the present time, however, there is practically no systematic attention given to the garden culture of the blueberry.

THE MOST VALUABLE SPECIES.

Probably ninety per cent of the fruit which reaches the market is of three species, viz.: *Vaccinium Pennsylvanicum* Lam., *V. Canadense*, Richards, and *V. Corymbosum*, L. The first of these species, commonly known as "Early Sweet" or "Low Sweet" is by far the most common and, in the wild state, of the greatest commercial importance. The fruit is usually large, sweet, bluish-black and covered with bloom. It varies greatly, however, in size, form and color. The plant is of low habit—6 to 12 inches and on newly burned areas is very prolific. Old plants bear but few flowers or fruits in a cluster, but plants one or two years from the "burn" usually send up a prominent spike which produces freely.

Vaccinium Canadense, commonly called "Velvet Leaf" or "Sour Top," is more vigorous in habit than the first named species, being usually 1 to 2 feet in height, and grows more commonly in rather moist, rocky, not swampy localities. The foliage is soft and velvety and the fruit, which is larger and more acid than that of *Vaccinium Pennsylvanicum*, matures from two to three weeks later. It is not so popular in the general market as is the first mentioned species, but it is very prolific and its lateness in ripening is a point in its favor.

Vaccinium Corymbosum, the "high-bush blueberry," or the "huckleberry" of New York and Michigan, is of coarser habit,—growing 3 to 10 feet high—with minutely warty, greenish-brown, branches. It is usually found in swamps and moist woods, but often extends to dry hillsides. This species is very variable, not only in the habit of growth, but in its blooming characters and fruit. Not infrequently individual plants bear large quantities of fruit measuring ⅜ to ⅝ inches in diameter, while a black fruited variety (*var.*

atrococcum, Gray) has small, polished, black fruits equally as good as the other in flavor. The fact of variability renders this species one of the most promising for cultivation. It flourishes alike in the sunlight and in partial shade; on the dry upland and in the swamp. The fruit also commands a much higher price than does that of other species.

Other species often associated with *Vaccinium Pennsylvanicum* in the eastern and middle states are *Vaccinium vacillans*, Solander, and *Vaccinium nigrum*, Britton. While these types are very distinct, they are not usually separated from the other low growing forms.

Another species which I have never seen, but which is said to be in every way worthy of attention is *Vaccinium myrtilloides*, Hook. This species is found in "damp woods, Lake Superior to the coast of Oregon and British Columbia." Hooker says the fruit is much relished by the natives of the Northwest Rocky Mountains, and T. J. Howell, of Oregon, says the berries are "large, ½ to ¾ inch in diameter, flat, with a broad calyx, of good flavor and in every way a good berry." *He calls the shrub Large Blue Huckleberry. Bailey in his report on the plants of Northern Minnesota does not, however, mention this species, but refers to the specially large fruited forms of *Vaccinnium Pennsylvanicum.*

THE BLUEBERRY IN COMMERCE.

In many of the northern and eastern states there are thounsands of acres of land, utterly worthless for agricultural purposes, which, after the pine is removed, send up an abundant growth of blueberry bushes, alders, poplars, grey birches, etc. and which, by proper management may, it is believed, be made to yield a handsome profit to their owners.

In New Hampshire the picking of blueberries has come to be an important industry in may of the country towns. Whereas a few years ago, farmers thought the blueberry crop of no account, and allowed perfect freedom in gathering the fruit, many owners of blueberry pastures now charge "stumpage" at the rate of two cents per quart, and the blueberry field is regarded with as much concern as the apple orchard.

In Michigan, and some other states, the blueberry crop on the wild lands is an important source of income to the families of many laboring men; but in no case, so far as I have been able to learn, is the work systematized as in New England.

In the southeastern part of Maine, principally in Washington county, there are about 150,000 acres known as the "blueberry barrens." This land lies chiefly in the towns of Cherryfield, Columbia, Deblois, Beddington and Numbers 18 and 19. Much of this land was burned over by the Indians before the colonial period and since the timber was removed from the remainder, it too, has been repeatedly burned to keep down the growth of birches, alders, etc. and to facilitate the harvesting of the fruit. About 40,000 acres of these "blueberry barrens" belong to Mr. William Freeman of Cherryville. Mr. Freeman's method of handling his blueberry lands may be taken as an example of what may be done in developing the industry in other sections.

The plan is somewhat as follows: The land is divided into several parts each of which is leased to some responsible party who assumes the whole care of burning over the land, keeping off trespassers, harvesting and market-

*Case's Bot. Index, 1881, 38.

ing the fruit. Mr. Freeman receives for the use of the land one-half cent per quart for all the fruit gathered. The pickers receive one and one-half to three cents per quart; those who lease the land and haul the fruit to the canning factory, or to the station for shipment, one-half to one cent per quart. The fruit is all canned or shipped by one firm in Cherryfield (J. & E. A. Wyman, who keep a record of the fruit as it is brought in and pay the royalty to Mr. Freeman, retaining for themselves whatever profit there may be on the canned fruit.

Every year a certain section of each "lease" is burned over. This burning must be done very early in the spring, before the ground becomes dry; otherwise the fire goes too deep, the humus is burned from the ground and most of the bushes are killed. Many hundred acres, on what should be the best part of the "barrens" have thus been ruined. The method most commonly used in burning a given area, is for the operator to pass around the section to be burned, dragging after him an ordinary torch or a mill lamp. He then retraces his steps and follows over the burned area setting new fires in the portions which have escaped, and back-firing if there is danger of spreading unduly over areas which it is desired to leave unburned. A device found in use by one party consists of a piece of ½ inch gas pipe bent at the end at an angle of about 60 degrees. The end opposite the bent portion is closed with a cap or plug and in the other end after filling the pipe with kerosene is placed a plug of cotton waste or tow. This device is regarded superior to the lamp or torch, as it is more easily handled.

As already indicated, most of the fruit from the barrens is taken to the factories for canning. Early in the season, however, before the factories are opened, a considerable amount is shipped to Portland, Boston and other points for use while fresh. This fruit is usually shipped in cases of thirty-two quart boxes each.

All of this early fruit is picked by hand, and only the ripe fruit is gathered. Later in the season, particularly on "old burns" *i. e.*, on areas which will have to be burned over the next year, the fruit is gathered with a "blueberry rake." This is an implement somewhat similar to the cranberry rakes in use on Cape Cod, and may be likened to a dust pan, the bottom of which is composed of stiff, parallel wire rods. The fruit may be gathered much more quickly and more cheaply by means of the rake. The bushes are, however, seriously injured by this treatment. In no case should the rake be used in gathering the high bush blueberries.

The canning of blueberries is largely in the hands of a few leading packers, among whom may be mentioned: J. & E. A. Wyman, Cherryfield; Columbia Falls Packing Company, and J. A. Coffin, Columbia Falls; and Burnham & Morrill, Harrington. At the Wyman cannery, which has a daily capacity of 700 bushels, the average annual output is about 8,300 cases of two dozen cans each; representing 6,250 bushels of fresh fruit. The average price per case for the canned fruit is $1.90. In other words, the value of the annual product of this one factory is not far from $15,000.

The total canned product of the "blueberry barrens" in 1898 was about 15,000 cases, valued at about $28,500,—and this was but little more than one-half of the average season's production, which is said to be about 30,000 cases. The present season the crop is particularly good and it is estimated that the total pack will be about 50,000 cases; while, thanks to the tariff on canned blueberries, the price has risen to $2.20 per case. In other words, the value of the blueberry crop in this one small section, the present season, is considerably more than $100,000.

THE OUTLOOK.

What of the future? The distribution of the blueberry is not confined to a few thousand acres in Maine; but throughout New England, New York, Pennsylvania, West Virginia, Michigan, and many other states, are vast areas which, while bearing a considerable number of bushes and yielding a profitable return to the few people who make a practice of gathering the wild fruit, are not utilized as they might be. The systematic treatment of the wild lands, as already described, might with profit be extended to many other sections.

There are also large areas, otherwise worthless, which might without doubt be made to yield good returns if in some way a growth of blueberries could be started—either by setting bushes or by scattering seed. Perhaps this suggestion may be regarded as visionary, but it is quite within the range of possibilities.

Another phase of the subject which is worthy of careful attention, is that of domestication and the improvement of types by selection. Little has ever been attempted in the garden culture of the blueberry. That satisfactory results might be obtained, however, there is little doubt. The fruit in its wild state is far superior to that of many other cultivated plants, and is very susceptible to the influence of environment.

At the Maine Experiment Station some attention is being given to this matter. Numerous clumps of bushes of the several species, which bore fruit of special merit, were transferred to the garden last year and are making a vigorous growth. The plot under cultivation at the present time includes about one-eighth of an acre and the area will be increased this fall.

In Massachusetts several gentlemen have undertaken the cultivation of the blueberry in an amateur way with encouraging results. The fruit sold from the cultivated bushes commanded nearly double the price of that shipped in from the wild lands. The most promising species for this purpose of cultivation appears to be the high-bush berry, *Vaccinium Corymbosum*. Of the species there are very well marked varieties which may be perpetuated by division or by grafting.

In general, one is perfectly safe in predicting, that within a very few years a race of garden blueberries, rivaling in value some of the best of the other small fruits, will be placed before the public and the culture of the blueberry will be as much a matter of course as is that of the blackberry or the raspberry.

The evening session was pleasantly terminated with an interesting talk on "Fruit Culture in the Mediterranean Countries," by Mr. Walter T. Swingle, of the Section of Seed and Plant Introduction, U. S. Dept. of Agriculture. Mr. Swingle's remarks were illustrated with lantern slides, and were much enjoyed by those present.

FRUIT CULTURE IN THE MEDITERRANEAN COUNTRIES.

BY WALTER T. SWINGLE, SECTION OF SEED AND PLANT INTRODUCTION, U. S. DEPT. OF AGRICULTURE, WASHINGTON, D. C.

(Abstract.)

Mr. Swingle called attention to the great antiquity of horticulture in the Mediterranean countries, especially in the lands bordering the Mediterranean on the east and referred to the absence of nurseries as a potent factor in bringing about a multiplication of varieties, since scions are likely to be of local origin.

The date-palm was described in some detail and some account given of the varieties cultivated in the Northern Sahara, in Algeria and Tunis. The lecturer reviewed the attempts made to introduce these varieties into America and considered the prospects very good for the establishment of the industry in Arizona and California.

The caprification of the fig was then described and an account given of the introduction of the Smyrna fig and the caprifig into California, and the recent successful attempt to establish there the Blastophaga or fig insect, which lives in the caprifigs, and whose action in transferring pollen from these caprifigs to the young Smyrna figs is necessary for the successful culture of figs for drying, though ordinary figs mature without caprification. Finally a few notes were given on the olive, pistache, raisin grape and on Bulgarian rose culture, and the successful introduction of all of these profitable industries into the Southwest was shown to be feasible.

Upon motion the Society adjourned to meet at 10 a. m., on Friday.

SECOND DAY.

FRIDAY MORNING SESSION.

September 8, 1899.

The Society reassembled at ten o'clock a. m.; President Watrous presiding.

Prof. W. H. Ragan, of Indiana, spoke of what he termed a very pleasant episode on the previous day, when the Society was addressed by the venerable Mr. Parsons, who was present at the birth of the organization, and when they also heard, by letter, from another of the original members. He now called attention to the presence of Mr. Robert Manning, of Massachusetts, who also attended the first meeting of the Society, fifty years ago.

President Watrous extended a cordial invitation to Mr. Manning to come forward and be presented to the Convention.

Mr. Manning came to the platform and, after the applause which greeted his appearance had subsided spoke as follows:

REMINISCENCES.

BY ROBERT MANNING, SALEM, MASS.

Mr. President—I hardly know where to begin or what to say. I was present at the first meeting of the American Pomological Society. "The American Congress of Fruit Growers" was the title first adopted, and the meeting was called in New York City, under the auspices of five hortlcultural socieities, of which the Massachusetts Horticultural Society came first, the Pennsylvania Society next, I think the American Institute next, then the New Jersey and the New Haven Horticultural Societies. A committee consisting of three members from each of these societies was appointed to call a convention, which was later held in the city of New York, where they were the guests of the American Institute just as we are the guests of the Pennsylvania Horticultural Society today.

In my retrospect, I have been led naturally to consider who are left of those who attended the first meeting of the American Congress of Fruit Growers. I am glad that Mr. Samuel B. Parsons is here. We prevailed upon him to come. Not knowing whether there was any local horticultural society from which he could come as a delegate, we took it upon ourselves, as Mr. Parsons is an honorary member of the Massachusetts Horticultural Society, to include him in our delegation, and I think he was pleased to be included.

Many of you remember Benjamin K. Bliss, who was for many years a seedsman in New York and who introduced the Early Rose potato. Mr. Bliss, who was also an apothecary at Springfield, was generally spoken of

as "Dr." Bliss, but was much interested in horticulture. He was appointed a delegate to this convention from the Hampden Co., Mass. Horticultural Society, and is living in Boston now. I tried to induce him to come here but he wrote me a rather non-committal letter and he has not come. Then there was H. W. S. Cleveland, of Burlington, N. J., who, like myself, originated in Salem, Mass., but was engaged in fruit growing in New Jersey. He afterwards went to Chicago and then to Minneapolis, where he carried on the business of a landscape gardener. I think he is still living, as I would have been sure to hear of his departure because he has friends in Salem. Then there was Frederick Law Olmsted, who was present at our first meeting and afterwards became eminent as a landscape gardener. Another of the original members was Peter B. Mead, who, I understand, is still living and whom I met a few years ago. He was an active worker in the arrangements for the first meeting. He should have been here today, but possibly physical infirmity has deprived him of that pleasure.

When the time came for the convention to come together Mr. Wilder prevailed upon me to go to it with him. I was perhaps the youngest member there. My father, at his death, left the largest collection of fruit trees then in the United States and, although but a boy of fifteen, I had to take up his work and carry it on as well as I could, so that I was brought directly into contact with Mr. Wilder and the other eminent horticulturists of the time. When we came to New York one of the first things done was the appointment of a special committee to prepare a list of Fruits For General Cultivation. A. J. Downing was chairman and Dr. Brincklé was a member of the committee, of which I was also a member. That was the foundation of this Catalogue, which has grown to the magnitude in which you see it here today. While Mr. Wilder lived he was desirous to have me come to all the meetings, and, when he departed, I said to myself "I don't think I can ever go to another," but, upon reflecting that this was the fiftieth anniversary of the Society, I thought I would "dig out" once more. As I look around here I notice a considerable difference between things then and now. What impresses me most is the character of the discussions. In the early days the points of discussion were confined almost wholly to the question of the value of the different varieties of fruit; at the present session we have nothing of that, but we have elaborate papers covering the whole field of horticulture. We cannot fail to notice how the experiment stations have come to the front. Formerly an experiment station was not thought of. Another thing that has impressed me is the pre-eminence which the Department of Agriculture has attained. I recollect the presence of the Commissioner of Agriculture at some one of the early meetings and his making a speech, which consisted largely of generalities, an assurance of how very glad he was of the co-operation of the Society and all that sort of thing. Today we are glad to meet here the heads of Divisions in the Department of Agriculture, who have something valuable to say and who are among the pioneers in scientific investigation. Certainly there has been a great advance in this respect. You can judge, from what I have said, of the difference between then and now; and I do not doubt that another fifty years will bring an equally great advance.

I may perhaps be indulged with a personal word. I spoke of my father's collection of fruit. He was one of the founders of the Massachusetts Horticultural Society. He presented to the Society some half a dozen books, which formed the nucleus of the library of that Society, of which I now have

charge, and which is beyond comparison the best horticultural library in this country, and there are few finer ones in Europe. So, you see, I was born into the Horticultural Society. That Society has held its exhibitions, and its rooms have been opened, on every Saturday, excepting holidays, for, I think, seventy years—not fifty, as Mr. Hale had it yesterday, but seventy years. The act of incorporation was dated June 12, 1829; which was a little before the Pennsylvania Horticultural Society was incorporated, although that Society was organized a little earlier. In addition to the weekly exhibitions, our large exhibitions of plants, flowers, fruits and chrysanthemums, lasting from two to four days, have been attended by visitors from all over the country and have been influential in the promotion of horticulture. The influence of our Society has gradually extended, and its invitations have been accepted upon at least four, possibly five, occasions by the American Pomological Society, whose sessions have been held in Boston. Various other national societies, like the Forestry Association and others, have also availed themselves of our invitations.

I have spoken of the library of our Society, and I want to say to you that it contains many works on pomology that would be of interest to you, especially those containing colored plates of fruits. It includes French, English, German and Italian books on pomology. Everyone perhaps cannot read those but the colored plates may be readily understood. When you come to Boston you must be sure to come to Pomological Hall. I now give an invitation to everyone here. You can come on any day of the week, and you will always find the latch-string out. (Applause.)

A REGISTER OF MEMBERS.

Mr. W. C. Strong, chairman of the Committee on Credentials here made a supplemental report perfecting the list presented on the previous day.

Mr. Hartshorne said that he understood that the Committee's record showed only names of delegates who had been regularly accredited by the different State Societies and did not include the names of other members in attendance who were neither regular delegates nor life members. He apprehended that, for this reason, the actual size of the present convention would be underrated by the public unless the secretary was careful to give out information to counteract any erroneous statements in the public prints.

Prof. Alwood asked whether a record of the members present was being kept.

President Watrous replied that he understood the Treasurer had taken the names of the life members present and that these would be incorporated with those of the biennial members in a full list of the membership.

Treasurer Taft replied that his record contained only the names of those from whom he had received membership fees and he had no means of ascertaining as to life members at the present meeting except as they paid their fees at this time.

The Secretary explained that as members reported to him they were recorded, and that was the only method he had of determining who were present. He suggested that it would be well for the new Secretary, in his circular, preliminary to the official publication of the Proceedings, to ascertain from members whether they had been present, as in that way only he could perfect the list. He added that if a registry book could be made use of the list might be made up at the present time.

Mr. Hartshorne: We ought to have a registry book at every session, and every member present should be registered.

President Watrous suggested that a motion be made in regard to the matter.

Mr. Hartshorne: I move that the Secretary be authorized to procure a registry book, in which life members and biennial members may register their names to show their attendance at the meeting, and that this be done at the present meeting.

Mr. Wm. H. Barnes, Kansas, said that as Secretary of the Kansas State Horticultural Society, two years ago he began to keep a book in which he registered the names of members present at the meeting then held, and that he made a partial registration for previous meetings. It had proven to be an interesting record for reference. He suggested that what was now proposed ought to have been done earlier and that it would meet a long felt want. He added that if such a record had been kept from the beginning, the members could now refer to it to see who were present with Mr. Manning at the first meeting of the society.

Mr. Hartshorne's motion was adopted without objection.*

AN INVITATION FROM MASSACHUSETTS.

Mr. W. C. Strong, in presenting the report of the Committee on Credentials, stated that the Massachusetts Horticultural Society proposed to build an expensive Horticultural Hall within the next two years and that it would give them great pleasure to receive the American Pomological Society at its next meeting.

ELECTION OF OFFICERS.

Mr. J. C. Evans, from the Committee on Nomination of Officers for the ensuing biennial period, presented a report, which was read by Professor Taft as Secretary of the Committee. Meanwhile President Watrous temporarily vacated the chair to Mr. Berckmans.

The Committee reported, first, the nomination of Mr. Chas. L. Watrous, of Des Moines, Iowa, for President.

Chairman Berckmans stated the question upon the nomination and, after taking the vote, announced Mr. Watrous' unanimous election.

President Watrous responded: "I know you do not want a speech and do not expect it. This meeting shows we are not here solely for speechmaking but for work. This election is of course a very great gratification to me. It is enough to gratify the ambition of any man who loves pomology; it is, I thing, the very highest honor that pomology can pay a man on this earth. But, beyond that, I take it that it means you approve the efforts that have been made in the last two years, to bring this Society in touch with the future needs of American pomology.

As you know, after our meeting in Columbus, some kind and sympathetic friends of this Society prepared and published in the newspapers a very touching obituary, reciting what a fine and honorable life the Society had lived; that now it had reached old age, that its work was done, that the local Societies were occupying all of the field, and hoping its ashes might rest in

*NOTE.—A temporary register was established during the Friday morning session. The names of members in attendance so far as known to the Secretary, including those registered, will be found in the membership lists, pp. 12-15. Secretary.

peace and undisturbed. Now, I shall take it that you approve of what has been done—evidences of which are to be seen in this meeting—and that you have all enlisted to help the work. I now serve notice on every one of you that, when you are asked to help the work, I shall not expect you to say "no" but to take hold and do the very best you can. If a man does that, it is enough. I thank you from the bottom of my heart for the compliment you have paid me on the work accomplished. (Applause.)

Prof. Taft read the following additional nominations by the committee, which were ratified by unanimous votes: First Vice President—Thomas Meehan, of Germantown, Pa.; Secretary—Wm. A. Taylor, of Washington, D. C.

President Watrous called on the Secretary for a response and added: I want to say that to Mr. Taylor's labors more than to those of any other man, and I might say of all other men almost, is due the success of this meeting.

The Secretary responded: Mr. President, If I were to follow my personal inclination I would decline this honor. This I endeavored to impress upon the member of the Committee from the District of Columbia before action was taken. Under the circumstances the duties of the position have been somewhat burdensome during the past two years.

But I must say that there have been compensatory features in it. The most gratifying of these has been the growing harmony and interest among the membership. If such is your desire, I will accept the office for the coming term.

Mr. Barnes reported, for the Committee, the nomination of Prof. L. R. Taft for Treasurer; and the nomination was ratified unanimously.

Treasurer Taft returned his thanks and appealed to the members for their continued co-operation. He added:

The President has spoken of the good work of the Secretary and I think I can testify to it. At the close of the meeting at Columbus we had seventeen members enrolled. During last year he worked up an additional membership of 102, making 119. This is a very good report. But I am afraid we shall run behind, this year, unless you all help us. As you know, the Biennial Membership fee is $2.00 and the Life Membership fee is $20, which gives to each life member a complete set of the reports. As these are very valuable and their value is increasing, we hope to enroll next year a larger number of Life Members than the ten we got last year.

The Committee on Nominations then finished its report. The nominations of State Vice Presidents reported by the Committee, embracing 24 States, were adopted by an unanimous vote. They were as follows:

VICE PRESIDENTS.

Arkansas	*W. G. Vincenheller	Fayetteville.
Connecticut	J. H. Hale	South Glastonbury.
Delaware	Alex. Pullen	Milford.
District of Columbia	William Saunders	Washington.
Florida	G. L. Taber	Glen St. Mary.
Georgia	P. J. A. Berckmans, Jr	Augusta.
Illinois	H. M. Dunlap	Savoy.
Indiana	James Troop	Lafayette.

*Note—Resigned Jan. 1900, to accept Chairmanship of State Fruit Committee.

Iowa	Charles G. Patten	Charles City.
Kansas	Wm. H. Barnes	Topeka.
Maine	W. M. Munson	Orono.
Maryland	J. W. Kerr	Denton.
Massachusetts	Wm. C. Strong	Waban.
Michigan	C. J. Monroe	South Haven.
Missouri	J. C. Evans	Harlem.
New Hampshire	C. C. Shaw	Milford.
New Jersey	I. J. Blackwell	Titusville.
New York	F. M. Hexamer	New York.
North Carolina	J. Van Lindley	Pomona.
Ohio	J. J. Harrison	Painesville.
Pennsylvania	Howard A. Chase	Philadelphia.
Vermont	F. A. Waugh	Burlington.
Virginia	Geo. E. Murrell	Fontella.
West Virginia	H. W. Miller	Paw Paw.

The next business was the reading of a paper by Col. G. B. Brackett, Pomologist, U. S. Department of Agriculture, Washington, D. C.

The paper, which was much appreciated, was as follows:

AMERICAN HORTICULTURE AT PARIS IN 1900.

BY COL. G. B. BRACKETT, POMOLOGIST, U. S. DEPT. OF AGRICULTURE.

(Abstract.)

It is a fact well recognized in foreign and home trade centers that the United States holds the lead in certain lines of horticultural production, and that she is making almost phenomenal advancement along these lines.

The area of land occupied and the capital already invested in the fruit industry, although vast, are being greatly increased annually, and consequently the surplus will be enlarged proportionately. When we study the statistics of the past decade relating to the increased area of land devoted to the industry, the increased product obtained therefrom and the aggregate of capital invested therein, we are astonished at the magnitude already attained, and what the development will be during the next twenty years or more if the pace is kept up.

Beginning with 1821, the first year of authentic statistics concerning fruit exports, when the apple was the sole fruit exported—and there were 68,643 bushels valued at $39,966, the schedules show a steady increase in quantity and value. Aside from apples, fresh and dried, and vinegar, no other fruit item was scheduled among exports until 1865. The following table of statistics will serve to show the average annual values of fruit exports from 1891 to 1897:

AVERAGE ANNUAL VALUES OF FRUIT EXPORTS, 1891-97.

	Quantity.	Value.
Apples, green or ripe	606,176 bbls.	$1,354,455 28
Apples, dried	15,483,143 lbs.	784,246 57
Cider	564,356 gals.	77,052 85
Vinegar	85,172 "	11,959 00
Fruits, green, ripe or dried, not elsewhere scheduled		1,322,356 57
Fruits, canned		1,142,221 71
Fruits, preserved		129,339 85
Nuts		95,114 00
Total annual value		$4,916,745 83

In consideration of the large areas in fruit plantations in the United States there will be a correspondingly large surplus product to be disposed of to prevent waste. The outlet seems of necessity to be through shipments to foreign markets.

Such disposition will encounter in some lines competition with the product of other countries, and a contest for supremacy in the markets of the world will result. If careful assorting, packing, handling and introduction be adhered to, we may expect successful results, for we have in our product every element needed to commend it to all lovers of fine fruit wherever it may be sent.

In view of these facts what are the best means for attracting public attention to our fruits At the present time exhibition at trade centers and national and international expositions, wherever they can be reached, seems desirable.

The Paris Exposition will afford us one of the grandest opportunities to show to the world the horticultural products of our country. Representatives from all the civilized world will assemble on official missions, and men from business centers will carefully scrutinize all exhibits of goods in their special lines, with a view to building up and establishing trade. Not only these, but thousands of visitors from all the nations that are consumers, and therefore purchasers, will be on the alert to find fruit products of the very choicest kinds. Such customers once secured, help to create a demand in their home markets for such goods as the United States will exhibit at the Paris Exposition, a demand which both the fruit dealer and producer will find it to his interest to foster.

Through a comprehensive exhibit at Paris a more general and better knowledge of the value and usefulness of our fruit products both in fresh and cured forms can be disseminated. The main object of our exhibit is not a spectacular one, but rather a display to show the commercial value of our products, to increase the demand for American fruits, and to build up and stimulate trade in them.

The Department of Agriculture therefore proposes to undertake what has never been attempted before at any foreign exposition, namely: To install and maintain during the period of the exposition a continuous, representative exhibit of American fresh fruits.

To accomplish this it will be necessary to provide a supply of choice specimens of our more desirable fruits, such as winter apples, pears, citrus fruits, cranberries, nuts, etc., of the present season's crop (1899) for display at the

opening of the Exposition and until specimens of the crop of 1900 are available.

It is proposed to place these fruits in cold storage, to be drawn on from time to time to replenish the exhibit, and to distribute specimens to persons interested in testing their quality. The exhibit will be collective, but each contributor will receive full credit for what he exhibits and the same consideration from the Jury of Awards that he would have if individual space were allotted him.

Collections made by states, horticultural societies, boards of trade, shipping associations, railroad companies, etc., will have the same consideration as those from individuals.

The Department has issued a circular (No. 8) of instructions which gives all necessary directions for aiding in the success of the work it has undertaken for the Paris Exposition. Copies of this circular will be sent free on application to parties interested in making the American fruit exhibit at Paris a success, and the co-operation of all such persons is solicited.

Mr. W. B. K. Johnson, Pennsylvania, inquired as to how much of each variety of apples should be shipped, to be put in the cold storage, so that a State Society might have a continual exhibit.

Col. Brackett: That would depend altogether upon the section of country from which the varieties are obtained and also upon the quantities that the contributor can supply.

Mr. Johnson: A peck, a half bushel, a bushel or two, a barrel or how much?

Col. Brackett: We do not design to have less than half a bushel of a variety, though of some new varieties we propose to take a smaller quantity.

The next business was the presentation of a paper on "Evils Attendant Upon Prevailing Methods of Marketing," which was read by its author, Mr. J. W. Kerr, of Denton, Md. It was greeted with much applause. The paper was as follows:

THE EVILS ATTENDANT UPON PREVAILING METHODS OF MARKETING.

BY J. W. KERR, DENTON, MD.

Do evils of any magnitude obtain, grow out of, or attach to the prevailing practices of our horticultural marketing? Could this query be answered by all the parties interested, so that the individual units of emphasis could be incorporated, compounded or welded into one simple reply, methinks the dynamic properties thereof would be all-sufficient to upset a hilarious and full feathered Kansas cyclone with its forceful "YES." A brief and simple discussion of these evils contemplates no studied remedial theory or profound speculative reformation, but merely a crudely constructed framework of an acknowledgment of their debauching influence. No locality or community in the broad domain of our country from which horticultural products are shipped to market by the growers, is without sin in this particular. Cancerous in character of procedure, they affect deleteriously every pulsebeat of the entire organism of horticultural pursuits. Here and there corporate power—and less frequently, individual tact of the highest and exceedingly rare order, under and by virtue of conditions, which to dream of making

general is ridiculously absurd, manage to stem or stifle these evils to an extent that grudgingly yields to such superior effort, a respectable share of honestly merited reward. Such instances, though, are nearly as rare as truthful politicians. The great army of industrious toilers, to whom fortune and Nature have been less kind, are all paying oppressive tribute annually for the maintenance and fostering of a commercial leprosy, that consumes with withering and unrelenting certainty more than its share of their substance. That the generally prevailing methods of marketing constitute a mere makeshift; that they are largely primitive in principle and years in the rear of the growth and development of supply and demand; that they are a gross libel upon the intelligence and innate originality of all interested parties, would be very hazardous for any sane man to dispute. Keenly conscious that criticism frequently bears no relation to argument—that grumbling is not always associated with justice—and that there is a wide gulf between fault-finding and fact—it needs only to have prevailing methods of marketing brought into focus by the unerring camera of Truth, to disclose conditions or practices, fostered and fattening on its various ramifications, that would, if applied, yield a startling increase to the percentage of potash in the ashes of Ananias, and intensify the sombre drapery of deception that clings to the memory of Judas. In earlier days, when the volume of our marketing business was insignificant as compared with the present—those unpretentious times when we all felt and acted differently as to our responsibility to God and our fellow man—when intelligence and moral character predominated over and held in ironclad abeyance—avarice and illgotten gain in public esteem and preference—then the parties to these methods were less inclined to mock and revolt at the eighth and ninth commandments; but during the last quarter of the century, human cunning and trade craft have reveled in riotous intoxication, afforded by broadened and fascinating opportunity, and hold a vantage ground by which one hundred per cent of us are branded as unconstrained prevaricators and deliberate cheats, and have implanted in the hearts of the multitude a revision of the prayer of the Pharisee, something like this in effect: "Give unto me of cunningly devised wisdom, that will enable me to skin the other fellow in every deal." For practical proof of this, nearly every barrel of apples that is packed now-a-days, as well as the return of sales made thereof, bears copper-bound testimony. It is painfully true that in order to reach the consumers, the middle-men are indispensable; but the middle-men of the present have progressed far more rapidly than shippers in originating and promoting methods, whereby the barnacles of responsibility are avoided. While the shippers wrestled with the flimsy hope of increased reward in "snide" packages and dishonest packing, the middle-men have adroitly shifted all responsibility to the shoulders of the other fellows, and though they are staggering and perspiring under the galling burden, the unloading thereof is a consummation of which faint glimpses only are caught, as it electrically flits along the obscure shadows of the distant future. Apple growers in some localities have enlisted in their interest the great searchlight of true progress, and by it are being safely led out of the boggy wilderness of error, by selling direct to the middle-men, and safeguarding their consciences by having the latter supply the packages and do the packing. This is the only rational and common-sense plan of marketing where direct sale to consumers is impractical. There is really no good reason why this plan can not be made generally operative and applicable to all horticultural products. The competition

among the commission merchants, has reached a degree of tensity, that necessitates the employment of solicitors for every house doing business at the various stations and wharves. Why not purchasers instead of solicitors? The large per cent of human leeches, whose business and financial responsibility has for its only support their ability to deceive and defraud, whose lungs would be congested by one honest breath, would thus be driven out of the business, to the great relief of reputable and responsible parties now in the commission business. This must ultimately be the situation. It can not be accomplished at once, but the trend of public sentiment is forcefully setting in that direction. The innumerable abuses to which present methods are open and subject, are annually growing more and more intolerant. A careful scrutiny of the practical details and operations of marketing, largely warrant the opinion, that in them is greater promise of an abundant harvest for the unpopular monopolist of sulphur in the lower regions, than in either the legal profession or the broad field of politics. Many attempts at local protection, by organization of "Unions," etc., in different localities, have failed to relieve or amend satisfactorily the situation of the shippers, as is evidenced by the fact, that no plan of that kind has spread beyond the circumscribed locality of its origin. It is not generally feasible or practicable, for the grower to know at all times, the exact condition of the large city markets. Often he is situated several miles from his shipping point, contending and battling with circumstances that compel him to *send* his perishable products to the station or wharf, as the case may be, with directions that they be consigned to a certain commission merchant. The market where his favorite is operating may have been overloaded—choked up by an over-supply of the previous day; the check covering net proceeds that is remitted to him by the salesman, withers his hopes and implants in his mind the unchangeable belief that he was robbed. Disappointed, exasperated and smarting under this belief, he has resort to the plan of—shipping to another man, in the same market.

There never was, and doubtless, never will be a successful, smooth running organization of the tillers of the soil, into anything except an unmitigated band of pig-heads; distrustful and suspicious of every thing and every body engaged in the same avocation; incapable of profiting in any way by the countless failures of bad and defective customs that demoralize and make business unprofitable. Painfully and palpably protruding from poorly directed individual effort—the legitimate offspring of obstinate vanity masquerading in the garb of independence—are the buds that blossom into rich harvests for the sharks who despoil and besmirch the commission business. Admit that organizations will not survive in our honorable occupation as horticulturalists, when applied to marketing, such admission falls far short of argument favoring the continuance of the prevailing plan that makes hypocrisy and deception a pastime, honesty a hideous nightmare, and self-respect a bitter fabrication; a plan that bears the same operative and practical relation to the great horticultural interest of the country, that soft, sticky clay does to the wheels that pass through it. Assembled here is the honored Society of American Pomology, the history of which bears the ineffaceable impress of the wisdom and philanthropy of such noble types of American manhood, as the Downings, Wilder, Warder, Barry and many others. Speaking in a pomological sense—shall we play the role of degenerate sons of worthy sires, by a specious adherence to a conservatism, out of which reticently emanates a servility to these wrongs and evils, that menace the

interests of the entire superstructure of our ennobling and beloved art? Has this great society, in the plentitude of its efficient counsel, no duty to perform, no responsibility to face, in its guardianship of the glittering fame of American Pomology? There is not a member of this society, who does not know far better than I can describe, how disgustingly putrescent existing methods are. The wise counsel and encouraging recommendation of this society would serve as the leaven, to permeate, vivify and rescue from its preternatural sleepiness and apathy, the spirit of progress, equity and justice in prevailing methods of marketing.

The President invited discussion.

Mr. J. C. Evans, Missouri: It was said of Mark Twain, after he wrote the description of a coyote, that he never could have written it so well if he had not been there and seen the animal. (Laughter.) Now, I am in hearty sympathy with the gentleman who read the paper, and I wish I could suggest a remedy for the evils he complains of. I want to say that we, in the West, are trying to get to a place where we hope to be better off than we are now with these conditions existing; that is, that we are selling our products on the track as much as we possibly can. We know that all reforms come about slowly, but a reform in this direction is coming faster than we expected it would. Many of our products, especially car load products, were sold on track during the past two years; and we hope to be able to sell everything in car lots on track, in the future. It relieves us of any responsibility after we get the product packed and loaded.

We are willing to do that, and then we want the people who want the product to come to us and get it just as we go to New York to buy our goods; that is, we want them to come and get it at first hand.

Mr. J. H. Hale: It is a very pretty theory, and may be satisfactory to some in practice, to sell your fruits right at home, either in the orchard or at the railroad station; and I can conceive of many instances where this might be the best thing that the small producer could do. But, after all, fruit growing and marketing is a business; and why should not the producer be business man enough to sell his own goods as well as produce them?

There are plenty of honest commission men in all our large markets, and if the grower will only have business sense enough to thoroughly grade his goods, pack them honestly, decide carefully what markets he wants to supply, hunt up the commission man he believes will serve him best and then stick to that man and that market year in and year out, he can make more money than under any other plan. Of course he must take the risk of damage in shipment, or any other risk that may occur between the time of shipment and sale; but this risk must always be borne by somebody; and if you are to sell your fruits at the home station, the buyer is bound to buy at a price so low as to guarantee him against loss from any of these risks and a profit on top of it that would be far in excess of the average commission merchant's charges. As to the honesty of the commission men, while I do not want to belittle my fellow fruit growers, I would say that, in the light of past experience, I think the percentage of thoroughly honest business men is rather greater among the dealers than among the producers. Business men *have* to be honest or they cannot remain in business long; and in every city can be found commission houses that have been established for a quarter of a century or more, that are always found doing business at the same place and that work longer hours and work harder than any of us do on the farm. They are entitled to fair compensation for their services. I count the com-

mission man my partner or servant, just as I do the horse or mule that works the cultivator among the trees. We are all necessary to one another, and must treat one another honestly if we are going to reap our just rewards.

Mr. Kellogg: Mr. Morrill, whose peaches are on exhibition here in the hall, furnishes a worthy example of marketing on his own reputation continuously through one commission man, by selling over 4,000 bushels of peaches at an average price of from seven to eight dollars per bushel. This fruit evidently brings him at least two dollars a bushel above the regular market price, on account of his general reputation and known trade mark, among those from whom he seeks customers. He has marketed through this one commission house since the beginning of his business. He grows strictly fancy fruit and has a regular line of customers through this house, which fact enables him to fix the price at which his commodities shall sell. In this way he will be able to raise the total sales from a fifty-acre orchard to the enormous sum of $35,000. His other produce always brings fancy prices and is operated on the same general principle in marketing.

Mr. P. Pedersen, Pennsylvania: I can corroborate, from my own experience, what Mr. Hale has said in regard to acting honestly and sticking to the same commission man. At the start I commenced to deal with different people. Later I gave the preference to the man whom I found to be honest; and, year after year, by honest packing, we have got better prices; everything we sell being sold under our mark. We guarantee every barrel or basket turned out by us to run the same way all through. As a consequence I may mention that in 1897, when there was a large crop of Smith's Cider and the common price was from $1.25 to $1.50, we did not sell a single barrel for less than $4 and we got as high as $5. When we send our wagon out, no matter how crowded the market is it is rarely a half hour after we have got unloaded before everything is sold, a fact to which every man who works with us can testify.

Prof. Wm. B. Alwood, of Virginia, addressed the Society upon The Commercial Apple Districts of Virginia, illustrating the geographical points in his talk by frequent reference to a large map of the state on which the districts were shown.

THE COMMERCIAL APPLE DISTRICTS OF VIRGINIA.

BY PROF. WM. B. ALWOOD, VIRGINIA POLYTECHNIC INSTITUTE, BLACKSBURG, VIRGINIA.

The State of Virginia presents marked physical and climatic features which have a very decided effect upon fruit growing in the state. This is markedly true of the culture of the apple.

The state lies between parallels 36° 31′ and 39° 27′, north latitude and between the meridians of longitude 75° 13′ to 81° 37′ west of Greenwich. Its shape is that of an irregular triangle with apex at Harper's Ferry and measured in a direct line it is about two hundred miles from this point to the North Carolina line near Danville. The base of this triangle is the southern border of the state and is four hundred and forty miles long. There are about one hundred and twenty-five miles of sea front; about six hundred miles of inland navigable waters and fifteen hundred miles of shore line touching upon these waters. This latter line is measured along the convolu-

tions of the bays and inlets. The State reaches from the sea to the highest crests of the Alleghanies and has, because of its varied elevation and proximity to the sea every shade of climate from semi-tropical about the lower borders of the Dismal Swamp to a sub-boreal along the higher ridges of the Alleghanies.

The wide range of elevation and the varied climatic phenomena are accompanied by a like variety of geological strata; hence the soil varies much and renders the question of orcharding one of extreme complexity.

The physical features mentioned above have led to the division of the state into six regions or divisions more or less clearly defined by their geological strata and less clearly marked by climatic phenomena.

TIDEWATER VIRGINIA.

The region or division beginning at the sea is known as the Coast Plain or Tidewater, which stretches inland to a line, drawn from a point a few miles above Alexandria on the Potomac river, in a south-easterly direction to Fredericksburg, southward to Richmond, Petersburg and the North Carolina line. This district embraces eleven thousand three hundred and fifty square miles, or more than one-fourth of the entire area of the State. The highest elevations within this district reach only a few feet above tide. These are bluffs on the rivers and the ridges between the streams. It is characterized by magnificent, broad rivers and the navigable waters of the state are wholly within its borders. The soil is mostly drift and detritus from the upper regions of the state and, except in cases of alluvial deposits, it is thin and easily worn. While it is possible to grow apple trees to perfection in this section, the climatic conditions affecting the fruit are such that commercial apple growing is out of the question. In passing, I would like to say that pear and plum growing and small fruit growing offer great opportunities.

MIDDLE VIRGINIA.

The next district of the state lies westward of the line mentioned. It is known as Middle Virginia and extends from a line on the Potomac about forty miles above Washington, in a southwestwardly direction to a point on the North Carolina line about twenty-five miles west of Danville, thus marking off a large triangular tract twelve thousand four hundred and seventy square miles in extent, bounded on the west—northwest by the Piedmont formation, the border of which is in many cases marked by a low range of outlying mountains, a part of the Appalachian system. This section of the state varies in elevation from the head of Tidewater to about five hundred feet above tide; and on the whole is characterized by a thin soil which has been in many cases so worn and depleted as to make it unproductive. It is, throughout its extent, an undulating, gently rolling plain, crossed by numerour rapid rivers. This portion of the state, because of its climatic conditions is not a commercial apple growing section. In certain parts, especially along the more western borders of the district, apple growing is conducted with fair success but this section is not a factor in the commercial orcharding of the state.

THE PIEDMONT SECTION.

The next step upwards, speaking as regards elevation, brings us to the Piedmont section of the state which comprises a long narrow parallelogram lying between Middle Virginia and the upper slopes of the Blue Ridge mountains proper. It extends from the Potomac to the North Carolina line, and in fact the same formation is continuous into the Carolinas. This district varies in width from 20 to 40 miles and in elevation, from five hundred to one thousand feet, having however a number of detached mountain chains of small extent. Its western border is very sinuous, following the winding slopes of the main range of the Blue Ridge mountains. In this district the rivers are narrow and more rapid and are made up of many branches so as to nowhere present the appearance of considerable streams. The surface is much broken, presenting in the more northern portions, gently undulating uplands, becoming marked with cross ridges of detached mountains, as we approach the central portion of the state. The northern portion is characterized by limestone outcrops and assumes something of the character of a blue grass country; but this shades off into the red clays of central and southern Piedmont, which are the pedominant soils characteristic of this division. However, the soil varies infinitely, from limestone soil to red clay formed from shales impregnated with iron and the darker granitic soils formed from feldspar, hornblende, etc. to thin sandy soils in which flint and quartz rocks predominate. Wherever the richer granitic elements combine with the red clay formations, in sufficient quantity, a rich loam of black, brown or chocolate color is formed. The red clays furnish a soil of very fair character as to fertility and of great retentive power, but very stiff and requiring careful handling to keep in first class condition. The sandy flint and quartz formations need not be considered in a discussion of apple growing.

The Piedmont section of our state has come into considerable prominence during the past decade because of the profitable exportation of certain apples, and this has led to an immense development in orchard planting. How wisely much of this planting has been directed, the future only can tell, but to one who has watched our past successes and failures the prospect has a dark side, and as an exponent of sound teaching on pomology this Society ought to consider and promulgate correct information.

What specific facts then as regards soil, exposure, drainage, etc., are essential to an understanding of apple culture in this section of Virginia?

First, all of the lands in this section which are naturally fertile enough will produce good red apples, but the certainty of crop is markedly affected by situation. Given the proper soil, exposure and altitude are still prime factors. If the planter selects low lands along the streams in foggy situations, he is not only placing the orchard where it will be especially subject to late spring frosts, but to fungous attacks as well.

In the northern portion of this section of Virginia the climate is inclined to be dry during the summer months, thus rendering the land droughty and not calculated in every case to support a strong growth of apple trees; but on the richer and deeper soils where the rock does not approach the surface too closely in stratified layers, apple trees can be grown with certainty. The vicissitudes of climate are not more trying than in many other parts of the state. The counties of Loudoun and Fauquier comprise the principal portion of limestone soil east of the Blue Ridge and offer opportunities in the best

situations for the culture of red apples, such as York Imperial, Winesap, Ben Davis, or its near relative Gano.

Below these counties above mentioned, the peculiar foothill formation of the Blue Ridge becomes a marked characteristic of the landscape and the soils of the lower levels of the Piedmont belt take on the red clay characteristic above mentioned. This red clay land is interspersed with gravelly, sandy land and on the upper slopes of the foothills wherever the granitic outcrop known as epidotic rocks appears above the shale, the soil takes on the black, brownish, loamy character which constitutes the particular mark of a natural "pippin" soil. All the red lands mentioned and their various intergrades with other soils, where rich enough and rightly situated, will produce the same character of red apples mentioned above. But the black and brownish loams extending up the foot-hills and mountain sides, often as high as or even above the perennial springs, comprise the apple lands of the best value. While no positive definition of this soil can be made which will always apply and mark the district at once as "pippin" soil, yet an invariable characteristic of this soil is that it shows the broken, greenish rocks of granitic derivation which appear to be a necessary element in the make up of a natural "pippin" soil.

The areas of "pippin" soils are seldom if ever of large extent in one contiguous body, but are found more frequently winding up the hollows or exposed on the somewhat even slopes of the foothills and the sides of the main mountain chain. These lands are almost always moist and produce a luxuriant growth of poplar, oak and other common timbers.

There is no prime pippin land, so far as I am aware, above the county of Rappahannock and the largest bodies of this land are found in the counties of Albemarle, Nelson and Amherst, extending into Bedford and a further belt appears again in the county of Franklin extending into Patrick. No good pippins are grown as far down from the mountains as Charlottesville, nor have I ever seen any pippin land extending out to the line of the Southern Railway.

It is chiefly in these narrow strips just described that the famous orchards of Virginia are situated and wherever the orchardists in the past have planted on this most desirable land and the orchards have been cared for, the owners are now reaping a sure profit. There are instances where forty acres of such land have produced crops of ten and twelve thousand dollars worth of fruit; but these phenomenal successes are much more widely published than the many failures or more moderate successes occurring throughout the orchard belt of this section. Nothing could be more ill advised than for me or anyone else to say that this entire belt designated as the Piedmont will produce choice apples. It is in fact a critical matter and requires careful observation to be able to designate the lands on which one can hope to achieve the best success.

I advise all interested purchasers or planters to observe very carefully indeed the results obtained by those living in the district where they are contemplating purchasing or planting orchards and to be largely guided by the facts observed.

THE BLUE RIDGE SECTION.

This district comprises in its major part the narrow ridge of the higher portion of the Blue Ridge Mountains, which is in the main a rather barren

mountain top marked in many places by the outcrop of sand rock and only here and there showing soil formations worthy of consideration as apple lands; yet it is true that where this main ridge is broken down in some of the lower gaps or mountain passes there are considerable areas of choice apple lands for both red apples and pippins; and I should add that these higher situations that show the proper characteristics of soil are more desirable than those lower down the mountain slopes.

In the southwest part of the state the Blue Ridge section widens out into a high plateau comprising the counties of Floyd, Carroll and Grayson and portions of the adjacent counties. This is a very elevated district of country ranging from two to three thousand feet high and is marked in many places by the outcrop of limestone rock mingled with sand and granitic formations, forming in many places strong soils. Only in a few rare instances does this southwest portion of the Blue Ridge section show pippin lands, but it does furnish a splendid situation for the culture of the red apples which I have already mentioned. As to its climatic features, from its elevated situation and the high mountains lying still back of it to the west, this section is less subject to injurious climatic changes than most of the more northern part of the state.

THE VALLEY.

The Valley of Virginia comprises not only what has been known in literature as the valley of the Shenandoah, but the successive valleys of the North Fork of the James, the head waters of the Roanoke and the high plateau of New River and the lesser streams which flow through it in the extreme southwest. It is a long stretch of country reaching from the Potomac to the borders of Tennessee and in the main is a limestone country presenting soils of the very finest quality for the ordinary agricultural purposes and naturally where the elevation and other conditions are suitable is an excellent fruit section. This valley is in fact a high interior table land bounded by the Blue Ridge on the east and the still higher Alleghanies on the west. Its mean elevation varies from eight hundred to two thousand feet. While in the main the soil is of limestone origin yet there are many instances in which outcrops of shale and sandstone occur, thus giving a variety of soils. Wherever the sandstone outcrops through the limestone mingling with the latter, a most excellent soil is formed for the growth of apples. A ridge of this character lying to the west and north of Winchester known as Apple Pie Ridge is one of the finest fruit sections of the state and, strange to say, though it is not what is called typical pippin land yet on the slopes of this ridge is situated one of our finest pippin orchards. The present bearing orchard comprises forty acres of trees, about eleven hundred all told and has yielded in one crop fifteen thousand dollars worth of fruit.

The shaly soils of the valley are very illy adapted to fruit growing, but wherever the limestone soil is deep and rich without rocky ledges and has sufficient elevation above the water courses, excellent fruit is grown. In fact there is nowhere in the state such a large body of land adapted to the growth of apples similar in character to those grown in New York and other northern states as may be found in this high valley. The fact is yet to be proven as to whether it is not true that wherever the sand rock outcrops and mingles with the limestone we cannot also grow pippins. Cer-

tainly by supplying a large amount of humus matter to such a soil I am inclined to believe that pippin culture might be extended to certain districts of the valley though they are not naturally pippin lands. There are many foothills and cross spurs of the mountains extending into this valley which break up its even course as a comparatively level, rolling, farming country and on the slopes of these orcharding has, as yet, scarcely been attempted; hence I cannot speak especially of them. The fact is, that these valley lands have been so valuable for grain and stock raising that from one end of this section to the other orcharding has scarcely begun.

As the chief centers of orcharding in the valley I mention the district about Winchester and some new ventures at Mt. Jackson in Shenandoah county where a large area of land has been planted to apples, and another venture of like character near Salem in Roanoke county. These last two ventures are the largest orcharding plants in the state of Virginia and comprise respectively fifty-four thousand and forty-four thousand trees, apple and peach intermingled. While I have serious doubts as to the outcome of ventures of this character on so large a scale, I have no doubt whatever that there are thousands of acres of land in this district of the state which will produce the choicest York Imperial and Ben Davis apples. I do not advise Winesap except where the sand rock distinctly outcrops so as to form with the limestone a well drained thoroughly mellow loam soil.

In the high, southwestern portion of the valley the Virginia Beauty, a variety little known to the trade, is grown to some extent; but I am not yet inclined to recommend it for large plantations. The Baldwin is also grown and comes to great perfection; but, unfortunately, it matures so early that it is scarcely a winter fruit. For commercial planting we are practically limited to the well known sorts already mentioned. However, considerable plantings are being made of Arkansas, the so called *Mammoth Black Twig*, and Stayman Winesap and other sorts as yet untested. The Arkansas, I can say from personal experience, having had it in our orchard for eleven years, has thus far set fruit very shyly, but grows to good size, is deep, dark red in color, and in quality inferior to Winesap.

APPALACHIA.

The high Appalachia district which lies above the valley lands to the west and northwest comprises about one-fourth of the state and is of a very rugged mountainous nature, ranging from two to nearly five thousand feet high. Many of these mountain sides offer the most favorable situations in the state for red apple culture. Yet, at the same time, many of the flatter lands and narrow valleys are unsuited to apple culture because of the drainage of cold air into them and the further fact that the abundant supply of water pouring down into these valleys renders their climate especially moist. This area of the state has been less examined by me than any other and it is only here and there in it that apple culture has obtained a foot-hold Yet on the very elevated districts of Russell, Wise, Lee, Scott and Washington counties, I am certain from personal examination that there are valuable apple lands. Especially on the line of the Clinch mountains in the first named county, there is an outcrop of granitic rock mingling with the sand and limestone forming a large area of black soil exceedingly rich, rising to an elevation of about three thousand feet which to all appearances is natural pippin land.

From the facts which I have been able to bring together and which cannot be presented in detail in such a paper as this, I am satisfied that the apple industry in Virginia has scarcely been begun though we are now second to New York in total quantity of fruit raised, and yet not one-tenth of the possible apple product of the state has ever been produced. The fact is there is not an instance to my knowledge where apples have been properly planted in the State, and given culture and modern care that they have not averaged in crop from fifty to one hundred and fifty dollars per acre; and of such quality that our apples command the very best prices in the foreign markets. It has been thought and many times stated that the future of Virginia as an apple growing State lies in its foreign trade, but facts which we are now collecting show that this is not true. We are now developing a great trade with the far south and we have in fact lying at our very doors the entire middle south and Gulf states which are eagerly demanding all the late fruit which we can send them and, in the main, give us as good a net price as we obtain at Liverpool.

I think that the statement is fully warranted that there is no state in the union that offers a better opportunity or has a brighter future for the technical development of apple growing. But I think that all persons should be warned that only those who are willing to undertake this work in a thoroughly technical manner can hope to succeed, for the development of fungous diseases and insect pests in our areas devoted to orchards has been such in the past few years as to frighten many in regard to the outlook for the future. Yet with us as in New York and elsewhere proper methods have sufficed to produce a good crop.

J. S. Collins, New Jersey, inquired whether any attention had been given to pollination; said he regarded this as a subject of much importance.

Prof. Alwood: I am paying such attention to this subject as I can. So many difficulties surround questions of this character that I have learned to be cautious in making a reply. For instance, I have now in mind a certain orchard in the county of Botetourt composed of about one thousand trees which became unproductive. After careful investigation of the matter and obtaining all the local information I could in regard to it, I concluded that possibly here was a case of imperfect pollination. Yet, it is such a difficult matter to correct this trouble in an old orchard, as one must wait for the growth of the top grafting that I decided to prescribe a thorough course of treatment by cultural and spraying methods. The result of this was that it appears that pollination had nothing to do with the trouble. The first year after the renovation work was undertaken the orchard produced a good crop of fruit and has been producing good crops since.

However, while considering this subject I wish to say that I am advising the intermingling of varieties and would not myself set large blocks of one variety isolated.

I have yet to have clearly brought out in my work the fact that any variety of apple fails to pollinate itself. In numerous instances where orchards have failed, after they have been brought under a careful system of cultivation and modern treatment of spraying the trouble has disappeared. In fact, if the pollen was impotent at all, apparently it was so from lack of vigor and the orchard needed constitutional treatment rather than top grafting.

R. M. Kellogg, Michigan: In restoring those orchards that are unfruitful do you practice close pruning as a measure for the restoration of the vitality and the potency of the pollen?

Prof. Alwood: I have photographs here illustrating the methods I pursue in regard to pruning old orchards and I hand them around. The Station orchards had been greatly neglected prior to the organization of the Experiment Station and we have followed the custom in them of severe pruning with the very best results. In fact, I always advise a thorough pruning of neglected orchards. Yet I do not wish to be understood to mean indiscriminate cutting or chopping away of limbs. I think it of the greatest importance to judiciously open the tops of old trees and thus stimulate growth, but at the same time I realize that, carried too far it would be a shock instead of a benefit.

Mr. Kellogg: This is very true, but I believe that the main cause of lack of potency in pollen is exhaustion through overbearing, which is corrected by proper pruning.

Prof. Alwood: Do you mean that the pollen has lost its potency, or that the tree has lost its constitutional vigor?

Mr. Kellogg: The potency of the pollen is lost through the loss of constitutional vigor.

Prof. Alwood: Yes; I believe that too; it is exactly what I have said.

Professor John Craig of the Iowa Agricultural College and Experiment Station presented the following paper:

SOME EFFECTS OF THE FREEZE OF 1898-9 IN IOWA.

BY PROF. JOHN CRAIG, IOWA AGRICULTURAL COLLEGE, AMES, IA.

Undoubtedly a certain amount of root-killing occurs every year in some part of the country. Whenever on light soils the ground is found bare of vegetation or snow covering during hard freezing weather, injury of this kind may occur. Hartig * suggests that this injury received by the roots while the tops remain unhurt is due to the thinner periderm of the roots as well as to their relatively more extended period of activity. If weather conditions have been such as to produce complete vegetative inactivity then root injury on the accession of severe freezing might not be expected to the same extent as when soil and climate conditions of the autumn favor root growth. These environmental conditions, of course, may determine in a measure the extent of the injury, but if the frost is very severe and the surface of the ground unprotected, root-killing is certain to ensue. In other words, when the ground is bare and the frost severe, situation and variety of stock within certain limits have little influence upon the results. Injury is, however, usually most severe where the subsoil is of a hard and impervious character and overlaid by a thin layer of upper soil.

In early spring the appearance of the root-killed tree is not sufficiently marked to enable an observer to distinguish it from the uninjured specimen. The twigs and branches retain their plumpness until the commencement of the vegetative process. The flower buds open, and in some instances fruit sets; the leaves partially expand. At this stage the trees begin to give indications of an abnormal condition; growth ceases; the blossoms and embryo fruits wither and fall, soon to be followed by the leaves. Sometimes an entire tree top dies with the exception of a branch or two. If the

*Diseases of Trees, p. 289.

weather is favorable and the rainfall abundant, as was the case this year, the trees may remain in leaf without making any growth till mid-summer, then wither on the arrival of the dry days of early autumn.

On digging large orchard trees of this character last spring, it was found in nearly every instance that the upper system of roots was entirely killed, while usually the lower extremities of the roots were uninjured. Slight injury usually manifested itself by a discoloration of the cambium layer; severe injury by a blackening and a more or less complete disorganization of cambium and inner bark, apparent as soon as frost leaves the ground. In the case of root grafted apples the seedling root was always injured to a greater extent than scion or upper part of the root stock. Where grafted apples were not killed it was generally due to the escape of a few roots thrown out from the scion part of the stock. The number of trees of a given variety which escaped destruction was somewhat but not by any means always dependent upon the abundance of the scion root system. The amount of surface protection received was a much more important factor. With regard to the area over which this injury occurred, Mr. Greene, Secretary of the State Horticultural Society, says that "The injury was more severe in the central than in the southern part of the state. The injury is greater in a belt nearly five counties wide extending across the state from the Missouri to the Mississippi river, including Hamilton, Story, Polk and Warren counties. The counties contiguous to this belt have suffered some loss, but the injury was not so severe as those included in it."

In the center of the geographical area of greatest injury the amount and character of the root system exerted less apparent influence upon the ultimate results than it did along the margins of the affected area where the frost was less severe or protective covering more abundant. Here rooting characteristics of scions and hardiness of scions were qualities readily discernible. A striking instance illustrating this point was shown in a nursery at New Sharon, Iowa, where a block of two year old Jonathan root grafts, though protected by weed growth, was completely killed while alongside Virginia Crab, Shields Crab and Whitney No. 20 lost only the roots upon which they were worked and made fair growth throughout the summer. In a different location where the frost was more severe and the nursery under cleaner culture very few of the crabs escaped. Virginia Crab roots freely from the scion.

INJURY TO NURSERY TREES.

Apples.—In the region worst affected the destruction to one and two year old nursery stock was almost complete. Varietal differences manifested themselves to some extent in this series as noted above. Inherent hardiness with ability to root from scion and depth of planting, were important factors. Neglected nurseries fared better than those receiving good cultivation. Transplanted nursery trees escaped much better than those not transplanted because set deeper. In one case a row of peach trees was saved by the soil thrown up from a drain opened late in the autumn. As to stocks, no opportunity presented itself during the course of this study for securing a comparison of hardiness of stocks except in one instance where a considerable amount of stock grafting had been done on the Shields and Whitney crabs previously noted. Jonathan, Grimes Golden and Willow Twig, as three year top grafts in nursery, came through in good condition. Prof.

N. E. Hansen of South Dakota Agricultural College reports apple trees root grafted on *Pyrus baccata* seedlings entirely uninjured and suggests the use of this stock by nurserymen of the northwest. At present seed is not available.

Apples in Orchard.—The vigor and age of the individual tree affected the final result materially. 1. Trees from five to fifteen years old suffered less than those younger or older. 2. Trees on north slopes suffered more from root-killing than those on south slopes. 3. Apples were injured most on sandy soil, least on loam, and to an intermediate degree on clay. 4. A standard of hardiness based on ability to withstand injury to the branches did not prove reliable in all cases, when applied to the injury sustained by the roots. For instance, Haas, an unusually vigorous and hardy tree, was generally killed throughout the snowless region. In the college orchard where it has been freely used for top grafting purposes the destruction of this variety was almost complete. 5. Among varieties least injured are: 1st, the crabs; 2d, natives, Siberians and the Hibernal type of Russian apples; 3d, varieties of western origin, such as Northwestern and Patten; 4th, Wealthy, Duchess, Tetofsky, Willow and Scott Winter.

Plums in Nursery.—Plums, native or European, worked on peach or Myrobolan killed, on Marianna badly injured, on *Americana* slightly injured, but recovered rapidly. In a few instances permanently injured.

Plums in Orchard.—The injury may be scaled in the same manner but was less pronounced throughout. *Americanas* on peach roots escaped where well rooted from the scion. Sand cherry (*Prunus Besseyi*) stocks have been used to some extent in the state. In no case have I found these roots injured in the slightest degree. In passing I may add that experience has not yet developed the ultimate effect of this stock upon the scion. Thus far its dwarfing influence upon varieties of the *Americana* type is conclusively demonstrated. *Domestica* plums on own roots fared better than the same varieties on peach, Myrobolan or Marianna. Let me interpolate at this point that the experience of our nurserymen has proved the unsuitability of *Americana* stocks for propagating the Domesticas and Japan varieties by budding. The top outgrows the stock. When root grafted the scion soon becomes an "own-rooted" tree; but the first year's growth in nursery is unsatisfactory.

In orchard the results of the freeze as bearing upon the kind of stock used approximated quite closely those outlined above. As to varieties *Americanas* suffered slightly; *Angustifolias* considerably; *Domesticas* badly; Japanese severely. Japan on sand cherry came through without injury.

Cherries in Nursery.—The two almost universally used cherry stock are Mazzard and Mahaleb. The former was practically a total loss in the case of two year olds and a complete loss of one year olds. Morello stock and own rooted Morello trees generally escaped with slight injury except in exposed situations. In orchard the results were substantially the same, though the desirability of deep planting received emphatic commendation by the escape from root injury of several young Richmond orchards set unusually deep (e. g. those set in a dead furrow). In the college nurseries the practice of root grafting the cherry received commendation by the fact that the only trees which escaped were those which were partly on their own roots.

EXPERIMENTS IN TREATING ROOT INJURED NURSERY STOCK.

The college nurseries furnished abundant material for experimentation. It was determined to try the effect of cutting back the trees with different degrees of severity. The trees selected were three year old root grafts. Each lot included one hundred trees made up of an equal number of five varieties, Ben Davis, Longfield, Good Peasant, Lead, Antonovka.

Apples.

Lot 1. All branches including leader cut back one-half their length; in other words, severely "headed in."

Twenty per cent grew. This is a larger number than was obtained by any other method. The growth was generally weak and spindling.

Lot 2. Side shoots all trimmed back. The tree left in the form of a whip.

Of this lot seventeen per cent grew, but with few exceptions the growth was feeble.

Lot 3. Side branches trimmed off. Leader cut back to a height 2-3 feet.

Of this lot twelve per cent grew, half of them making a vigorous growth.

Lot 4. Trees cut down to within four inches of the ground.

Fifteen per cent grew of these. Eighty-five per cent made a growth of ten to thirty inches.

Lot 5. Not trimmed.

Ten per cent remained alive throughout the summer, but made very feeble growth.

It would appear that a severe heading back gave the best results.

Plums on Native Stocks.

Lot 1. Side branches cut back half their length.

Eighty-five per cent grew; growth uniformly strong, 26 to 36 inches.

Lot 2. Side shoots cut back to main stem; leader not cut back.

Ninety-five per cent growing; 20-30 inches.

Lot 3. Side shoots trimmed off, leader cut back.

Ninety-two per cent growing. Growth 3 to 4 feet.

Lot 4. Cut back to ground.

Ninety-two per cent growing. Growth 2-3 feet, but weak, slender and spindling.

Lot 5. Not trimmed.

Eighty-three per cent growing. Growth 15 to 20 inches.

In the case of plums the best trees were obtained by cutting the trees back to straight sticks two to three feet in height. Cutting back to the ground is to be discouraged very decidedly as the method tends to produce an unsalable nursery tree. When cut low they do not sprout promptly and growth is likely to be continued abnormally late.

BANKING.

The effect of banking or hilling up root injured nursery trees was tried. The banking was done by turning the wings of the cultivator so that they would throw the soil against the row. The object in view was to encourage

the rooting of the stock from the live wood at the surface of the ground. Practically no beneficial results were obtained in the case of apples or plums.

With the grapes, however, eighty per cent of the varieties in the college vineyard were saved by cutting them back severely and hilling them deeply. They have rooted near the surface of the ground and have made a top growth of from 1½ to 3 feet, but of course, will need thorough protection for two or three seasons until the roots penetrate to their normal depths.

GENERAL CONSIDERATIONS AND CONCLUSIONS.

A careful canvass of the whole field with the assistance of the leading fruit growers of the state leads to the following conclusions:

1. That the lack of a protecting blanket of snow coupled with unusually low temperatures was the chief cause of the great loss of nursery stock and orchard trees.
2. That in as much as trees on north slopes suffered more than trees on south aspects and in proportion to the surface protection present the intensity of frost bore a definite relation to the amount of injury inflicted.
3. That conclusive data are wanting to show that more injury resulted on untiled orchard lands than on those supplied with tile drains.
4. That orchard and nursery trees suffered more on exposed dry knolls with northern aspects than elsewhere.
5. That the character of winter surface cover, in other words, desirable cover crops, is a question of paramount importance in northern Mississippi Valley States.
6. That the matter of congenial and hardy stocks for plums, apples and cherries is a subject worthy the earnest attention of Experiment Station workers and nurserymen in the northwest.

The Society, upon motion, adjourned, to meet at 2 o'clock p. m.

FRIDAY AFTERNOON SESSION.

September 8, 1899.

The Society reassembled at Horticultural Hall at 2 o'clock p. m., President Watrous presiding.

Prof. H. E. Van Deman, of Parksley, Va., being called upon by the chair, read the following paper:

RELATIONS OF COMMERCIAL FERTILIZERS AND SOILING CROPS TO FRUIT CULTURE.

BY PROF. H. E. VAN DEMAN, PARKSLEY, VA.

With the progress of fruit culture our soils, although filled with the elements of fertility in their natural condition, are becoming less and less productive. The orchards, vineyards and berry fields are showing the effects of repeated cropping as well as the grain fields. Although fruits do not take

from the soil so large quantities of nitrogen, phosphoric acid and potash as the cereals, yet they do need liberal supplies of these and some other elements that help to constitute a fertile soil. It is far too common a practice to plant fruits upon lands that have already been in some measure depleted of their fertility, and then, fail to manure the soil for many years afterward, if at all.

Within the last decade or two there has been a higher appreciation of the need of fertilizing fruits of all kinds than formerly. We are coming into a better understanding of reasons for manuring, the scientific principles which underlie the practice, and likewise, of the cheapest and most rational ways of doing it. We have come to know much more of the exceeding value of humus in the soil, whether we are growing farm crops or fruits. The benefits of tillage are also better understood than they once were. Yet there is abundant room for improvement in both theoretical knowledge and practical application.

To be more specific, we know that nitrogen, phosphoric acid and potash, with lime for some soils, are the essential manures for fruits and all other crops. Any soil that does not contain them in liberal quantities and in available forms is not good for fruit. Nature may once have had them there in abundance, but if, through the agency of man, they have been much reduced, it is absolutely essential to renew the supply.

Of the three nitrogen is the most expensive to obtain in a commercial way. The various mineral nitrates and organic substances that contain nitrogen in available forms and in considerable quantities are always costly. But there is a limitless storehouse full of it within easy reach, if we only know how to unlock its doors. Four-fifths of the bulk of the air is free nitrogen. Every fruit bearing tree, vine and plant is surrounded with a sea of fertility and yet they often famish for lack of it. They cannot lay hold upon it. They are like shipwrecked mariners upon the briny ocean, "with water, water every where nor any drop to drink." But fortunately the clovers, peas, beans and some other leguminous plants are the keys by which these doors of wealth may be unlocked. They have the peculiar ability to imbibe the free nitrogen of the air. Nature has also provided minute bacilli which cause a large part of the nitrogen to be collected in nodules on the roots of these plants. If the fruit grower will make use of these means to enrich his lands he may, for almost nothing, acquire nearly all the nitrogen that is necessary to the proper growth of his trees and plants.

He can do this by sowing the clovers and cow peas in his orchards, vineyards and berryfields with proper judgment. Some of the best orchards in the country are treated in this way. On the great Olden fruit farm in Southern Missouri, the cow pea is sown by the hundred acres each year. This is done late in June, after the land has been thoroughly tilled up to that time. One bushel of the variety Whippoorwill, which seems to be the best for that region, is sown broadcast just before the last cultivation. Nothing more is done with the crop until the next spring, except to turn in hogs when the peas are ripe and after the fruit is gathered in the fall. They get a large amount of nutritious food, which has cost almost nothing. The trash on the ground prevents washing to some extent. The following spring all that is left is worked into the soil by the Morgan spading harrow. This adds not only nitrogen, but humus to the soil.

The same plan is followed with crimson clover in some of the larger pear and peach orchards in New Jersey and elsewhere; only, that this variety

of clover is sown about August and worked into the soil the next April or early in May.

Cow peas and crimson clover are also highly beneficial in the vineyard. Within the past few weeks I saw some most remarkable examples of this character about Southern Pines, N. C. The vineyard of the Experiment Station of the North Carolina Horticultural Society there had had rows of cow peas planted in them on certain plots and with the most astonishing results in the way of growth. Every plot that had been so treated could be picked out at a glance. The vineyard of Dr. B. von Herff a few miles distant, which had an extent of many acres had all been treated in the same way and was a picture of health and vigor. It is true that chemical fertilizers had been used on it also, but they contained almost no nitrogen, the cow peas supplying that ingredient. Although the lands upon which both these vineyards stand was naturally about the poorest in America, being poorest of the poor sandy pine lands of the South, yet better looking and more productive vineyards I have never seen this side of California. The clusters were large and the grapes of the best flavor of their kind. The soil looked dark, compared with that not so treated, because of the humus it contained.

In some of the vineyards of Virginia and farther north the same plan has been followed with very great benefit. It has also been tried to some extent, especially with crimson clover, on fields of bush fruits. Raspberries, blackberries and currants have been stimulated in growth by sowing it in the late summer and early fall and working it under the next spring.

Common red clover is also a good crop in an orchard. The Wellhouse apple orchards in Kansas are sown to clover after the first five or six years, and some of them have not been plowed for ten or more years afterwards. The clover is allowed to grow uninterruptedly, and each summer the crop of clover, weeds and all that grows between the trees is mashed down and cut into short pieces by a peculiar sort of rolling cutter. Everything is left to rot on the ground. No chemical fertilizers have so far been used on these orchards, the land being mostly rich, virgin prairie. This method seems to work very advantageously and cheaply.

It is a good plan to sow common clover in bearing apple and pear orchards, and after two or three years, plow it under. It does not make a compact sod like grass, nor does it draw so largely on the moisture and fertility of the soil. Of course there should be nothing taken off the land in the way of forage; because this would decrease both the fertility and the humus in the soil.

In the orange orchards of Florida it is a common practice with some to grow cow peas or beggar weed, and for the same reasons that have been mentioned in regard to other orchards.

As nitrogen induces a rank, leafy growth, which is more necessary in the production of forage crops and vegetables than in fruits, there is danger of excessive applications of nitrogenous fertilizers. They should be used knowingly and with caution. It is also possible to add too much nitrogen to the soil by means of the soiling nops just mentioned. I have seen it done. Not more than two or three crops of such should be grown in succession on ordinary lands. After a year or two of rest, they may be repeated, giving thorough tillage in the mean time.

If nitrogen is applied to fruits in commercial fertilizers the forms that yield it up slowly are better than such readily soluble forms as nitrate

of soda. The organic forms, such as tankage and cotton seed meal are excellent.

As has been already said, phosphoric acid and potash are essential to the production of fruit. They are more important than nitrogen; if we can say that one element is more necessary than another. Both of them are naturally found in all arable soils in large quantities and in various chemical combinations. They are indestructible by fire, and are the principal elements of fertility in wood ashes. Without discussing at length the peculiar function which each performs in the economy of plant growth it may suffice to say that they are the backbone of all manures for fruits, whether home-made or bought in fertilizer sacks. They give vigor and stability to the tree and rich colors and luscious quality to the fruit. While nitrogenous manures prolong the season of growth and retard the ripening of the fruit, they hasten its development and maturity.

The cheapest form in which to buy phosphoric acid is in bone meal, bone black, dissolved bone or as dissolved phosphate rock. The latter is nothing more than the fossil means of prehistoric animals, mixed with various mineral compounds, thus making vast beds of rock boulders or pebbles. Potash is most cheaply bought as muriate of potash. Sulphate of potash is also an excellent form in which to buy it in the market.

It has been formerly stated that there are large quantities of both potash and phosphoric acid in the earth. Fortunately they are very largely in such forms as to be unvailable to the immediate growth of vegetation. Tillage is the key that will unlock the combinations. The process may be slow, and it is well that it is so, but it is sure. We may sometimes wonder why stirring the soil frequently causes our crops of various kinds to grow so luxuriently. There are several reasons, one of the chief of which is, that it keeps the soil loose and porous, so the moisture and air may penetrate it, and in their own mysterious way dissolve the potash and phosphoric acid that has lain there unappropriated by the vegetable world through unknown ages. And that is one reason why humus, which is nothing more than decaying vegetation, helps to make things grow. It makes it spongy and able to hold more moisture than a hard and compact soil.

Surface tillage also has a wonderful effect in keeping the moisture in the subsoil from escaping. It not only keeps down weeds, but it forms a dust mulch which acts like nature's covering of the soil in the deep forests. It need not be deep, and indeed it should not be so, especially in an orchard or other fruit plantation, else the roots will be disturbed more than is for their greatest benefit, and that of the parts above ground.

There have been repeated experiments, by the several Experiment Stations, and, in some cases covering a long series of years, for the purpose of determining what tillage would do in this direction. Neither have private experimenters been idle. It may, perhaps, be sufficient to mention only one of the latter class, because it is a most notable case of the good effects of thorough tillage, and because it may be duplicated ten thousand times by as many or more fruit growers in practical every day life. It is that of Mr. Willis T. Mann, in the treatment of an old and unprofitable apple orchard in Western New York.

In the first place, he felt that the trees were too thick. That they were starving for space under ground, if not above. Therefore, he cut out half the rows each way, leaving but one-fourth the original number of trees. He then plowed it thoroughly, and we might think too deeply, for the plowed

ground was so full of loose and broken roots that they clogged his harrow badly. He kept harrowing with frequent intervals all summer. A part of the rows, running crosswise of the varieties, which were those commonly grown in that region, were treated with muriate of potash and the rest were simply tilled. An application at the rate of 150 pounds per acre was put on each year for three years in succession, making 450 pounds in all on each acre of the manured part. And now for the result. He could not tell the trees which were manured from those that were not, judging by the fruit grown, and from the growth of the trees, except that in some cases, the fertilized trees had a darker color in the leaves. The secret lies in the fact that there were large quantities of latent fertility in the soil which tillage helped to make available.

We would not necessarily learn from this and other tests that have been made that muriate of potash and other commercial fertilizers are not beneficial, for they have proven that they are in very many cases. But we may learn that tillage is the cheapest, the most potent and the most ready-at-hand of all fertilizers, for the generality of soils. Use commercial fertilizers when necessary, but do not spend too much in buying what is already in the soil. Rather let us fertilize our orchards and other fruit plantations liberally with horse power first, and then supplement this with whatever else may be needed. Let us also not forget the limitless supply of nitrogen in the air, and the means by which we can draw upon it. There is no better way to economize commercial fertilizers, when we must buy them, than by applying them to the soiling crops; thus stimulating them to greater action and usefulness. The potash and phosphoric acid will be just as available as before if not more so, and the soil will become enriched by liberal additions of nitrogen and humus. Thus may we be able to grow larger crops of better fruits, and correspondingly cheaper and more satisfactory to ourselves and others.

REPORT OF COMMITTEE ON AWARDS.

Dr. F. M. Hexamer, Chairman of the Committee on Awards, presented and read the report of that committee, as follows:

To the President and Members of the American Pomological Society:

Your Committee on Fruits Exhibited report the following awards:

WILDER MEDAL, SILVER.

New Jersey State Horticultural Society. For large and highly meritorious collection, comprising 696 plates, in 12 different classes.

Ellwanger and Barry, Rochester, N. Y. For collection of pears, comprising 100 varieties.

Michigan Sub-Experiment Station, South Haven, Mich. For an interesting educational exhibit.

Pomona Nurseries, Parry, N. J. For an extensive collection of edible nuts.

Roland Morrill, Benton Harbor, Mich. For unique exhibit showing results in peach growing by following approved methods of culture; illustrated by specimens of fruits, accounts sales and photographs of orchards.

John Charlton, Rochester, N. Y. For Charlton grape, a cross of Brighton and Mills, combining the qualities of both.

Prof. Jno. T. Stinson, Arkansas Agricultural Experiment Station, Fayetteville, Arkansas. For fifteen varieties of Arkansas seedling apples correctly named, with synonyms given.

WILDER MEDAL, BRONZE.

C. L. Watrous, Des Moines, Ia. For collective exhibit of native plums, including the new varieties Brittlewood, Bursota, New Ulm and Silver.

Howard A. Chase, Wiscasset Farms, Mt. Pocono, Pa. For collective exhibit comprising 24 varieties apples, 6 varieties pears, and 2 varieties plums.

Geo. E. Murrell, Fontella, Va. For collective exhibit comprising 31 varieties apple, 1 variety quince, 8 varieties grapes.

HONORABLE MENTION.

Peder Pedersen, Cairnwood Orchards, Bethayres, Pa. Collection of 42 plates of fruits and nuts.

W. B. K. Johnson, Allentown, Pa. Collection of 35 plates of apples, pears and quinces.

New York Agricultural Experiment Station, Geneva, N. Y. Collection of native plums.

Rev. Lyman Phelps, Sanford, Fla. Collection of kaki or Japanese persimmons.

Luther Burbank, Santa Rosa, Calif. Seedling grapes and apples. (Damaged in transit so that true merit could not be determined.)

Central Experimental Farm, Ottawa, Canada. Collection of hybrids between *Pyrus baccata* and *Pyrus Malus*, showing remarkable variation.

Iowa Agricultural Experiment Station, Ames, Ia. Collection of cultivated native crabs, showing improvement in size and form over wild type.

Pennsylvania Agricultural Experiment Station, State College, Pa. Collection of 35 plates of apples and grapes.

Greening Bros., Monroe, Mich. Specimens Winter Banana apple.

C. C. Corby, Montclair, N. J. Specimens of Corby grape and Montclair grape.

C. R. Hartsborne, Brighton, Md. Specimens Bloomfield apple.

OTHER FRUITS EXHIBITED.

W. H. Morgan, West Mount, N. J. Kieffer and Howell pears.

John Charlton & Sons, Rochester, N. Y. Bismarck apple; Campbell Early and Concord grapes.

Missouri State Horticultural Society. Large and handsomely colored Jonathan apples grown on three year old trees.

Capt. Jno. J. Haden, Cocoanut Grove, Fla. Display of Avocados (*Persea gratissima.*)

J. L. Normand, Marksville, La. Bearing branch of fig, var. "Hirta du Japon."

H. C. C. Miles, Milford, Conn. Plate of Bartlett pears.

Iowa Agricultural Experiment Station, Ames, Ia. Hybrid pears, and collection of native plums.

Calvin Cooper, Bird-in-Hand, Pa. Five plates of apples.
Geo. E. Boggs, Livingston, N. C. Nine plates of apples.
Silas Wilson, Atlantic, Ia. Plate of McPike grape.
H. M. Engle & Son, Marietta, Pa. Display of apples, pears and chestnuts.
H. W. Stout, Pine Grove, Pa. Eight plates of apples.
Henry Wallis, Wellston, Mo. Hicks grape.

Respectfully submitted,

F. M. HEXAMER, Chairman.
H. E. Van Deman,
JOHN CRAIG,
G. B. BRACKETT,
A. G. GULLEY.

As Chairman of the Committee on New Fruits of American Origin, Dr. Hexamer submitted the following report:

REPORT OF THE COMMITTEE ON NEW FRUITS OF AMERICAN ORIGIN.

Among the most promising new fruits that have come under the observation of your committee since the last session of the American Pomological Society are:

Apples—Canajoharie.—The original tree has been grown for fifty years or more on the farm of Mr. L. M. St. John in Montgomery county, N. Y. Its size is medium; form, roundish oblate; color, waxen yellow, splashed with carmine red; flesh, tender; flavor, mild; quality, good. As a dessert apple it has much to recommend it, and it is especially valuable on account of its late keeping as it is at its best from January to May. The tree is a vigorous grower, of spreading habit with slender willowy branches.

Pride of the Hudson.—A handsome red winter apple of high quality, which although known in its original habitat for many years has not been brought to public notice before last year. It is above medium size, roundish conical, sometimes flattened, slightly ribbed. Its color is bright red, handsomely striped with darker red, and slightly dotted. The stalk is long and deeply set. The flesh is white, very fine grained, juicy, mild subacid and fine flavored. The fruit hangs firmly to the tree until late in the fall and after picking keeps in good condition until spring. The tree is of vigorous growth, somewhat spreading habit, very productive, and has clean healthy foliage. The early history of this variety is in obscurity. All that is known is that Mr. Jacob Barringer, Columbia county, N. Y., who was the first one to grow it outside of its original home, found five trees of this kind on the "Ludlow Farm" in the northern part of the town of Clermont in his county. He also states that these trees were grafted, which of course, leaves a doubt as to the origin of the grafts. These five trees were in their prime fifty years since. The last one survived until two years ago, at which time its trunk measured over three feet in diameter.

Peaches—Worcester.—Large to very large, globular in shape, and displaying a suture from stem to calyx end. The flesh is yellow, red at the stone, juicy, sweet, rich and generally of a quality superior to the average. The fruit is a perfect freestone, ripens medium to late and if the tree continues to bear as prolific crops as it has produced heretofore, this variety will no doubt become a valuable addition to our list of peaches. The parent tree was raised from the pit of a California peach, of unknown variety, by Dr. J. Warren Worcester, Middletown, N. Y.

Grapes—Brown Seedling.—Originated with W. B. Brown, Newburg, N. Y., a deep black grape, of good sized cluster, good average sized berry, and very sweet. It is productive and hardy, and if largely grown in the place of Champion, it would no doubt prove a boon to grape growers as well as consumers.

Charlton.—A cross between Brighton and Mills, raised by John Charlton, Rochester, N. Y. The original vine has fruited the last six years, and its fruit seems to improve each season. The berries are globular in shape, and medium to large in size, moderately compact and sometimes shouldered; color red, similar to Catawba, flesh tender and melting, juicy, sweet and vinous, separating readily from the seeds, of which there are but few; quality best. Skin thin, but firm enough to insure good keeping and shipping quality. Season early, showing color before Concord, but the fruit is in a eating condition before it is fully colored The vine is a strong healthy grower and a prolific bearer.

Strawberries—Gibson.—Originated with J. H. Gibson, Ulster county, N. Y., blossoms staminate, berries large, irregular globular, sometimes slightly conical, and very uniform in size; color bright, glossy crimson; quality very good, high flavored and mild; texture firm. The plants are vigorous and healthy, very prolific and carry a good sized crop to the end of the season. According to the testimony of several intelligent and experienced fruit growers who have given the Gibson a trial on their own grounds it ranks among the most promising varieties introduced for some time.

F. M. HEXAMER,
Chairman Committee on New Fruits.

Reports received from three other members are appended hereto.

Parksley, Va., Sept. 2, 1899.

My Dear Dr. Hexamer:—In reply to your request for information regarding new fruits, all I can say, so far as those originating within the limits of district No. 3, during the last two years is,that I have knowledge of but two of special value. These are the Seaford and Hall strawberries.

The Seaford originated near the town of Seaford, Delaware, and was brought to public notice by Charles Wright of that place. It is imperfect in flower, and like many of that character, is very productive. The plant seems to be healthy and vigorous. The fruit is medium to large and of good color, and flavor.

Hall originated near Marion, Maryland, and was disseminated by John W. Hall of the same place. It is a thrifty grower and abundant bearer. The flowers are perfect. The fruit is large and well colored.

(Signed.)

H. E. VAN DEMAN.

Humboldt, Tenn., Aug. 9, 1899.

Dear Sir—Your letter of inqury of August 4, to hand, and in reply will say. I have two varieties of apples that are specialties of mine and are of local origin here. One is locally named, "Koffman June" apple. It is a supposed seedling of Carolina Red June and ripens with it. It is very large, an abundant bearer, almost black red, oblong and commands fancy prices in markets glutted with ordinary fruits.

The other is local, named by me "Pride of Tennessee." This is a June apple, red with a few white specks on it, rather flat, with wine streaks through

the white meat inside; it holds up six weeks in shipping, and is a most desirable sort. My orders exceed my propagation now. These varieties are the best in West Tennessee for fancy market and eating. I will mail you specimens in 1900.

(Signed.) T. C. FERRELL.

Westport, Mo., Aug. 8, 1899.

F. M. Hexamer, Chairman—One of the best of the black-cap raspberries originated in Clay county, by our old President, J. C. Evans of Harlem, Mo.

It is thrifty, vigorous, productive, good and hardy; produces twice the quantity of our old Hopkins. Berry large, bright black, good; cane vigorous, strong, stands up well.

Of peaches we have two; the "Evans" a late Elberta, with all the good qualities of Elberta and which comes just after that variety is gone. It was originated by J. C. Evans, Harlem, Mo.

The "Dewey Cling" a good cling like Oldmixon, just after it in season and fine. Originated by H. W. Jenkins, Boonville, Mo.

Have a number of new apples but will have to wait another year to report.

L. A. GOODMAN.

Dr. B. D. Halsted, from the Committee on the President's Address, presented and read a report as follows:

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

Your Committee upon President's Address begs to report that it has considered the able document referred to it as fully as the very limited time at its disposal would permit, and heartily commends to the Society the several points therein contained.

Your Committee recognizes the great importance of some adequate effort looking to the proper distribution of fruit to prevent the glutting of markets, and would suggest that the Executive Committee consider the advisability of the appointment of at least two prominent commercial fruit growers, one for the East and the other for the South and West, to prepare papers upon marketing of fruit, for presentation at the next biennial session of this Society.

Your Committee notes with such pleasure the hearty spirit in which our President commends co-operation between the pomologists of the country and the national and State experiment stations, and to further this excellent work it is suggested that the Society request the Division of Pomology of the United States Department of Agriculture to prepare a bulletin upon the subject of Pomology and the Experiment Stations, said bulletin to be issued before the next biennial session of this Society and form a basis for special papers and discussion at that meeting.

Respectfully submitted,

W. B. ALWOOD,
B. D. HALSTED,
F. M. HEXAMER.
Committee.

On motion of Mr. Kellogg, the report was adopted.

REPORT OF AUDITING COMMITTEE.

The Secretary announced that the Committee on Auditing the Treasurer's accounts had handed in a report. The box containg the Treasurer's vouchers having been stolen from his room at the hotel during his absence, the Committee reported the accounts apparently correct, deferring final report, upon request of the Treasurer, until duplicate vouchers could be secured for their inspection. Upon motion the preliminary report was adopted.

(The stolen vouchers not being returned, the Treasurer procured duplicates which were sent to the Chairman of the Auditing Committee, who after auditing them forwarded the following statement.—Secretary.)

Fayetteville, Ark., Oct. 30, 1899.

I hereby certify that I have examined duplicate vouchers for each of the credit items in the report of Treasurer L. R. Taft, and find them properly receipted and bearing the President's approval. The vouchers are accompanied with a cashier's certificate showing the sum of $636.93 on deposit as reported. (Signed.)

W. G. VINCENHELLER,
Chairman of Committee on Auditing the Treasurer's Report.

The Secretary in presenting the report of Mr. Frank A. Kimball, chairman of the Committee on Tropical and Sub-tropical Fruits, said:

The report is evidently a very complete and valuable one, covering the whole Florida and Gulf Region and the State of California. It seems to me that the Committee has set a good example for similar committees in the future. in view of the fact that according to the statement of the Chairman there is but one member of it who is not either disabled, sick or dead.

President Watrous: I think we may take the word of our Secretary in regard to the report; and, unless some one knows some reason to the contrary, it will be passed to the printer without reading.*

A paper on "Fruit Breeding in the Northwest," by Mr. C. G. Patten, of Charles City, Iowa, was read by the author.

BREEDING OF FRUITS FOR THE UPPER MISSISSIPPI VALLEY.

BY C. G. PATTEN, CHARLES CITY, IOWA.

Perhaps a brief outline of the area referred to, coupled with a few facts drawn from experience with forest trees, on and adjacent to this territory, are necessary to give the reader a clear understanding of its climatic conditions. With its eastern border resting on Lake Michigan, its western border on the Missouri River, and its southern and northern limits on the south line of Iowa, and the north line of Minnesota, the region, covers an area nearly six hundred miles in one dimension by seven hundred miles in the other. The eastern one-third of this, though somewhat broken into by prairies, is timber land. In the primitive forests within twenty-five miles to the west of Milwaukee and Sheboygan, the white beech grew into grandly towering trees two feet and more in diameter, with the bark almost as smooth as if

*The report will be found in full on pp. —— of this volume.—Secretary.

polished by artificial means. Seventy-five miles inland this tree can scarcely be induced to grow at all. Three hundred miles to the southwest in Iowa the writer tried to grow this Wisconsin white beech on what seemed a favorable soil and proper shelter, with the result that out of fifty trees planted, about twenty years ago, only one, and that not more than four feet high, remains.

The red cedar as developed in southern Illinois, will not live in central or northern Iowa; but the red cedar in some of its forms is indigenous over the great northwest. The red cedar of the Platte River in Nebraska, has taken on a constitution peculiar to its climatic environment and is only a partial success in Iowa. Black walnuts from southern Illinois seed will not endure the climate of northern Iowa; while the black walnut grows to an immense size along all the principal rivers of the State.

It may be well to State in this connection that in about one-third, the northwest portion of this area, the wild crab apple, *Pyrus coronaria*, is not found in any of its forms; while in the remainder of the territory it is found in great abundance. And when we add to the facts above stated, that the proportion of this region is exceedingly limited over which any variety of the apple of eastern origin is even fairly successful; and that the Concord grape cannot remain on the trellis during severe winters in more than one-tenth of this entire territory, the listener can catch a glimpse of the difficulties that beset the horticulturist, and the magnitude of the work that confronts the scientific experimenter.

That fruits will be adapted to this region there is not now room for doubt. We have reached a point in evolution and experience from which progress will be comparatively rapid. The Turner and Loudon red raspberries and the Older black cap have successfully withstood thirty-five to forty-five degrees below zero the past winter, and have borne good crops; the Turner originated at Jacksonville, Illinois; the Loudon at Janesville, Wisconsin, and the Older at Independence, Iowa.

Several of the improved varieties of the *Americana* plum seem to be at home over the entire territory, and the fact is a significant one that the central portion of this region has given to horticulture a larger number of valuable varieties of this species than all other portions of our country combined. We have made some little progress it is true, in the development of the apple, but it is a matter for sincere regret over the whole west and northwest, that we have done so little. It need not have been so, but sometimes there are extremists high in authority as well as elsewhere; and it so happened that unwise and unqualified recommendations have resulted in almost unqualified failure where large success should have been attained. Had the counsel of such men as your honorable president and our worthy pomologist prevailed we would not have wasted fifteen to twenty years over the assumption, that the apples, pears, plums and cherries of Northern Europe would suit our tastes, and meet the demands of our climate. Could we reasonably expect it? —when the *Domestica* plums originating in our own country are almost entire failures here, and pears likewise—the best of the morello cherries only half a success; and not a single variety of apples originating in the eastern states that can endure successfully our severest winters? Fifteen to eighteen years ago, the writer in several articles contributed to the "Iowa Homestead" pointed out the proper course to pursue in adapting fruits to the Great Valley of the Upper Mississippi, showing that the future successful orchards of this region would be the out-growth of seedlings produced from its own soil and climate.

Today the atmosphere is cleared; we have not a single plum or pear from Russia or elsewhere in Northern Europe that has any commercial value; not a cherry hardier, if as hardy, as the Early Richmond, and most of them shy and tardy bearers, and not a single apple out of the great number imported by the Department and the Iowa Agricultural College that is as well adapted and valuable as some already produced by ourselves.

The problem of adapting fruits to our climate is now almost exclusively one of breeding; selecting the best seed, from the best specimens, of the best plants or trees, from which to raise improved varieties in all parts of our territory; both by natural selection, and the highest skill known to the hybridizer. Without doubt, some varieties or seedlings will be found far better to select seed from for improvement than others.

The problem of breeding improved fruits is undoubtedly somewhat more intricate than that of improving animals. And yet there is a striking analogy in the power of individual animals and plants to transmit their qualities. The Concord grape is a good illustration of this fact. It is so cosmopolitan in its character, so nearly adapted to wide variations in soil and climate, that we would naturally expect it to become the parent of a valuable family of grapes. This grape is but little less conspicuous among fruits than the old Morgan horse among animals in its power to produce superior kinds. Seedlings of Whitney No. 20 crab are about as typical of the parent form of tree and appearance of leaf, as a like number of grafted trees of any variety; the seedlings are very hardy, fruit of an increased size, and following closely in season and in texture of flesh the parent apple.

The Brier Sweet, a seedling of the old Large Red Siberian and an undoubted hybrid with the Bailey Sweet apple, is so persistent in transmitting its upright form of tree and its color of bark and leaves, that its seedlings seem almost like a variety; with its general markings of fruit and texture of flesh. But a notable exception is seen in its hereditary power when the pollen of the Pound Sweet apple is used on it. In this cross the typical upright form of the Brier Sweet was completely broken up in ten out of eleven seedlings, and a long-limbed, and somewhat angular habit produced. But the Brier Sweet persisted in the general size and shading of leaves and color of bark, and I shall expect to see it in the coloring of fruit also.

The Wolf River when crossed on Brier Sweet gave quite as interesting results in tree, though of far different appearance; but a strong impress of the latter is left on a majority of the seedlings.

The Hamilton crab, a beautiful native wild apple found at Morning Sun, Iowa, when used as a pollenizer of the German Borsdorf apple, has given results in tree that are both noticeable and interesting to the horticulturist. In three instances there is scarcely a trace of the native left. The evolution of the apple in the northwest is proceeding along the following lines, either by chance or scientific means:

First, By crossing the American and Russian apples.

Second, By blending the best developed Siberian hybrids with the best adapted American and Russian sorts.

Third, Development of the pure American apples from hardiest varieties, or crosses in the same family as between Perry and Golden Russet, and Fameuse and some of its best seedlings.

Fourth, By hybridizing the native crab or wild apple with the best American sorts.

First, then, we cannot expect long keeping apples by crossing with the Russian type, because a high northern latitude with its short summers has fixed in the race the habit of early maturity; and when grown in our longer and hotter summers they mostly drop from the tree before their juices are perfected, and hence are low in quality. In very many cases they are also seriously subject to blight. This habit in the Russian apple of dropping so early, is a serious defect, and any attempt at a scientific development of the apple, that does not take into account the prime importance of working with varieties that hang well to the tree will fall far short of the demands of a prairie region. It is all the more important because our climate at times, and in some seasons is of such a rushing, hurrying nature, that it hastens maturity in cereals and fruits with great rapidity. For instance in the present season varieties of large dent corn growing from seven to ten feet high, are ripening in from ninety to one hundred days from planting. Just here the scientific experimenter has one of the greatest obstacles to overcome in the production of improved apples, pears and plums for this valley; for if our fruit will not hang on until it is fairly ripened, there is neither pleasure or profit in growing it; and the same cause that hastens the maturity of our grains and fruits, will leave its impress upon the generative forces of the fruit buds with which we are experimenting.

Secondly, the development of the Siberian apple is well under way and from one to three generations of crosses will undoubtedly produce apples of great value. Perhaps the Siberian and Russian cross will be best for the north and the American for the southern part of the territory. But as far as is now known, some of the hybrids with the American apples are fully as hardy. Peter M. Gideon has produced some valuable Siberian hybrids for experimental work, but being crossed with the Russian varieties we may expect early apples only; but accidental crosses with Golden Russet and other American apples have produced several early as well as better and longer keeping sorts, that add greatly to the list for scientific work. Several of them are of large size and hang so firmly to the tree that it requires a high wind to blow them off. In fact, the occasional appearance of Siberian varieties hanging firmly to the tree renders it of special value in the development of improved fruits for this climate. Besides this, their fruit buds are more hardy than that of any other apple with the possible exception of our native crabs.

Thirdly, the development of improved varieties from purely American sorts is both natural and highly practical for a large portion of this valley. It will no doubt, be a surprise to many to learn that with me, the Perry Russet, a tree representing one of the best and most distinct families of American apples has produced more hardy seedlings in proportion to the number grown than has the Oldenburg. Some of the seedlings of the Oldenburg are very hardy, but as a rule, its seedlings reproduce neither its hardiness or productiveness, and with rare exception its seedlings are of the color of the pollinating variety; foreshadowing its lack of individual force or its mongrel character. Another variety, the Malinda, so far as I am able to judge from seven to sixteen years' experience, has also produced fully as many hardy trees as the Oldenburg. It is a long-keeping American apple originating in Vermont; fruit hanging firmly to the tree. This tree is a fine example of the superiority of individual plants, over others for breeding purposes. Its seedlings follow with marked uniformity the general expression of the parent tree, though they are more vigorous and of far better habit; while its fruit

seems to be easily impressed with the pollinating sort. Another interesting peculiarity of this tree is, that while it is a tardy bearer its seedlings have thus far proven the earliest in bearing of the many varieties with which I have experimented.

Fourth, by hybridizing the native crab or wild apple with the best American sorts, or by development with pure seedlings. I am aware that in introducing this subject I am stepping upon uncertain ground, and shall present it from the standpoint of an observer and experimenter only. Mr. Peffer once informed the writer that there were two or three groves of native crabs on his land at Pewaukee, Wisconsin, that were so like the Soulard that he could not distinguish one from the other. Mr. D. B. Wier as quoted by Prof. Bailey in his "Evolution of Native Fruits," says: "That along the streams in Northern Illinois I have seen many wild crabs the superior of the Soulard in every characteristic." Mr. Wier had seen one, and had heard of two or three instances of these native crabs having bright red cheeks. The writer also saw one in an early day in the settlement of Iowa near his present home, with a distinctly bronzed cheek, and a group of them in Wisconsin in 1850, with fruit that was quite yellow with specks similar to the Swaar Apple—flesh exceedingly crisp and juicy, with much less acerbity than is common to the race—and almost transparent when fully ripe; these trees, fully twenty feet high, grew in an opening in the woods just off a small prairie in eastern Wisconsin. Some miles west of my present home, in the early settlement of the county, there was a grove of oblong apples of large size, flattened at the poles like the Grimes Golden, and the tree was unlike in form any that I had ever seen; the apples were of just such form as the Hamilton crab, which by the way, has nearly as much of a cultivated look as the Grimes Golden. The Mercer, brought to notice by Mr. N. K. Fluke, of Davenport, Iowa, is larger, I believe, than the Mathews crab that is figured by Prof. Bailey in his work just referred to. And your President, I understand, has the honor of presenting to the public one that is still larger than either of the above.

Mr. N. K. Fluke cross-fertilized the Mercer crab or native apple on a larger scale than any other one within my knowledge, using the Mercer and pollenizing it with the Baldwin and other well-known winter apples. He succeeded in growing more than one hundred hybrids. The writer has ten varieties of the best appearing ones, top-worked three years ago to test their hardiness and value. A very surprising thing about them is, that there is scarcely a trace of the native leaf apparent on any of them; the entire collection sent me seemed to have the native crab almost entirely eliminated, judged by the appearance of the trees on my own ground. Among my experiments I used the pollen of the Hamilton crab on the German Borsdorf, with the result that in three seedlings, the characteristics of the native crab leaf is entirely obliterated; and in one at least, the leaf and general appearance of the trees is far better than the Borsdorf. When using the Soulard as the pollinating variety the influence of the cultivated apple was not nearly so apparent. If the Soulard is a hybrid of *Pyrus Malus* it should have shown more evidence of it in its seedlings; the few seedlings that I have grown from it, at three different plantings, have generally been very inferior in tree and strongly resembles the common crab or *Pyrus coronaria*. Whatever it may be, whether a hybrid of either *Pyrus Ioensis* or *Pyrus coronaria* with *Pyrus Malus*, or pure *coronaria*. I have the second generation of its seedlings just coming into bearing; this tree is certainly an anomaly, being of an exceedingly upright growth, as much so as a Lombardy poplar, leaves

resembling both the common apple and the Siberian crab with an expression somewhat unlike either; the fruit gives evidence of being of good size, dark green in color, with that peculiar rounded form at the top of the fruit that is so characteristic of the Soulard crab, and has a slight trace of its acerbity left in it. It is yet too immature to be fully described. The appearance of this tree is so like the apple that is has suggested doubts about its being a hybrid; and it was with no little satisfaction that I discovered its true character in the apple, and in the indented markings of a few of its leaves that are so distinct a feature of our native crabs. I would not for a moment, think of discussing the carefully prepared digest of Prof. Bailey's on our "Native Apples." But I am well aware that skillful botanists have heretofore had occasion to revise their conclusions and I shall be greatly surprised if on farther investigation, we do not have a revision of this subject. When we take into account the processes of evolution for hundreds of years before the white man saw these prairies, and consider the natural domestication that has been going on by the red men dropping the seeds of the best around their camp-fires, and in the richest alluvial spots where these larger forms were likely to spring up and be perpetuated; and developed into different forms and varieties as we now see them; that the "saving clause" that was in the Professor's mind will perhaps become more emphatic; and that the beautiful fragrant flowered *Pyrus coronaria*, *Pyrus Ioensis* and *Pyrus Soulardii* and possibly *Pyrus angustifolia* really represent only one species in the great Mississippi Valley; and that latitude and longitude, humidity and aridity, widely varying soils and the environments of special locations, has created all this variety that we see; and will account for what seems to be two or three kinds of leaves on one species, and for the varying forms and sizes, and quality of fruit that is represented in the different kinds that have been discovered, and would also account for so many things that appear to be common to all these species.

Possibly it will be thought that it is quite as reasonable, not to accord specific rank to these large sized wild apples. What value is there in any of these apples? is the question of practical horticulture. Of one thing I am certain; if any valuable advance is made in them for the northern area of this valley, it must be by selecting the most hardy varieties. None other will give of their hardiness sufficient strength in a cross with our cultivated sorts to meet the extremes of this climate. No apple, that had its constitution fixed by the changing evolutions in the latitude and climate of St. Louis, can ever impart enough hardiness to endure successfully the rigors of our winters. And development along pure lines would also lack this necessary element of strength. The nativity of this species, the size of the largest varieties, their aroma, their long keeping character, and the tenacity with which they cling to the tree, are all qualities that recommend them to the experimenter. Their long keeping habit, and their endurance on the tree, commend them in a special manner to the scientific horticulturists of the prairie regions.

THE EXPANSIVE TREE PROTECTOR.

Mr. Willis H. Coon, of the Expansive Tree Protector Co., of Rochester, N. Y., was allotted five minutes in which to address the Society on the above mentioned subject. He exhibited and explained a device to protect trees and foliage from insects that come from the earth. He said it consisted of a felt band saturated with a chemical substance repellent to insects; the band being

fastened to a wire expanding spring by means of which it is adjusted, in the different sizes in which it is manufactured, to any tree, without interfering with the tree or injuring its bark. To the pad and spring is attached a metal apron, the under side of which is covered with a sticky substance inoculated with an insecticide that is sure death to all creeping things which infest a tree. He said the device had not yet been placed on the market, but would be very shortly.

The following paper was read by Prof. W. H. Ragan, of Greencastle, Ind.:

SUGGESTIONS ON CATALOGUE REVISION.

BY PROF. W. H. RAGAN, GREENCASTLE, INDIANA, CHAIRMAN OF COMMITTEE ON REVISION OF CATALOGUE.

Mr. President—I will take some liberties with the subject assigned me, on your program, by your worthy Secretary, and add a short report of my doings as Chairman of your Committee on Revision of Catalogue, and also make a few brief comparisons of the present catalogue, which has just been published as Bulletin No. 8, of the Division of Pomology, and its immediate predecessor, which was published in 1897 as Bulletin No. 6, of that Division.

I find, by this comparison, that Bulletin No. 8, embraces the names of 1,161 varieties of fruits and 62 of nuts. There are also, included in Section 3, or that portion of the Catalogue embracing "species of native and introduced fruits and nuts grown under cultivation in the open air," 159 species of fruits and 31 of nuts. Of this latter class many are already successfully domesticated and utilized as articles of human food, and all are hopeful species in the hands of the experimenter. Bulletin No. 6 embraces a total of 1,038 varieties of cultivated fruits and 69 of nuts. It also includes, in Section 3, 143 species of fruits and 30 of nuts.

It might seem difficult for your Chairman to prove that this increase of 123 varieties of fruits as given in Bulletin No. 8 is an improvement over its predecessor since brevity is generally considered meritorious in select lists of this character. But when the extent of territory covered is taken into consideration, together with the fact that this catalogue really represents nineteen distinct lists, and the pressure that is now being brought to bear on your committee, by interested if not in some instances by designing parties, to secure places for favorites on said lists, the Society will perhaps indulge the Committee in this slight expansion of its Catalogue of varieties. I will add, however, that many varieties have been stricken from the old lists as either valueless or unworthy, while quite a number may now be found listed which were not heretofore. I also find that while there is an aggregate increase in varieties, taking all the different species into consideration, there is an actual decrease in some of the leading fruits, as, for instance the pear list which consisted of 95 varieties in Bulletin 6, while in Bulletin 8 there are but 79.

I feel that I cannot do better, by way of report of my doings as your Chairman, than to offer you the following, which appears in an introduction to Bulletin No. 8.

"The Revised Catalogue of Fruits prepared under the joint auspices of the American Pomological Society and the Division of Pomology of the United States Department of Agriculture is herewith submitted.

"In making this revision the Chairman of the Committee on Revision has availed himself of the experience of his able predecessor, Hon. T. T. Lyon, and, through correspondence, of many practical pomologists. Many sources of information have been sought and repeated efforts have been made to secure accurate and conservative opinions on the merits of varieties and their adaptability to the several districts. But notwithstanding these efforts the Chairman of your Committee is aware that this revision is not without defects.

"The highest aim and desire of your Committee has been to present reliable data concerning the behavior of varieties in various sections of our country. If this desire has not been realized it has been largely due to the difficulties experienced in outlining districts sufficiently homogeneous in soil, climate, and other important features, and in securing responses to the numerous inquiries sent out to practical fruit growers. While these difficulties have been quite real, it is yet due the fruit growers to say that they as a class are very generous in giving out information gathered through their experience.

"Actuated by a desire to make the work as reliable as possible and therefore a safe guide to planters and others seeking such information, the work of this revision has been done in Washington, where easy access could be had to the library and records of the Division of Pomology as well as opportunity for frequent consultations with the Pomologist and his corps of assistants. All uncertainties of origin, nomenclature, etc., have been carefully investigated with a view to arriving at correct conclusions.

"The general plan of the Catalogue is based on that of its immediate predecessor, which was largely the work of that eminent pomologist, the former Chairman of your Committee on Revision, Hon. T. T. Lyon, of Michigan. The districts have been somewhat changed in boundaries and increased in numbers in order, if possible, to conform more closely to practical as well as scientific principles. The map has also been enlarged and the boundaries of the districts made more distinct.

"In view of the lack of knowledge on the part of any but a resident expert concerning the behavior of varieties and the true status of fruit growing in that section of our country bordering on the Pacific coast, Prof. E. J. Wickson, of the University of California, was appointed by the Pomologist to prepare that portion of the Catalogue which is embraced in Districts Nos. 15, 16, 17, 18 and 19, and this revision is based almost wholly on his report. The thanks of your committe are extended to Professor Wickson for his valuable services.

"The list of public spirited fruit growers generously contributing assistance is too large to attempt individual acknowledgment, but on behalf of the Society and its committee, I feel bound to refer especially to the invaluable aid of Colonel Brackett and his able assistant, Mr. William A. Taylor."

One of the greatest difficulties experienced in the discharge of my duties as your Chairman, has been in securing abundant and reliable data upon which to base the revision of the Catalogue. The plan pursued has been substantially that followed by my predecessors in the past: That is, in cooperation with the several State Chairmen and their sub-committees. But this plan would seem to have had its day, and especially now, that the Division of Pomology is so efficiently aiding the Society in the performance of this important work. It would now seem that we should have a broader plan, one that would come in touch with a larger number of practical fruit growers in the several states and districts of our country. To this end I

would suggest; that a special form of inquiry, concerning the behavior of varieties and their ratings by practical fruit growers quite generally, be sent out and answers secured from all such available sources. These, when compiled and tabulated for publication, by districts, would have a meaning of far greater value than if secured as now, from so limited a number of individuals. In other words, I should make this inquiry very general, so much so that answers would be secured from a large list of practical fruit growers. And I would have these answers to come direct to the Committee, or to its Chairman, and not through any secondary channel. These answers or reports on the behavior of varieties, when compiled and tabulated, by your Committee, would much more faithfully and accurately present the lists of varieties for each of the several districts, than can the present plan.

As to how these answers, or reports, are to be secured, I would recommend that a printed list of varieties, embracing all that may be well known and tested, of each species of fruits and nuts, with their descriptions, and blanks for new and unknown varieties, with franks for their return, after being filled out, be sent to fruit growers. These blanks, as above indicated, should embrace a pretty large list of names of varieties that are likely to receive the approval of fruit growers, who have tested them, to be followed by the usual descriptive columns and the abbreviated descriptions, subject to such changes as the persons reporting would indicate, and a column for his ratings of the particular variety. This column to be marked by him, in all instances, if the variety succeeds with him (the reporter), to be "indicated by an asterisk (*); if highly successful, by two asterisks (**); if considered promising, by a dagger (†); if tested and found undesirable, by a dash (—);" or if unknown or untested by him in his locality, by a dotted line (....).

With answers to this form of inquiry, we would secure exact and reliable data, from a practical standpoint that would be of great value to planters and others seeking such information, while the fact that the Catalogue revision was based on the far greater number of answers returned, would add still more value and importance to the work of the Committee and the Society.

These are the principal suggestions that your Chairman would offer as the result of his experience and observation while performing, to the best of his ability and in his peculiar way, the responsible duties you have assigned him, though there are many minor points that might be profitably discussed if time and space admitted.

And now, that the responsible duties which you have entrusted to me have been discharged (after a fashion, at least), and the time for which I was chosen, having expired, I return to you the trust, with many thanks for your high consideration and with the hope that in the future you may be able to secure the services of one better fitted by education and practical experience for the onerous duties of Chairman of the Committee on the Revision of Catalogue.

After a five minute recess the Session was resumed.

REPORT OF GENERAL FRUIT COMMITTEE.

Prof. L. R. Taft, Chairman of the General Fruit Committee, made a verbal statement from that Committee as follows:

The General Fruit Committee consists of about fifty-five members, one from each State, Territory and Province. I have been fortunate enough to receive from some forty-five of these quite elaborate reports that will be published in the Proceedings of the Society. Those forty-five include the reports of

practically all the fruit growing States. The only State of much importance that has failed to furnish a report is New York. I have reports from all of New England and from nearly all the Northern states. A few western states have for various reasons been unable to furnish a report, but they have promised to do so in a few days.

REPORT OF COMMITTEE ON MEMORIALS.

Mr. P. J. Berckmans, from the Committee on Memorials, presented and read the report of that Committee as follows:

The members of the American Pomological Society are called at every Biennial Session to record their grief at the departure of co-laborers in the science and art which this organization was established to perpetuate, and this Committee regret that the number of pioneers in Horticulture who have fallen since the last Session is unusually large. The Society has to mourn the death of three of the most prominent cultivators of the grape, who were loved and honored for their characters and labors.

George W. Campbell, Delaware, Ohio, for many years past the efficient Vice President from Ohio, and late the First Vice President of this Society; the introducer of the Delaware and unwearied improver of the grape, whose new and valuable varieties form a more appropriate and enduring monument to his memory than any testimonial that this Committee can indite;

Isidor Bush, Bushberg, Mo., whose exhaustive "Bushberg Catalogue" forms an equally appropriate monument to his memory;

Benjamin G. Smith, Cambridge, Mass., for many years the efficient Treasurer of the Society, whose zeal in the cultivation of the grape is evidenced by his exhibition before the Massachusetts Horticultural Society, on his eightieth birthday, of sixty varieties of native grapes grown by him;

Edmond H. Hart, Federal Point, Fla., esteemed and valued by his friends, has left a vacancy in the ranks of the pioneers in the improvement of citrus fruits in Florida, which will long be seen and felt;

Harrison Reed, Jacksonville, Fla., for four and a half years Governor of Florida, who also edited the "Semi Tropical Magazine," in which he labored earnestly to advance the pomological interests of his State;

William Parry, Parry, N. J., who will long be remembered for his efforts in the introduction of nut bearing trees of many kinds;

Frederick Smyth, Manchester, N. H., for many years State Vice President of the Society for New Hampshire, who was four times mayor of his city and twice Governor of his State, holding many important public positions, among them that of Commissioner from the United States to the Paris Exposition of 1878;

A. A. Crozier, Ann Arbor, Mich., Secretary of this Society from 1887 to 1891, and author of numerous valuable contributions to horticultural literature;

George S. Conover, Geneva, N. Y., A. M. Lawver, San Francisco, California, introducer of the Lawyer apple; J. M. Samuels, Clinton, Ky., Superintendent of Horticulture at the Columbian Exposition, and R. Maitre, New Orleans, La., deserve the respect of their co-laborers in this Society for their faithful efforts to promote its objects.

For the loss of all these associates the members of the Society express their sorrow and sincere sympathy with those nearer and dearer to them, who

survive to mourn their loss and to cherish the memory of these worthies as a precious possession.

Respectfully submitted,

P. J. BERCKMANS,
ROBERT MANNING,
THOMAS MEEHAN,
J. VAN LINDLEY,
W. H. RAGAN,
Committee.

The Committee's report was adopted by a rising vote.

A paper on "The Improvement of American Grapes," prepared by Prof. S. A. Beach, of the New York State Agricultural Experiment Station, Geneva, N. Y., was submitted by its author, who suggested that, on account of the heat and the length of the session, the reading of the paper be dispensed with, as the paper could be read in the published proceedings.

A motion by Prof. Beach to the above effect was agreed to.

THE IMPROVEMENT OF THE AMERICAN GRAPES.

BY PROF. S. A. BEACH, N. Y. STATE EXPERIMENT STATION, GENEVA, N. Y.

The cultivation of American varieties of the grape, either for table use or for wine, is distinctively an American industry. American grape growers need fear no competition in this line. They have the whole field to themselves. Their fruit finds no market outside of America because the foreigners prefer other grapes. Even in those portions of this continent where varieties of the old world species, the *vinifera*, can readily be grown, the American varieties meet with little demand. Professor Wickson says that except for the production of resistant roots on which to graft *vinifera* varieties, the nursery trade in California in American vines, is almost infinitestimal. Probably less than one-tenth of one per cent of the vine acreage of California is devoted to American vines grown for fruit. A very few are grown for home use and for a very uncertain market demand. It is not a question of the ill adaptation of these grapes to local conditions, he says, but simply the fact that *vinifera* varieties are preferred for all purposes.

BETTER MARKET GRAPES NEEDED.

This may be an unwelcome truth to those who are interested in the native grapes, but being the truth it is best that it be frankly admitted. Two or more decades ago when the interest in the progress of American grape culture was running high and much excitement still attended the introduction of new varieties, the statement before this Society that such fruit as that of Delaware or Iona, or the best of the American hybrids, is inferior for dessert purposes to *vinifera* grapes, doubtless would have been called heresy and aroused vigorous opposition. Although some of these varieties have now been in cultivation thirty, forty and even fifty years, yet at the present time none but Americans eat American grapes. It is folly to expect to further the advancement of viticulture by closing the eyes to facts which are ap-

parent to unprejudiced observers. A taste for peculiar flavors and qualities in fruits, as in other articles of diet, is frequently developed by cultivation, and often unconsciously. It is not surprising that those who have been accustomed to American grapes from childhood should really prefer them to *vinifera* sorts. It must be admitted, however, that the outside world in general prefers the latter. The Californians turn from the American to the European varieties where both are to be had. The efforts which have been made to find a market for American grapes on the other side of the Atlantic have thus far failed. These facts have an important bearing on the development of viticulture and its associated industries in that vast region where only American vines succeed, a region extending from Canada to Mexico and from the Atlantic to the Rocky Mountains. Within its limits the vine acreage is now determined by the demand for the fruit for home consumption, and it must continue to be so until American varieties are sufficiently improved to make them acceptable in foreign markets.

THE DEVELOPMENT OF GRAPE CULTURE IN EASTERN AMERICA.

From the earliest settlement of the country grape growing has from time to time received some attention. Along the coast from Massachusetts to Florida and at various interior locations, many efforts have been made to grow *vinifera* varieties. None of these have thus far been permanently successful. Early in the present century two varieties of native grapes of the *Labrusca* species having fruit of purer flavor and better quality than the typical *Labruscas*, were found as chance seedlings and introduced into cultivation. These proved so desirable that they gradually became widely disseminated, and both of them are still handled by nurserymen and grown to some extent in commercial vineyards. One, the Catawba, is said to have been found wild in the woods of Western North Carolina. The other, the Isabella, is said to have originated in South Carolina. At the time this Society was organized, fifty years ago, these two grapes were the leading cultivated American varieties.

AMERICAN VITICULTURE FIFTY YEARS AGO.

The principal vineyards of the country at that time were near Cincinnati, Ohio. These were planted chiefly to Catawba. They comprised several hundred acres. A small acreage in the vicinity of New York and Philadelphia was devoted mostly to furnishing table grapes for those cities. There were practically no vineyards along the Hudson River. In the interior lake region of Western New York grape culture had not yet spread beyond the boundaries of the gardens. In most of the markets of the country American grapes were rarely seen, and the *vinifera* kinds, being either imported or grown under glass, were a luxury beyond the reach of the common people. Although many native grapes had from time to time been cultivated in a limited way, the list of really desirable kinds, especially for the north, was very small. In many places Catawba could not be ripened, and even as late as 1854, Hovey in the Magazine of Horticulture, said of the Isabella, "From its introduction in 1819 to the present time it has been the only variety, with the exception of the Diana, worth growing in the northern and eastern states." The Diana, it will be remembered, was introduced about 1843.

ORIGIN OF THE CONCORD GRAPE.

Towards the close of the first half of the century interest in the improvement of American grapes became especially active in New England. Work in this direction was undertaken by various persons and encouraging results soon followed. The most notable success was obtained by E. W. Bull of Concord, Mass. Finding that even Isabella did not always ripen early enough in his garden to perfect its fruit, he endeavored to raise an earlier variety. A chance seedling of the *Labrusca* species which came up on his place he transplanted to a trellis by the side of a Catawba vine. It proved to be a very early variety, ripening in August; but the fruit did not hang well to the clusters, and for other reasons the vine was not worthy of cultivation. Nevertheless because it was sweet, good in quality and had the very desirable characteristic of earliness in ripening, Mr. Bull decided to grow seedlings from it. The best one of the seedlings which he thus obtained is today the most widely cultivated of American grapes. It is a significant fact that this, the Concord, was produced by one of the very earliest efforts to improve the native grape by breeding from purely American vines. It will be remembered that Isabella and Catawba are chance seedlings. At one time Mr. Bull was growing over two thousand seedlings, but all things considered none of his seedlings has proved equal to the Concord, although some of them are still cultivated.

INFLUENCE OF CONCORD AND DELAWARE ON AMERICAN VITICULTURE.

About the time that the Concord made its appearance the Delaware was brought to notice. The introduction of these two hardy and early ripening grapes, whose merits and defects are too well known to need discussion here, gave a wonderful stimulus to the interest in viticulture. It really inaugurated a new era in American grape growing. Vineyard planting rapidly extended, especially in localities naturally suited to the vine which also had good facilities for transporting the fruit to market, for it was found to be much more profitable to grow grapes for table use than for wine.

As an illustration of the prices at which the new varieties were then introduced it may be said that Concord vines at first sold at $5 each. A nursery firm in Geneva, N. Y., lost 10,000 rooted one-eye cuttings of the then new Israella and Iona by the burning of some propagating houses. Since these vines would have met ready sale at $1 each, by their destruction the firm lost $10,000. In one instance a little box of grape vines which a man could carry, was forwarded C. O. D., and the express company collected for it and returned the sum of $1,425. Under such circumstances it is not strange that new varieties were being constantly introduced. For thirty years at least interest in the improvement of the American grape was well sustained, as the records of this and other similar societies plainly show.

THE INTRODUCTION OF VINIFERA HYBRIDS.

The hybridizing of American vines with *vinifera* sorts received much attention. It was hoped by this means to combine the hardiness of the one with the desirable fruit of the other. Allen and Rogers were among the first to obtain good results. The first authentic hybrid between the two species mentioned was Allen's hybrid between Golden Chasselas and Isabella, which

was first exhibited in 1854. Many others took up this line of work, and within less than a quarter of a century scores of new hybrids, descended in part from the *vinifera* species, were disseminated among American grape growers. These, together with the varieties belonging to purely native species which have been named and introduced into cultivation within the last fifty years now number several hundred, while the number of seedlings which have been discarded as unworthy of cultivation has, during the same period, reached far into the thousands.

DECLINE OF THE INTEREST IN THE IMPROVEMENT OF THE GRAPE.

For many years well located vineyards were very profitable. Finally there came a period of depression. The price which the grower received for his grapes dropped from fifteen or more cents per pound to twelve cents, then to ten cents, then to eight cents and in succeeding years gradually lower and lower. In some of the prominent vineyard sections of New York the growers now feel well satisfied if they receive on the average two cents per pound for their fruit. Grapes are now grown on as narrow a margin of profit as the ordinary staple farm products. There are no prospects that the high prices of former years will ever be regained. Grapes are now so cheap that they are freely used by the common people throughout the country, and will doubtless remain so. The following incident illustrates the way in which, under modern methods of transportation, the grapes of one locality may be placed upon the markets in a distant part of the country and be retailed there at low prices.

A gentleman reports that in September, 1894, when he left the Chautauqua grape belt for a western trip the Chautauqua growers were receiving for their grapes by the car load, eleven cents per eight-pound basket, above commission and freight charges. The next day he found the same class of grapes retailing on the street corners of Chicago at fifteen cents, the dealer claiming that he made a profit of but one-half cent per basket. At St. Paul, Minn., he found the same kind of grapes retailing in stores at eighteen cents. At Fargo, N. D., they were twenty-five cents, and in little railroad towns in extreme parts of the State they were retailing at thirty-five cents per basket.

In consequence of the low prices at which grapes are now selling commercial vineyards are becoming more and more centered in favored localities, and are being extended in but few places. In many localities the vine acreage is even less than it was ten years ago.

The markets do not show sufficient discrimination to encourage the planting of grapes of superior quality, so that vineyardists are growing the more productive sorts of a lower grade, and many of the varieties of best quality are gradually disappearing from vineyard culture and from the nurserymen's lists.

LEADING VINEYARD VARIETIES.

It will be instructive to inquire here what kinds are persisting in vineyard cultivation. This may give some suggestions as to the direction in which to look for the further permanent improvement of commercial sorts. I have endeavored to learn what varieties are now grown most extensively in commercial vineyards, or for home use in sections where there are no commercial vineyards. I desire here to acknowledge my indebtedness to the station horticulturists, the nurserymen and the vineyardists who have with uniform

courtesy replied to my inquiries on this subject. Responses have been received from several localities in each of the states and territories, with but few exceptions, and from various parts of Canada. Correspondents were asked to rank the most important variety in their region at 100 and other varieties on a corresponding basis. The tabulation of these results cannot, of course, show the relative commercial importance of the varieties reported on, because the vineyard area of the different sections is not known; but surely it will give some approximate idea of their relative rank and the extent of their distribution, taking into consideration all sections of the country where grapes can be grown, exclusive of the regions where the *vinifera* varieties succeed. The following list shows the relative rank of the principal varieties which were reported on, the rank being determined by averaging the above mentioned reports.

LEADING GRAPES RANKED ACCORDING TO THE EXTENT OF THEIR DISTRIBUTION AND THEIR IMPORTANCE IN THE REGIONS FROM WHICH REPORTS WERE RECEIVED.

100.0, Concord.
35.4, Niagara.
32.3, Moore *Early*.
29.5, Worden.
13.3, Delaware.
12.9, Brighton.
9.8, Ives.
8.9, Diamond.
8.4, Lindley.
6.5, Pocklington.
6.3, Martha.
6.3, Salem.
6.1, Catawba.
5.8, Agawam.
5.7, Vergennes.
4.7, Norton *Virginia*.
3.4, Wyoming.
3.3, Hartford.
3.3, Winchell (Green Mountain).
3.2, Lutie.
3.1, Janesville.
3.0, Wilder.
2.4, Campbell.
2.4, Perkins.
2.1, Champion.
1.8, Isabella.
1.3, Bacchus.
0.9, Elvira.

The Herbemont and Lenoir are important wine grapes in some sections of the south. The Scuppernong and some other varieties of the southern muscadine grapes, are frequently mentioned in reports from southern states as being desirable varieties for home use.

Since Concord stands pre-eminent in the above list it is ranked at 100. Next in order, but far below it in importance, come Niagara, Moore Early and Worden. These each stand at about 30. Next come Delaware and Brighton, ranking about 12 each, Ives at 10, Diamond 9, Lindley 8 and below these a long list of varieties of less general importance.

The origin of Concord has already been noticed. Neither the variety itself nor its pure seedlings give evidence of anything but *Labrusca* ancestry. It is simply as improved type of the northern *Labrusca* grape. The three varieties which rank next to it in importance, Niagara, Moore Early and Worden, are Concord seedlings, as also are Brighton, Diamond, Pocklington and Martha. Prominent among the grapes of recent introduction are the Campbell, Hicks, McPike and Charlton, and these all have Concord blood. If the Concord and its progeny were swept away what a vacancy it would leave in American vineyards. We little realize the benefits which Ephraim Bull conferred on American viticulture when he originated the Concord grape. According to the figures given above, the important varieties in general cultivation outside of Concord and its seedlings, rank in the order named below: Delaware, Ives, Lindley, Salem, Catawba, Agawam and others.

VINIFERA HYBRIDS.

About the time the Concord was introduced, as has already been observed, the hybridizing of American with *vinifera* grapes was undertaken. The work was prosecuted with much zeal. It was then freely prophesied that it would soon result in producing hardy American vines with fruit rivaling that of *vinifera* varieties. Some of the kinds which were thus originated do bear fruit of great excellence, but we now know that *vinifera* parents have invariably given to their American hybrids, so far as these have been thoroughly tested, some one or more serious defects or weaknesses. Up to the present time none of the first or primary hybrids between *vinifera* and any of the American species has gained a leading place commercially in any grape growing section of this country. Some might claim that the Delaware is an exception to this statement, but who can tell the parentage of the Delaware? It is by no means certain that it is a primary hybrid between *vinifera* and an American species. Indeed some hold that it is purely American in its origin.

As has already been shown, none of the primary hybrids with *vinifera* have become leading sorts in commercial vineyards. Consider now their descendants. The two grapes of this latter class which are most widely grown are Niagara and Brighton. The parentage of Niagara is Concord crossed with Cassidy. The variety has the appearance of a pure *Labrusca*, but as I have shown by growing pure seedlings of it, it has some *vinifera* blood. This fact affords a satisfactory explanation for one of its defects, namely, a somewhat tender root. It is well known that Niagara suffers more than Concord from root injury in severe winters.

The parents of Brighton are Concord and a hybrid between Concord and *vinifera*. Brighton has a good degree of hardiness, though not equal in this respect to the Niagara. It is vigorous and often very productive, but it is almost completely self-sterile, so that it needs to be planted near some variety which blooms at the same time. Without mentioning the particular weakness or fault of each one, for these will come to mind as their names are called, it is sufficient to name as further representatives of this class among the older varieties, Croton, Elorado, Geneva, Lady Washington and Oneida. In fact, so far as I know, among this class of hybrids there are no varieties which have been tested for fifteen years that do not show that the infusion of *vinifera* blood has brought with it undesirable characteristics and sometimes as in the case of Niagara, without bestowing any compensating advantage.

It is not the purpose of this paper to attempt to point out the particular individuals which appear to be desirable parents for use in breeding grapes for special purposes, but rather to consider certain phases of the subject of general interest. It may be said, therefore, that should one choose to use even the *vinifera* hybrids in attempting to improve the type of American grapes, the facts which have been presented show that it is extremely important to make the selection of the parents only after thorough acquaintance with the individuals, and to use great discretion in the combinations which are made.

The primary *vinifera* hybrids have uniformly been deficient in one or more of the following essentials of a good commercial grape, namely, in vigor, health of foliage, hardiness of root or vine, self-fertility, constitution or reliable productiveness from year to year. In view of such records it is not

surprising that in this country nothing is now being done in the direct hybridization of *vinifera* with any of the American species. However, new varieties are constantly appearing which are known to be descended either wholly or in part from some *vinifera* hybrid, or which are chance seedlings resembling known *vinifera* hybrids in certain well marked characteristics. Time is needed to demonstrate whether satisfactory progress may be made more rapidly by breeding this class of plants rather than by giving attention wholly to plants having no *vinifera* blood. Granting that their good qualities may be maintained and the undesirable features eventually bred out, it may still be considered an open question whether it would not be better to hold strictly to vines of purely American origin. Indeed there are strong reasons for thinking that permanent advance may be made more rapidly by breeding only from grapes of purely American origin, thus avoiding altogether the weaknesses which are inherent in the exotic *vinifera*. While we may not thus succeed in producing a grape combining with the size of the Concord the beauty and high quality of the Delaware, yet by following such a course we shall bring nearer to perfection the peculiar types of grapes which grow naturally in this country, and by ameliorating their harsher features and developing their good qualities, eventually produce fruit which shall be acceptable in the markets of the world, distinct in type from the grapes now found in foreign markets and which shall be produced as cheaply as the Concord. As the improvement of the grape progresses, the varieties which survive the process of selection will naturally be those which are best adapted to the local environment and the market demands. In this way the different grape regions will doubtless develop quite different types of fruit each having its peculiar merits. It is not at all probable that any other variety will ever hold the unique position of superiority over so great an extent of territory as the Concord now does. In its place will be various types, each superior to Concord in fruit and each taking the lead for commercial purposes in a comparatively limited area to which it is specially adapted.

CULTIVATED NATIVE SPECIES.

Several native species are represented in cultivation at the present time and still further accessions to the list will be made in the future.

From Virginia southward varieties of the southern muscadine grape, such as Scuppernong and Thomas, are more and more coming into general cultivation for wine making and home use.

The Post Oak grape, *V. aestivalis*, var. *Linsecomii*, Bailey, is the parent of very promising varieties specially adapted to the southwest. Some of them also appear to be well adapted to the north.

From Virginia and Missouri southward the types represented by Norton, Virginia and Herbemont find favor in many localities, especially for wine.

By far the most important species horticulturally is the *Labrusca*, the northern type being represented in cultivation by Concord and the southern type by Catawba.

The Riverbank grape of the north *V. vulpina L.* (*riparia Mx.*) has not yet given important table grapes, but some of its varieties are esteemed for wine. Clinton, Elvira and Empire State are descended wholly or in part from this species. The range of this species extends northward into Canada, Minnesota and North Dakota. Professor Hansen informs me that the Janesville, a hybrid between *riparia* and *Labrusca* has proved hardy in Dakota, where

pure *Labrusca* varieties like Concord and Worden winter-kill. It is probable that from *vulpina* or its hybrids there will be eventually produced a type of fruit sufficiently hardy to extend the cultivation of the grape, for home use at least, considerably beyond its present northern limits.

American grapes have practically been under regular vineyard cultivation for but little more than a half century. The *vinifera* grapes have been brought to their present high standard through thousands of years of cultivation. Vineyards of them have been grown in the Old World from time immemorial. The American species which have given rise to so many varieties of great merit in the brief period in which they have been under cultivation, will surely add varieties of universally acknowledged excellence to the future lists of cultivated grapes. We firmly believe that the improvement of American grapes will continue till the fruit of our vineyards finds sale in foreign markets. Thus the field of American viticulture will be broadened and the industry given increasing stability and prosperity. The next fifty years should witness more rapid improvement than has been seen in the last fifty years. Greater success than now seems possible may crown well directed persistent effort.

Work in the direction of improving the types of American grapes may well accompany the variety testing, which is being conducted at many of the agricultural colleges and experiment stations of the country. Students may easily be led to take an interest in it, and by their labors hasten its progress. More rapid advance may doubtless be made by continued systematic effort looking toward some definite result. Too much of the work that has been done in the past has been unsystematic and unscientific. It has been entered upon with vague notions as to what results were desired and if some indefinitely anticipated good variety has not come like a lottery prize with the first batch of seedlings, the work has often times been dropped. In but few instances has there been anything done which may properly be dignified by the name of grape breeding. How often has effort been well directed toward a certain end, for more than two generations of vines? Where grapes have been bred with a definite purpose in view encouraging results have been attained, notably in the work of Bull, Munson, Campbell, Hoag, Ricketts, Moore and a few others.

In closing I desire to call attention to the great service which those who are interested in the improvement of the grape may render to the cause by publishing the results of work in this line so that the records will be accessible to other workers. These records should be sufficiently complete to set forth the general type of the seedlings which come from any known parent or combination of parents. They should show the undesirable parents and uncongenial unions as well as those which give desirable results.

The published records which throw light on this subject are still very meagre and each worker is compelled to depend largely upon personal experience and observation for the knowledge which he needs in order to work to advantage in any definite line. The members of this and other kindred organizations, the horticulturists of the colleges and experiment stations, and those who are associated with the horticultural press or who contribute to horticultural literature may do much towards securing the publication of data of this kind which would be of great value to American viticulture. Not until more definite information is accessible concerning the pedigree of cultivated varieties and the characters which particular parents

may be expected to transmit to their offspring can grape breeding be put upon anything like a satisfactory basis.

The following paper was read by the author, Mr. G. L. Taber:

FRUIT NOTES FROM FLORIDA.

BY G. L. TABER, GLEN ST. MARY, FLA.

Mr. President, Members of the American Pomological Society, Ladies and Gentlemen:

Fruit notes, this year, from the South, as from other sections, are almost inseparably connected with freeze notes; and if this brief paper from Florida has as much to do with freezes as fruits, it will perhaps, under the abnormal conditions that have prevailed, be pardonable.

For, as some of you may have personally experienced, and the rest have doubtless read, we had some weather down our way last February the like of which the "oldest inhabitant" had never seen, and, in common with fruit growers of a younger generation, hopes never to see again, and for three days the orange and other subtropical trees throughout a large section of Florida stood white-robed, stiff and stark, an apt, although isothermally incongruous reminder of the "sheeted ghosts" in Whittier's "Snow Bound."

Then, when the first great shock was over, and nature, in a kindlier mood, had freed the trees from their unwonted load of snow and ice, came the days of suspense; of eager and yet fearful watching, to see what the final outcome was to be. We saw the leaf stems shrivel and the leaves lose their lustre, and day by day assume a lighter color, and we knew the foliage was gone. But what of the trees themselves? Would they survive? Would the orange trees that were not banked go to the ground, and, where banked, would they stop at the banking? We cut through outer bark on twig and branch and trunk, examined the inner bark and cambium layer, and applied all known tests of sight and smell and taste, and were finally forced to accept the fact that the tops were also gone. Then came the question whether to cut the trees off at a given point at or near the ground before the sap should by "souring" carry the dividing line between sound and affected wood lower down, or whether it were better to let the trees shift for themselves until this line of demarkation, as yet but imaginary, became fully apparent. Some of us followed the one course and some the other, and of those who cut the tops off before this line of demarcation was fully established, many were for awhile still left in doubt as to whether the stumps they had left represented in reality the foundation for a future orchard or only the headstones for their buried hopes.

Now I would not for a moment have it understood that all sections of Florida suffered alike. On the contrary, as is but natural, the southern counties suffered less than the northern ones, and there are in some of those southern counties groves that were practically unhurt; from which good crops of fruit will be shipped the present season. While this is true, yet the fact remains that the freeze covered a very large proportion of the state, and the losses to the fruitgrowers were extremely heavy.

My own grove is situated in the northern part of the state, thirty miles west of Jacksonville, near the Georgia line. Here the thermometer went to eight above zero, which was six degrees colder than had previously occurred in the seventeen years that I have lived in the same locality. And, with your permission, I will refer briefly to my own experiences under these extreme conditions. And in the first place I will say that few people outside of those actively engaged in the culture of citrous fruits—and even not all of those—have a proper conception of the tenacity of life of the roots of a well established orange tree. The tops may be repeatedly frozen back to the ground, and the trees, deemed worthless, abandoned to shift for themselves, and yet they will sprout up from the crown, or, if the crown is killed, from the crown roots, and these sprouts can by proper attention again be transformed into vigorous bearing trees.

In the severe freezes that we experienced during the winter of 1894-1895, at that time the most severe that had occurred in sixty years, there were, amongst other trees that I had frozen to the ground, several large sweet seedling orange trees that were located on an uncultivated portion of my grounds.

These trees, with the exception of being sawed off to the ground, received no attention during the year following the freeze, and they were considered dead beyond redemption. They showed no sign of a sprout from the roots for a full year; but after lying dormant for fourteen months, threw up shoots which grew off vigorously, and, apparently, as healthily, as if no freeze had ever occurred.

The fact that the roots of the orange trees are so tenacious of life, leaves the main consideration, as far as freezes are concerned, to be given to the tops, for of course, without bearing tops, present or prospective, the roots are valueless. One very simple precaution against total loss of the budded portion of the trunk, and an added safeguard even to that portion of the tree extending above the mound, is to bank the trees with earth, piled cone-shaped, around the trunk, in the early winter, and let this mound of earth remain until after danger of freezes is over in the spring. It is generally completely effective as high up as the mound extends, and, as above indicated, often higher; for, by protecting this lower portion of the trunk from the cold we are also protecting it from the direct rays of the morning sun, and a severe cold spell followed by clear weather, and sunshine, is the worst possible combination on the unguarded trunk of an orange tree.

In different sections throughout the state many experiments have been and are being made with artificial heat, permanent and removable coverings, etc., all having in view the control of temperature during the short, dangerously cold snaps that visit us at irregular intervals; sometimes once or twice during the winter, and sometimes but once in a period of several years, but which, whether frequent or infrequent, accomplish much damage when they do occur.

On the night of the eighth of February last I had wood fires burning at distances of fifteen to sixty feet apart over about twenty-five acres of orange groves and nurseries. These were mostly small fires, arrangement for the quick lighting of which had of course been made in advance. These small fires were supplemented by larger fires on the north and west, the direction from which the wind almost invariably comes during our dangerously cold spells. The result obtained from these fires was at the time considered

highly gratifying, as we saved all tender new growth and blossom buds, although the temperature outside of the influence of those fires was twenty-six above zero, with a very heavy frost, and ground frozen. On the night of the twelfth of February, four days later, we undertook to repeat this gratifying success, but were confronted with conditions that again demonstrated the truth of the proposition that "The best laid plans of mice and men gang aft aglae." We had planned for a "right smart" cold spell, but not for a full-fledged New England winter.

In view of the fact, however, that no such severe freeze had been experienced in Florida since 1835, it is probable that few of us now living will ever see another of equal severity. Many of us, even in northern Florida, have not yet lost faith in orange growing, and that I have not done so is evidenced by the fact that I have planted out several acres of additional grove since the February freeze. I admit, however, that to have to wait several days for snow to melt and ground to thaw out in order to dig holes to plant orange trees, as was the case in the present instance, is a little trying to one's nerves.

To take up all of the fruits that Florida produces and report on them at length, is outside of the province of this paper. It would necessitate treating of the state by sections and of the fruits by varieties, and would in any event belong more properly to the Florida branch of the General Fruit Committee. Suffice to say, therefore, that in some portions of the state many of the so called hardy fruits were injured either in tree or bud, while of those that are listed under the "tropical" section of this Society's Catalogue, many of them suffered from contact with weather which was anything but tropical.

In conclusion, I would say that many of us old residents still expect to live long enough to see a return of old-time Florida weather, and, if there is any dependence to be placed in the law of averages, this should soon put in an appearance—and last a long time.

When Nature, relenting of her recent escapades, has worked assiduously for a few years in her endeavor to obliterate the scars, we shall hope to have this society do us the honor to meet with us again in Florida. We trust the time will be short until we can, with confidence, invite you to a renewal of the pleasant acquaintances you formed in 1889 with our state, our people, our fruits and our *climate*.

GENERAL BUSINESS.

INVITATIONS FOR NEXT MEETING.

The Secretary, upon the suggestion of the Chair, gave a summary of communications received from the following named cities, inviting the society to hold its next meeting therein:

Denver, Col.: From Mrs. Martha A. Shute, Secretary of the Colorado State Board of Horticulture, suggesting Denver as a "convention city located in a climate particularly adapted to the raising of fruit which is the finest in the world."

Detroit, Mich.: From the Detroit Convention and Business Men's League, endorsed by Mayor William C. Maybury of Detroit and Governor Hazen S. Pingree of Michigan.

Grand Rapids, Mich.: From the Michigan State Horticultural Society, the Michigan State Agricultural Society, the Grand River Valley Horticultural Society, and the Grand Rapids Board of Trade.

Milwaukee, Wisconsin: From the Citizen's Business League.

Cleveland, Ohio: From the Cleveland Business Men's Convention League.

Cincinnati, Ohio: From the Cincinnati League, endorsed by Mayor Gustav Tafel of Cincinnati.

Buffalo, N. Y.: From the Bureau of Finance and Industries of the Merchants' Exchange, an earnest invitation for 1901, during the Pan-American Exposition.

Niagara Falls, N. Y.: From Mayor A. S. Hastings of the City of Niagara Falls, endorsed by the Commission of the New York State Reservation.

Saratoga Springs, N. Y.: From the Saratoga Convention Bureau.

An additional invitation (verbal at the present meeting) from the Massachusetts Horticultural Society, through Mr. Wm. C. Strong, to meet at Boston.

Mr. J. C. Evans of the Missouri State Horticultural Society extended an invitation from Kansas City, Mo. He remarked that more acres of first-class fruit land were to be seen there than anywhere else in the country.

Mr. Wm. H. Barnes of Kansas, seconded the invitation.

Mr. Evans moved to refer the matter of the time and place of the next meeting to the Executive Committee.

Mr. Howard A. Chase, in seconding the motion, urged the choice of Buffalo. He said that two years hence, on account of the Pan-American Exposition, that city would be a center of attraction to which there would be cheap transportation facilities.

The motion was carried.

On motion of Dr. Hexamer, it was ordered that the evening session be held at 8 o'clock p. m., at Wissahickon Inn, and the Society adjourned.

FRIDAY EVENING SESSION.

September 8, 1899.

The final meeting was called to order in the spacious parlor at Wissahickon Inn, shortly after 8 o'clock p. m.

GENERAL BUSINESS.

The Secretary called attention to the fact that the library of the Pennsylvania Horticultural Society lacked the Volumes of Proceedings of the American Pomological Society subsequent to 1883, needed to complete its set, and suggested that the Treasurer be authorized to furnish the Pennsylvania Society with the missing volumes.

On motion of Prof. John Craig, it was ordered that the reports be furnished.

AMENDMENT OF CONSTITUTION.

Attention was called by the Secretary to the necessity of a change in the wording of Section 8 of the By-Laws, requiring the appointment by the President, immediately after his election, of "a standing committee on native fruits, consisting of eleven members," (* * *) "to report biennially on native fruits," etc. He said: The point of uncertainty is the meaning of the word "native;" as here used. One member who was appointed on the committee very naturally interpreted it to mean "indigenous" and declined to serve, on the ground that in his section of the country (California) little attention was paid to "native" fruits. A verbal change is necessary to make the By-laws conform to our present use of these terms. When the Constitution was framed there were so few indigenous fruits in cultivation that "native" meant simply that the thing was of seedling origin in this country, regardless of its specific origin; but now we use the word "native" solely to designate varieties of our indigenous species. I therefore move to amend Section 8 of the By-laws by striking out, wherever they occur, the words "native fruits" and substituting in lieu thereof the words "new fruits of American origin."

The motion was carried without objection, and the amendment ordered to be made.

FRUIT SCHEDULES IN CENSUS OF 1900.

The Secretary called attention to the fact that the fruit schedules for the Census of 1900 would soon be prepared, and urged the importance of securing fuller information in respect to the acreage, yield and value of product of the common orchard fruits in the several states that have been secured in former censuses.

These schedules are in preparation, and proofs of them will be submitted for criticism within the next few days. They will furnish the basis of enumeration for the general census, independently of the special investigations that may be made on special topics. Mr. L. G. Powers of Minnesota, in charge of Agriculture (including Horticulture) for the Census, has recently consulted several times with the Division of Pomology in regard to what should be included in the fruit schedules of the census. I think he is willing to do for fruit culture all that he can without encroaching upon other lines of agricultural investigation which he considers of more importance; perhaps an expression of the desire of this Society in the matter would serve to strengthen the standing of commercial fruit culture in the census. The fruit schedule is being framed upon the lines of that in the census of 1890, which covered the common orchard fruits under the following heads: "Acreage," "Crop of 1889." "Bushels sold in 1889," "Number of bearing trees," "Number of young trees not bearing." Those five items are duplicated for apples, apricots, plums, cherries and pears. "Other orchard fruits" are put in one column and no value of product is given until you get the value of "all orchard products." So that, while you can determine by computation the average yield per tree of the bearing trees, you cannot from the census figures determine the yield per acre nor get any idea of the value per bushel of the several fruits, the only statement of value being the summing up of "all orchard products." We feel the need of more exact statistics on value and yield per acre of the several fruits in the several commercial fruit producing districts, so that we may, for example, be able to determine the value of

peaches in California, Connecticut, Delaware, Georgia, Michigan, Missouri, and all the way around. We cannot do that at all under the existing plan; and I fear that unless this matter is impressed upon the Director of the Census quite soon, the results obtained under the coming census will not be much of an improvement over those secured in 1890.

President Watrous suggested that the Secretary prepare a resolution on the subject.

The Secretary: Perhaps it would be sufficient to endorse the general proposition to secure exact statistics of acreage, yield and value of product of each of the more important fruits that are commercially grown. I would not wish to propose a particular schedule.

Prof. John Craig said he thought it important that the census collectors be given exact instructions as to what data should be collected.

After an informal discussion of the question, in which several members participated, the following resolution was drafted and submitted:

Resolved, That, in view of the great and growing importance of our fruit industry, the Director of the Census of 1900 be requested to provide, in the enumeration, for exact statistics on acreage, yield and value of product of each of the important fruits that are commercially grown within the United States; particularly the apple, pear and quince; the apricot, cherry, peach and plum; the fig; the blackberry, currant, gooseberry, raspberry and strawberry; the cranberry; the lemon, lime, and pomelo; the olive; the pineapple; the almond, chestnut, pecan, shagbark and walnut.

Mr. Evans and Mr. Patten suggested a modification of the resolution by omitting all but a few of the more important fruits and inserting the words, "and all other fruits of commercial value."

The resolution was voted upon as offered and was adopted unanimously.

On motion of Prof. L. C. Corbett, a Census Committee of seven was elected to present the foregoing resolution to the proper census authorities and to look after the general interests of Pomology in the United States in the taking of the census. Said committee to be constituted as follows: The President, L. A. Goodman, C. J. Monroe, G. B. Brackett, Wm. A. Taylor, G. L. Taber and F. A. Kimball.

CERTIFICATE OF MEMBERSHIP.

The Secretary asked for an expression of opinion by the Society upon the advisability of providing and furnishing to Life Members, in a form suitable to be framed and preserved, a Certificate of Life Membership He said there had been some correspondence on the subject between officers of the Society and that the Treasurer and Secretary favored the proposition but had no instructions in regard to it nor any definite estimate of its cost. He suggested that such a certificate would probably be acceptable to most members and would perhaps induce others to become members.

Professor Corbett spoke of the custom of national organizations to give certificates to honorary members whom they elected and that the recipients often prized these more highly than they did their college diplomas.

The Secretary stated that if deemed advisable the cost of the certificate could be met by making a small charge to the present members who might apply for it.

Mr. C. G. Patten said he was not favorably impressed with the suggestion to make a charge for the certificate. He thought it should be treated as

something of an honorary nature which was to be held out as an inducement to Biennial Members to become Life Members.

Mr. J. C. Evans concurred in the view expressed by Mr. Patten and said he thought that, as to the present Life Members, the imposition of a charge for any privilege would be *ex post facto*, and therefore irregular.

Mr. J. Horace McFarland submitted a motion which (after modification) was read as follows: That the Executive Committee be empowered to investigate the matter, and, if found advisable, to procure a proper Certificate of Life Membership to be sent to each present Life Member of the American Pomological Society and to those who may in future become Life Members.

Mr. L. A. Goodman discussed the probable cost of the certificate. He said that the copper plate for a high school diploma of which he had knowledge and which was a fine design for printing on parchment, cost $65. He estimated the cost of a lithographed certificate as not exceeding $25 or $30. He said he thought the Society could afford to assume this expense, particularly in view of the probable return of the money in an increase of Life Memberships.

Mr. McFarland said he thought the cost of an original copper plate design, well executed and of a suitable character, would be considerably over $100. He explained that the copper plate is engraved on the copper, while a lithograph plate is engraved on stone; and that the latter, if well prepared, would resemble a copper plate and many persons would be puzzled to decide between the two. He added that a diploma or certificate offered by a Society of the importance of this one should be of the best character.

Professor VanDeman remarked that, if a copper plate was purchased, it would become the property of the Society for all time and that the same plate could be used for subsequent printing, but this would not be the case with a lithographic stone, which would remain in the possession of the lithographer.

Mr. McFarland said he thought this motion was sufficiently broad to enable the Executive Committee to exercise their discretion in the premises.

Dr. Hexamer expressed the opinion that the contemplated expenditure was not warranted by the present financial condition of the Society. He said the Wilder fund could not be touched for this purpose and, aside from that, the balance in the treasury was not large enough and should not be expended for a thing which was not absolutely necessary. He advised that action in the matter be deferred to a future meeting.

Mr. Goodman suggested that it might not be bad business management to spend $100, if thereby the Society could realize $500 in additional life memberships.

Col. Brackett said he thought that, if the Society had funds to spare, it would be more advisable for it to increase the salary of the Secretary.

The Secretary objected to the introduction of personalities in the discussion. He argued that in addition to the sentimental conditions in favor of it, the certificate plan strongly commended itself as a business proposition. He thought that many men interested in commercial fruit culture could be secured as members if they were given some tangible evidence of membership, which they could have before them in their homes or at their places of business. He regarded the motion as unobjectionable; it did not require the Executive Committee to secure the certificate but left the matter discretionary with them.

Prof. VanDeman said he regarded the proposition as wise from a business point of view because, as the certificate would be given only to Life Members, the effect of it would be to stimulate accessions to the Life Membership roll from among the Biennial Members.

Treasurer Taft explained, in regard to the funds on hand, that he estimated there would be a balance of about five hundred dollars, after the printing of the Society's Proceedings, at the end of the year. He said that, as the Life Membership fees had averaged $100 a year for the last three years, the cost of a copper plate could be defrayed from this source alone.

Prof. Craig declared himself heartily in favor of issuing the certificate, as he believed it would promote the dignity of the Society and would be valuable from a commercial standpoint. He felt that if he owned a Certificate of Membership he would value it equally with his college diploma.

The discussion here closed, and Mr. McFarland's motion was adopted without objection.

Mr. Goodman, Chairman of the Committee on Resolutions, presented and read a report as follows:

RESOLUTIONS.

Resolved, That the good will and best wishes of every member of this Society are hereby conveyed to the Pennsylvania Horticultural Society and to its able and obliging Secretary, Mr. David Rust, for the use of the beautiful Horticultural Hall and its appurtenances for this meeting. A more pleasant and satisfactory place for such a meeting could not have been provided.

Resolved, That the thanks of the Society be tendered to the Press of the city of Philadelphia for their generous notices of our sessions, both before and during the meeting. Notwithstanding the fact that their columns were crowded with the many important features of the G. A. R. Encampment, which occurred at the same time, they have given generous space and attention to the work of the American Pomological Society.

Resolved, That our thanks be extended to the H. A. Dreer Company for courtesy in tendering to our members free of all cost, a trip to their beautiful nurseries and grounds at Riverton, N. J., which many of our members have accepted and enjoyed.

Resolved, That the gratitude of our members be made known to Messrs. Thomas Meehan & Sons for courtesies extended to those who visited their nurseries and particularly for their thoughtfulness in adding to the pleasure of the session by taking a large party of our members on a delightful carriage ride down Wissahickon Drive.

Resolved, That the Local Committee of Arrangements composed of Messrs. Moses Paxson, Edward Campbell, Thomas B. Meehan, Wm. Warner Harper and David Rust be tendered our thanks for their services in obtaining so delightful a place as Wissahickon Inn for the hotel headquarters of the Society.

Resolved, That our thanks are due to our worthy Secretary for securing so large an attendance of representative pomologists and for providing so good a program for the several sessions. He deserves just recompense, in our good will at least, for his labors in promoting the success of this meeting.

Resolved, That our sincere thanks be extended to all those who have presented the valuable papers and addresses for our instruction and to those who have provided the large, varied and interesting exhibits of beautiful fruits.

Signed

L. A. GOODMAN, Missouri, Chairman.
F. A. WAUGH, Vermont.
WM. R. LAZENBY, Ohio.

The resolutions were adopted by a rising vote.

Prof. VanDeman: Mr. President, if it is not too late, I wish to second the suggestion that was made by Col. Brackett and put it in a form to be acted upon. I therefore move that the salary of the Secretary be raised $50 per year. I understand it is now $100 a year.

Treasurer Taft: It is $50 a year.

Mr. VanDeman: That is not enough. I move it be made $100 a year; that is, $200 for the two years.

Mr. Goodman: Beginning from the Columbus meeting?

Prof. VanDeman. Yes, sir; including that. "The laborer is worthy of his hire."

Mr. Goodman: I second that motion.

Secretary Taylor: I object to this decidedly. I do not think that this ought to be a money-making position nor that it was intended to be. I believe in husbanding our resources. This would not be a good business investment as, I think, the expenditure for a certificate will be, if we can keep the cost of that within $100 or so. I would prefer that you do not vote this increase, but that you leave the salary as it is.

Several members here called for a vote, and Mr. McFarland indulged in some good-natured comments on Secretary Taylor's remarks to the effect that, as that gentleman had objected to personalities, the objection he now made ought not to prevail.

Professor VanDeman's motion was then carried unanimously.

The Secretary: Gentlemen, I appreciate your kindly expression of feeling more than I do the increase in salary, and I sincerely thank every one of you for that.

President Watrous inquired whether any further business remained to be disposed of. There being no response he added that, as all had been heard, he now declared the session adjourned *sine die*.

The remainder of the evening was spent in social converse and the Twenty-sixth Session of the Society was ended.

MISCELLANEOUS PAPERS.

Prepared for the Philadelphia Meeting and ordered printed by the Executive Committee.

QUALITY AS A FACTOR IN APPLE CULTURE.

BY CHAS. W. GARFIELD, GRAND RAPIDS, MICH.

A broad definition of quality covers a very wide field, and as applied to the apple, deals with all of the senses. Beauty of form, delicacy of color, have to do with the sense of sight; smoothness of surface and firmness of texture deal with the sense of feeling; aromatic qualities appeal to the senses of taste and of smell; and the crispness of fruit when used for dessert purposes has, at least indirectly, an appeal to the sense of hearing. So that in the discussion of the subject I have chosen, after eliminating the suggestions I have just made, there is comparatively little left of the important things connected with the culture of the apple. To be sure, there is climate, and soil, and habit of the tree; but all of the attributes of the fruit itself can be garnered under a broad definition of quality. My purpose, however, in the few moments' discussion given to this topic, is to take a narrower and more technical definition of quality as applied to fruits, and this definition has to do with the attributes that appeal to the sense of taste.

Really, is not the final test of the value of an apple in its appeal to the sense of taste? Applying well known words from the 13th chapter of Corinthians: Quality never faileth. But whether there be color, it shall fail, whether there be beauty of form, it shall fail; whether there be delicacy of bloom, it shall vanish away. So that in the discussion of the question of apple culture for the amateur or for the professional, the crucial test is in the quality of the fruit. Our views as to what we shall plant may be modified somewhat by what we are to do with the fruit, and the question of near market or distant market will mould our ideas with reference to the style of fruit to be grown. Thus, firmness of texture may be considered of great importance. But, while admitting this, we do not allow that quality is any the less the strongest factor. If we can get high quality with these other attributes, we want it. The consumer demands it, and our judgment as to what to plant is modified to suit the situation. I have seen hundreds of barrels of American apples opened on the Covent Garden market in London, and have noted with great pleasure that King, Swaar, Newtown, Pippin, Northern Spy and Red Canada brought far better prices than Baldwin and

Ben Davis. Nova Scotia puts upon the London market Fameuse, Gravenstein, Tompkins King and even Northern Spy in perfect condition. Admitting that this can be done, and admitting another greater fact, that an Englishman knows quality in apples, there is no excuse for shipping inferior sorts, simply because they can be packed loosely and still carry fairly well.

The other day, in a commission house in my own city, a connoisseur picked up a beautiful apple, and tasting it, remarked, "This is not fit to eat!" And the commission man responded, "Hardly, but it is a great shipper." In a horticultural meeting last winter we were discussing desirable varieties for market, and several lovers of good apples emphasized the importance of growing fruits of higher quality than those generally found on the market, when a large grower remarked: "You may talk all you please about high quality in apples; I shall continue to grow the Ben Davis because there is money in it." I do not expect to deter the large growers of apples from putting on the market fruit like the Ben Davis, in which they find an immediate large margin of profit; but I do wish to emphasize and maintain that the greater proportion of apples placed upon the market are put there by small growers. These men will not find the largest margin of profit in fruits of the type of Ben Davis, Cabashea, Gilliflower, Pennock, or even Baldwin. These growers raise fruits for their own use, and put upon the market the surplus. They deal with the same individuals year after year. An apple that pleases the consumer in every way is the one he will demand from year to year. If this demand can be satisfied by the grower, he has a profitable market for that quality of fruit.

In a recent discussion on early apples at the meeting of the Grand River Valley Horticultural Society, a majority of the market growers were opposed to the Primate as a market variety because, they said, it is not attractive in appearance, it does not ripen evenly, and will not pay to grow. But one gentleman said the Primate was the most profitable apple he had at its period of ripening because he had a few customers who appreciated it and would have nothing else, and would pay him his price for it. In the same meeting we discussed the Gravenstein, and the consensus of opinion was that it would not pay to grow this variety for market. But one man said that his tree of Gravensteins was the most profitable single tree he had in his orchard. Upon inquiry I found that his market was with certain individuals who appreciated the high cooking qualities of the Gravenstein, would have nothing else, and were willing to pay a large price for it.

A friend of mine has a little orchard of Red Canada, Wagener, Jonathan and Tompkins King. These, as you all well know, are rated by the authorities as having high quality. My friend has a line of trade that takes his output of these varieties at a high price, no matter what the ruling price for ordinary varieties on the market may be. He makes them far more profitable than any of his other winter varieties, which include all of the common sorts found on the market.

The nurseryman will not advise the orchardist to plant the Red Canada and Jonathan, because they are poor growers in the nursery, and he cannot afford to raise them at the price he can get, but this should cut no figure with the grower. He should plant the varieties that will give him the highest satisfaction and the largest income. I make these two points together because they are equally important. It is worth just as much to a man to get keen satisfaction from the things he puts on the market as it is to make

a large margin of profit. The grower who puts a poor product upon the market, and sells it upon its appearance, which is deceiving, can have no real pride in the transaction. We find a wretch, once in a while, who brags about a sharp trade that he has made; how nicely he outwitted somebody; and got the best of the bargain; and we occasionally find an apple grower who flaunts to the world the fact that he has cleaned up a fine season's business from an orchard of apples of such poor quality that he would not use them in his own family. But the man who goes into the culture of fruits ought to be of the type which will not be satisfied with transactions of this character.

There is no apple for all purposes that ranks higher than the Northern Spy. In commending it, however, we are met at the outset with the objection that the man who plants this variety does so with the expectation that his children will reap the reward, and not himself. The quality of the fruit, however, has led to careful experiments by horticultural experts, who find that the Northern Spy can be grown as a top graft and come quickly into bearing. But, it is objected again, the Northern Spy is so tender of skin that it cannot be shipped to a distant market. It is nevertheless true that the grower of peaches in California who ships them successfully to London would find nothing in this objection to hamper him, for the quality of the product is such as to make a demand for the fruit at a remunerative price. Careful methods of packing and shipping will overcome this technical objection.

The Hubbardston is scoffed at by many growers because it is not attractive in its appearance, and will not sell upon the general market. This is simply an admission that the grower must cater to ignorance rather than to wisdom. I know growers of the Hubbardston who never fail to get the highest price for their product.

Perhaps the most common objection to apples of high quality by the market grower is that they are so tender in texture that they are not good shippers. This objection is made to Shiawassee, Oakland, Mother, McLellan, Norton Melon and Ohio Nonpareil—varieties unequaled in quality, and which give the keenest satisfaction to the consumer. My contention is that it is of far more importance with the grower to solve the problem of putting these fruits of high quality into the hands of apple lovers than it is to develop a variety which will ship long distances at the expense of quality.

Why do we find so few of the Large Yellow Bough, Peck Pleasant, Swaar, Oakland and Rambo upon the market? It is because the grower has magnified the importance of putting upon the market sorts that will capture the eye of the ignorant apple consumer, rather than give any thought to the education of the buyer to a knowledge of the very best sorts and a desire to secure them. It may be that they follow the line of least resistance, but they are not following the line of the largest profit and the keenest satisfaction in the culture of apples.

The tradesman is keen to scent the desire of his customer, and to so cater to it as to increase his trade. He finds it profitable to do so. He goes farther than this, and calls the attention of his customers to the new and best things in his line upon which he can make a larger margin of profit if he can only get the custom. This is good sense, and when he points with pride to the customers he has made through practices along new and better lines, he says, "These customers know good things when they see them," and he takes a

personal pride in his trade and in his success in awakening a taste for the best things. This method ought to be attractive to the grower of apples.

The apple is the king of Northern fruits, and in a wide range of country should take precedence over all other fruits in its usefulness. It is a shame to us all, who are devotees of horticulture, that in this realm, where the apple should be at its best, and when at its best has no peer, foreigners should come in with inferior fruits and monopolize the trade. In these recent years this has come to be true to an alarming extent. The orange and banana have taken the place of the apple because only poor apples were to be found. There is no question which shall have precedence in the northern markets if the best apples are there to be bought; but as between the Ben Davis and a banana, the Baldwin and an orange, the banana and the orange get to the front. But if these southern fruits had always to compete with apples of the quality of the Swaar and the Jonathan and the Mother and the Oakland, they would surely take the second place.

If I were to plant an apple orchard today, after choosing my location with regard to climate, and giving due consideration to soil and hardiness of tree, I would make everything else subservient to the taste. I would grow varieties that would tickle the most sensitive palates, and I would expend my best thought and management in cultivating sensitiveness of taste and awakening a desire for the most superb quality. My immediate purpose would be the opening to their depths of the fattest pocket books, but I would cherish in my heart the conviction that when my business should reach the historical stage it would be to me a source of satisfaction and commendable pride.

AMERICAN PLUMS FOR AMERICA.

BY PROFESSOR E. S. GOFF, UNIVERSITY OF WISCONSIN, MADISON, WISCONSIN.

It would be folly to claim, for the sake of argument, that the introduced plums have proved a failure in the United States. Our fruit markets during the plum season would belie such a proposition. The European plum, with proper culture, succeeds over a very considerable part of our country, and its choicer varieties are among the most delicious of fruits. The more recently introduced Japanese plums have doubtless gained ground faster in our culture and in our markets than any other exotic fruit that has been brought to our country. The remarkable vigor and prolificacy of this species will insure its permanence on our soil, and while the average quality of its fruit is very low, the excellence of a few of its varieties leaves no reason to doubt that it will yet furnish plums as delicious as the choicest European sorts.

But both the European and Japanese plums have inherent defects that must forever prevent either of them from becoming the national plum of North America. The flower buds of neither are reliable to endure the winters of the Mississippi Valley much north of Mason and Dixon's line. The European plum is so susceptible to the curculio that its fruit can be secured only at the price of interminable warfare against this insect. The Japanese plums bloom so early in spring that they are comparatively unsafe, even in many localities where their flower buds have passed the winter. The European plum has been introduced nearly three hundred years, yet it has not become a

companion of the apple tree, the cherry tree, the raspberry and the currant in every thrifty farmer's or laborer's yard, anywhere in our land unless it be on the Pacific slope, for the reason that it cannot be depended upon to bear fruit without special treatment. The Japanese plum may become more of a family fruit than the European sorts have become, but their uncertainty of fruitage renders this improbable.

We have, however, native species of the plum, that when grown in their proper areas, are capable of supplying plum trees for every farmer's and laborer's garden in our land, that shall be as reliable for fruiting as the apple, with little if any more special knowledge or care than the apple requires; of which the fruit is excellent for all culinary purposes and of which the choicest varieties are scarcely surpassed in delicacy and richness by any fruit of our country, and for which the market demand is rapidly increasing.

The *Americana* plum is hardy, both in tree and flower-bud throughout the United States and far northward into Canada. The past winter, its flower buds endured 52 degrees below zero in Manitoba, where the Oldenburg (*Duchess*) apple in the same locality had its last year's growth frozen back three-fourths. Other species of the native plums succeed in the far South and Southwest. It may be safely said that no other tree fruit of equal value has so wide a climatic range in North America as the native plums, and throughout the northern Mississippi Valley, no other tree fruit can be depended upon to yield more dollars per acre, in ten-year periods than these native plums. The native plums, especially of the *Americana* species, are exceedingly variable. At the risk of incurring the ridicule of this the most dignified association of fruit growers in America, if not in the world, I make the unqualified statement that the richest and most delicious quality that I have ever tasted in plums has been found in native specimens. It is true that the average *Americana* plum has a thick and often acerb skin which is objectionable, but there are exceptions to this rule. A few of the choicer varieties, when fully ripe, have a skin nearly or quite as thin as that of the average European or Japanese plum.

In the *Americana* plum we sometimes find varieties that are perfect freestones. It should be remembered that while the European and Japanese plums have been in culture for many centuries, the most highly improved of our native plums are but two or three generations from the wild plum thicket.

When we consider this fact, their present value as a family and commercial fruit certainly offers remarkable promise. There is no reason to doubt that, during the coming century, the native plums will yield varieties that shall be equal in all respects to the choicest plums of foreign species, with the advantage that they will be more hardy and more uniformly productive.

I would not prejudice any against the European or Japanese plums. Let all grow them who can. But I would remove the prejudice that exists in the minds of some, that the best natives are unworthy of culture where the foreign plums can be grown. The large market demand for the best native plums that have grown up in the West fully disproves such a proposition. Let us treat our native plums for what they unquestionably are—a most promising fruit that is destined to play a most important part in American pomology; let us seek to improve them by every means known to horticulture, and their future will certainly take care of itself.

THE FUTURE OF COMMERCIAL ORCHARDING IN THE SOUTH.

BY PROF. F. S. EARLE, ALABAMA POLYTECHNIC INSTITUTE, AUBURN, ALABAMA.

The future of commercial orcharding in the South must depend on two factors: the requirements of the markets, and the possibilities of production. Any one familiar with market conditions during the past twenty-five years will readily admit that consumption of fruits is likely to increase in the future as it has done constantly and rapidly in the past. Not only is population increasing at all the great market centers, but the consumption of fruit per capita is increasing also, and it is coming to be considered more and more as a daily necessity rather than as an occasional luxury.

One of the factors that is causing this increased consumption is the improvement in transportation facilities due to the use of refrigerator cars, by means of which it is possible to transport perishable fruits for long distances at reasonable rates, and to thus greatly lengthen the season during which an abundant supply can be maintained in any given market. A few fruits out of season always command a fancy price, but it is equally true that only a small quantity of any fruit can be sold at all, out of its usual season. Thus a few crates of choice tomatoes in January may bring a great price, while four or five car loads will break a market that could handle a hundred car loads daily in July. Twenty years ago the peach season in New York and other Eastern cities began in July with the first shipments from Delaware. Now the recognized peach season opens four to six weeks earlier with the shipments from South Georgia, and large quantities can be disposed of from June to October. The market is thus to a considerable extent in the hands of the growers, since a large supply of good fruit in attractive condition always greatly stimulates consumption. There are no problems of greater importance to the fruit grower than those connected with the proper distribution and marketing of his product; and in the future as in the past, the men who make most profit will be the ones who pay most careful attention to these questions.

It is, however, the problems connected with growing, rather than with marketing Southern fruits, that it is proposed to consider in this paper; and more particularly the growing of fruits in the territory comprised by the Carolinas, Georgia, Alabama and Mississippi.

This area can be conveniently divided into three unequal regions differing somewhat widely in physical character and consequently in horticultural possibilities. First we have the rather narrow belt of moist low lying lands along the Atlantic and Gulf coasts. This is the region of rice, sea-island cotton and sugar cane. It is also the truck growing region *par excellence*, and immense quantities of vegetables are grown at many different points for Northern shipment. In the matter of fruit production this coast country is somewhat limited. The climate is too cold even on the Gulf, for oranges, and neither apples, peaches or plums can be planted with much assurance of success. Grapes grow and bear well, but the fruit ships badly, and the vines are often short lived. The Oriental pears thrive better than any other class of fruit trees, and but for the ever present scourge of blight, Kieffer and LeConte could be grown with every assurance of success. Figs and Scuppernong grapes succeed admirably, but neither can be classed as market fruits. Pecans should not be omitted in considering the horticultural possi-

bilities of the coast region. With proper care they grow faster and come into bearing earlier here than in any other part of the country.

Going back from the coast, as the lands become higher and dryer, but with no very sharp line of demarcation, we enter the great cotton belt. It is much the largest of our three areas and includes everything between the coast lands and the foothills of the mountains, or say from one hundred to eight hundred feet in elevation. The topography of this great area is necessarily quite varied. It is often hilly and sometimes quite broken, but low flat topped ridges or table lands frequently afford large areas of comparatively level land. The soil also varies widely, but for the most part it is more or less sandy, well drained and easily worked. It is usually somewhat lacking in lime and in phosphoric acid, and after a few years cropping in cotton or corn it becomes very deficient in nitrogen and in vegetable matter. Such soils, though poor, respond readily to fertilizers, and especially to green manuring. To the westward in Alabama and especially in Mississippi are considerable areas of strong lime soils including the black prairie lands. These and the rich alluvial region along the Mississippi river are not included in this discussion, as their horticultural possibilities are but little known.

The southern part of this region was originally covered by continuous forests of long leaf pine. The areas of this valuable timber that still remain are being rapidly encroached upon by the lumberman, thus opening up new lands for cultivation. These pine lands were formerly considered valueless for farming purposes, but they are found to respond readily to modern methods of fertilization, and they are being utilized extensively for both fruits and cotton. Farther north the lands are more variable, and there are frequent admixtures of hardwoods and short leaf pines. The better part of these lands are stronger than those of the pine belt proper, but they have been longer in cultivation and are more worn.

There is no part of this great area where peaches and plums will not grow with more or less success, and it is here that the largest commercial orchards are located. Owing to the abundance of cheap lands well located as to railroads, and the ease of cultivation, it is probable that peaches can be grown in quantity more cheaply here than in any other part of the country; and it is altogether probable that in the future as at present, the world's greatest peach orchards will be located here. The area suitable for the purpose is so great that the only limit to expansion will be the possibility of finding a market. In locating peach orchards in this region care should be taken to select only the highest, best drained lands, and those having a red clay subsoil. Where the subsoil is whitish, and where there is any tendency to seepiness the trees will be liable to die from that obscure disease called Gummosis. These precautions are especially necessary toward the south. In fact it is not likely that orchards will prove as long lived in any part of this region as they do farther north, and growers should plan to make frequent new plantings so as to constantly have blocks coming on to take the place of those that begin to fail.

These remarks on peaches apply equally well to the Japanese plums. They are at home in this region and are taking a prominent place as market fruits. The *Americanas* and *domesticas* do not thrive here. The Wayland alone among the native races gives promise of being of value on account of hardiness and sureness of crop. True the present varieties of this race are too small, but the possibilities of valuable crosses between them and the Japs seem very alluring.

Grapes grow well in almost all parts of this region, and some large commercial vineyards are located there. So far grapes have not been as profitable as peaches. Possibly this could be obviated by a better selection of varieties, but the same troubles would be encountered to some extent that were mentioned for the coast region.

Apples, too, will grow in almost all locations, but it is doubtful if they will ever become an important market fruit here, at least until we know more in regard to the varieties best adapted to the far South.

If it were not for the blight this region would produce immense quantities of the Oriental pears. Large plantings have been made in the past, but owners are quite generally discouraged by the prevalence and destructiveness of this disease. Future plantings will depend almost entirely on the success of the few who are making a determined effort to control it. Fortunately the bad effect of over cultivation and stimulation is being somewhat widely recognized, and where discouragement has led to the neglect and non-cultivation of pear orchards the loss from blight is usually greatly lessened. A noticeable result of the great freeze of last February which killed all the pear buds, thus entirely preventing blooming, has been the marked diminution in the prevalence of this disease which makes its most destructive attacks through the open flowers.

The third and last of these regions is to my mind much the most attractive from a horticultural standpoint. It is the mountain or Piedmont region, including the southern extension of the Appalachian mountain system with its outlying foothills. The soil is mostly a red micaceous clay derived from the disintegration of granitic rocks, though it also includes some limestone lands. Cotton is largely grown in this region also, but it was formerly the wheat belt of the South, and owing to the low price of cotton, farmers are again paying some attention to this crop. These soils are less easy to cultivate than the sandier lands found at lower levels, and the country is much broken so that level areas of much size are infrequent. They seem, however, to be particularly adapted to the growth of fruit trees, and with the greater elevation and consequent cooler winter climate, it is possible to grow a wide range of orchard products. Peaches and plums grown here unquestionably average higher in color and richer in flavor than those from lower levels and sandier soils, and they also seem to have somewhat better keeping and carrying qualities. The trees, too, are usually longer lived being less subject to the attacks of borers and to Gummosis. It is true that Rosette is a disease indigenous to this Piedmont region but it is proving much less destructive than was at one time feared. The fact that the crop ripens a little later here has so far been a distinct advantage, for the demand, stimulated by the immense shipments from farther South, becomes very active for the smaller quantity that is produced in the mountains.

Many parts of this region are particularly well adapted to the growing of grapes. The quality of the product is of the best, and the berries hang on the stem and ship as well as those grown in any part of the country. Ripening somewhat later than those from the lower country, they come at a time when the markets begin to want grapes, and I foresee that in certain favored locations plantings of this fruit are likely to be largely increased.

Many kinds of apples thrive admirably in the moister soils of this region and it is strange indeed that the commercial possibilities of apple growing at the South have been so long overlooked. I am glad to note that the question

was quite fully and favorably discussed at the last meeting of the Georgia Horticultural Society.

Some success with the Northern or European varieties of pears can be expected in portions of this region. The Kieffer, too, succeeds admirably, but the LeConte seldom escapes late spring frosts. As in the other parts of the South, blight is now too menacing a factor to warrant the large planting of pear trees. The longer blooming season giving a longer period for its rapid spread through the flowers, seems to explain the greater destructiveness of this disease at the South.

Cherries should not be omitted in considering the orchard possibilities of the mountain region for there is much evidence that some of the sour varieties at least will do well here. There can be no question of finding a profitable market if they can be successfully grown.

Taking the South as a whole, peaches are at the present time by far the most important orchard crop. The area where they can be successfully grown is very great and orchards can be grown very cheaply. From its geographical position the South should need to fear no rival in supplying the great markets of the Northeast with this fruit. The earlier varieties as they ripen in the North cannot compete successfully with southern grown Elbertas. The only competition that is really to be considered comes from the West. Texas is increasing her fruit production with giant strides, and we shall probably have to concede to her the markets of the great Northwest. It must be the province of the railroad systems of the Southeast to see that rates are so adjusted that we retain the advantage of our nearness to the eastern markets. California is another competitor that cannot be wholly disregarded. Even though handicapped by such great distance and such high freight charges, she still holds a portion of the fancy trade. This is not because California peaches are any better than those grown in Georgia, but the Californians have learned the importance of care in assorting and packing fruits, and they are also favored by their dry climate which prevents the ravages of the brown rot and of the curculio. Even after its long journey across the continent the California grown peach will last longer on the fruit stands and subject the dealer to less loss than southern fruit. In seasons when frequent rains occur during the gathering season, this will to some extent be unavoidable, but there is no excuse for flooding the market with wormy peaches, or in sending the fruit unassorted and poorly packed, as has so often been done in the past. This is not the way to build up a market and to increase the demand for southern grown fruits. This packing problem is one that is likely to adjust itself for the poor packer will unquestionably be forced out of the business. The complete control of rot and of the curculio by spraying or other means unfortunately presents some difficulties that have not yet been fully surmounted. No subject is of greater importance to the peach interests of the South for these two agencies cause more loss than all the other unfavorable factors combined. The San Jose scale problem that has attracted so much attention during the past few years has been attacked so vigorously that we can now begin to hope that the worst danger is passed. Let us hope that this success will encourage both growers and investigators to attack these older and even greater problems with the same vigor and determination.

FRUIT EVAPORATION.

BY DR. J. R. CARDWELL, PORTLAND, OREGON.

Mr. President, Members of the American Pomological Society, Ladies and Gentlemen:

Your Secretary has asked me to write a paper on fruit evaporation. An intelligent member has suggested that it should be a short, meaty paper; the first requirement I shall fill.

The development of the fruit industry in this country, the phenomenal yield in the Pacific coast states of all the fruits of the tropic, semi-tropic and temperate zones, has taxed to the utmost the inventive genius and capital of our most enterprising citizens. Sundry chemical processes, scientific packing, refrigeration, rapid transit—these have greatly facilitated the distribution of green fruits in their season to distant markets. Various culinary devices and new processes, wineries, distilleries, the making of unfermented liquors, vinegars, jams and jellies, glacé fruits, sun drying and machine evaporation—these are all operated on a scale hitherto unknown, with investment of immense capital and giving employment to great communities. Sun drying in California and other favorable districts in the southern states with the improved methods of handling, dipping, sulphuring, etc., is now a business of immense magnitude, bringing to the Pacific coast alone more than ten million dollars annually; and yet all these industries must be ten times multiplied and extended to utilize the yield from orchards and vineyards now set. New conditions and demands of the times will be met, appliances will be improved and cheapened; transportation facilities will be extended and rates reduced to insure a wider distribution to the world's markets.

The fact is apparent that consumption must be increased to meet the output. The prune trees set on the Pacific coast, will in five years more than supply the present world's demand, and perhaps as much may be said of the raisin grape and other fruits.

Fruit evaporation of today is a comparatively recent industry. About the years '79 or '80 the first large patent evaporator (the Alden), was introduced in California and Oregon. It was a stack machine, requiring a two-story building, lacking in capacity and not adapted to the slow drying of the prune. The plans or buildings and appurtenances, and methods of working introduced by the promoters were expensive and impractical. This was soon discarded. Then came the Plummer, the first steam apparatus with boiler, radiating pipes under rotating trays with no system to control the entrance of cold air or to deflect and regulate the heat, to create the requisite draft and carry off the moisture, so this proved to be a veritable sweat box, not a success and was also discarded.

Then came the American Evaporator, a side-draft or tunnel device of simple construction and economic working; popular with the farmer and small grower.

Enlargement and modifying of these three devices has been the basis for more than a thousand patent evaporators; brain and muscle are still active in this line.

Dr. J. F. Simonds has so well stated the chemical changes that take place in fruit evaporation, that I take the liberty of quoting:

"I will now describe the process of true evaporation. It has been found that by removing a part of the water rapidly, in swift moving currents of air,

heated to 240 degrees Fahrenheit, a different product is the result, wholly unlike either the fresh or sun-dried fruit, and which will keep better, is more digestible and nutritious, is less acid, and will sell for more in the market. But if, after having heated the air hot enough, there is not sufficient circulation, or the current not rapid enough the fruit will cook and then dry or burn the same as in a close oven. Apples will cook in boiling water of a temperature of only 212 degrees Fahrenheit, or bake in an oven at 225 degrees Fahrenheit; but if the heated air circulates fast enough, the fruit will not cook or burn, or become itself heated to the temperature indicated by the thermometers, even at 300 degrees Fahrenheit, for the evaporation of the water is a cooling process and every particle of vapor leaving the minute cells which contained it carries with it also a large amount of caloric in a latent form and thus keeps the heat of the apples far below the surrounding air. The chemical change which belongs to truly evaporated fruit now begins, and the albumen instead of being slowly dried, coagulates precisely the same as in an egg when boiled. The soluble starch existing in all the fruit, and composed of $C_6H_1O_5$ will, if the heat is high enough, combine with one equivalent of water (H_2O) so that now we have an entirely different combine, to wit, glucose, or fruit sugar, which will assist in the preservation of the fruit, instead of being liable to decomposition, as the dried starch is in the sun-dried or slowly dried product.

"All the pectin or fruit jelly remains in the cells undecomposed, or is left upon the surface by the evaporation of the water in which it was dissolved, and may be seen condensed upon the surface, instead of being decomposed and passing on with the starch and gluten into the acetic fermentation. The diastase or saccharine ferment contained in all fruit, and which is the primary cause of its decay, has been rendered inoperative, and all germs of animal or vegetable life have been destroyed by the high heat. It is by this chemical change, which I have briefly described, in uniting a part of the water already contained in the fruit with the fruit starch, that these truly evaporated products are rendered more wholesome, more digestible, more indestructible, and are thereby made more valuable, not only as articles of food, but because they are not subject to deterioration and loss. And it is also the reason why a bushel of apples will make more pounds of evaporated fruit than can be made by sun drying it, as a portion of the contained water which would otherwise be lost is retained by combining with the starch to form glucose, and the carbonic acid, which is always lost in the slow decomposition resulting from sun-drying, is retained in its natural combination with the other substances composing the fruit, and hence is heavier. These profitable and healthful chemical changes which I have mentioned are all in accordance with the laws of nature, and are certain to take place if the necessary conditions of heat and air, as I have detailed them, are properly supplied, otherwise, you will have a different product, and no matter how fine your apples, how perfect your paring, caring and trimming, or how white you have bleached them, you have not made truly evaporated fruit, and no matter how many have been deceived by its color or full weight or fancy packing, your fruit will not stand the test of long keeping in warm, damp weather. The natural starch, gluten and albumen of the fruit, instead of being cured or made indestructible by the chemical changes which constitute the difference between the evaporated and dried fruits, will absorb moisture from the air, will swell or increase in bulk, and can be attacked by mold, will absorb additional oxygen and finally sour and decay."

Requisites of a first-class commercial evaporator are, sufficient heat generating capacity to heat a given volume of air entering the furnace chamber from 200 to 300 degrees F., the volume of air necessary to keep a draught of moisture saturated air equally distributed through a given amount of fruit and passing off at a velocity of 880 feet per minute—20 miles per hour.

An apparatus of 450 cubic feet of air heated to 212 degrees, containing fruit will carry 120 lbs. of water, 100 lbs. taken from the fruit as the air at 62½ degrees will ordinarily contain 20 lbs. of water, thus it can be demonstrated in practice that a draught of 880 feet per minute at this temperature will extract and carry off 300 lbs. of water per hour, 1,500 lbs. in five hours, the time required to remove the moisture from apples. Scientists have found that the capacity of air to absorb moisture doubles with every 27 degrees Fahrenheit increase in temperature. At 194 degrees air will absorb approximately 3 lbs. of water to the cubic foot; at 221 degrees, nearly 6 lbs. Thus it is obvious that with a given machine with properly regulated deflectors and damper controlling the air entering the heating chambers and the heated air escaping so as to maintain the required 200 to 300 degrees of heat required according to the sort of fruit or stage of evaporation with the 880 feet draught per minute, a correct estimate can be made of the evaporating capacity, and further the amount of water in lbs. or gallons in a given amount of fruit to be evaporated and the time required for the operation. The evaporator thus regulated to mathematical rules has been difficult of mechanical attainment. More than one thousand machines have been patented in this country, many of them doing good work in a limited way on the farm or in the small orchard.

The reliable, economic working, 10 to 20 tons capacity, commercial evaporator, is not yet a well established fact; is still a subject of serious thought and earnest discussion in horticultural circles. As air is not a conductor of heat and can only be heated by contact—impinging on a heated surface, the difficulty has been to devise a method of heating a large body of air and controlling the equal distribution and rapid circulation through the fruit in a machine of large capacity.

On the Pacific coast, in the prune districts of Oregon and Washington, where sun-drying is not available, it is claimed that this has been practically accomplished. The enormous yield in extensive orchards of the large Fellenberg [Italian] Prune necessitated the construction of wholesale devices for handling this product. The prune, owing to the close texture of its skin, requires the low temperature of 150 to 200 degrees, and 24 to 36 hours time for the best results—to retain the aroma and color and change the starch into sugar, coagulate the pectin without cooking, properly concentrate the fruit juices, making a soft, pliable, raisined product alike attractive to the eye and the palate, a veritable confection edible out of hand or from the cuisine. This was the end sought and accomplished.

The comparative cheapness of the plant, facility for producing a valuable and attractive commercial article at fair remuneration to the producer, at low cost to the consumer—one-sixth to one-tenth the freight rates of canned goods, green fruits or other fruit preparations, conspire to make this a leading industry in the future. A list of fruits and vegetables now on the market thus prepared comprises apples, pears, peaches, apricots, plums, prunes, nectarines, figs, cherries, blackberries, grapes, green corn, peas, potatoes, sweet potatoes, onions, tomatoes, pumpkins, rhubarb, asparagus, hops, tobacco, meats, oysters, fish and eggs, etc.

The limit of this paper precludes a detailed intelligible description of the sundry mechanism doing this work well and championed by enthusiastic friends or interested promoters. Those interested may obtain this information by further inquiry.

AGRICULTURAL SCHOOLS OF THE HIGH SCHOOL GRADE.

BY PROF. SAMUEL B. GREEN, UNIVERSITY OF MINNESOTA, ST. ANTHONY PARK, MINN.

The subject as announced confines my paper to the discussion of Horticultural Schools of the High School grade, but on further consideration, I have decided to present to you the general subject of agricultural schools of the high school grade under which heading I can bring out the ideas which I had intended to mention regarding horticultural schools in particular.

The object of this society is to encourage the growing and improvement of fruits and in no way can it do so more effectively than by giving some attention to the subject of agricultural education in its broadest sense. The membership list of this society is full of the names of high-minded men of past and present times who have given much thought to this subject and whose acts have been among the foremost factors in moulding public opinion in regard to it.

My special object in presenting this paper is to oppose what I believe is pernicious doctrine and widely prevalent, namely, that it is not desirable to give horticultural or agricultural educa tion to students of the high school grade, but that it should be largely confined to those of the college grade. For nearly twelve years I have taught in the Minnesota School of Agriculture, which is an institution that has grown in that time from a mere "nothing" to the position of first in importance among agricultural schools in this country; from a doubtful experiment to a permanent establishment and from a position where it was despised by the horticulturists and agriculturists it has became the most popular state institution in Minnesota. This school is unique in its plan and I believe its inception marks the beginning of a special epoch in agricultural education in this country, in which horticultural and agricultural education will be put on a more helpful basis than at present.

Permit me to call your attention to a brief outline of its progress which may be taken as an index of what similar schools may do for horticulture.

The most of you are aware of the failures and successes of agricultural education in this country. How, that on the receipt of the land-grant from the national government, some of the states, having no faith in the possibilities of agricultural education, belittled their course in agriculture, so that it is now of little importance. Others have courses that were laid out by those who were not sufficiently in touch with the tillers of the soil to understand their needs, which has resulted in a course of study poorly adapted to its purpose. And in other states the standard of entrance to the agricultural college has been put so high as to make it out of reach of those who would have most profited by it.

In these ways agricultural education in this country has been kept away from the mass of our farmers and horticulturists. Within the last few years, however, a strong demand has led to the establishment of short lecture

courses on agriculture in many of the states, to which no entrance examination has been required, and while such courses have accomplished much good, yet every educator of experience knows that such a course must be very superficial and unsatisfactory.

Besides these short lecture courses on general agriculture, special dairy schools have been formed in many of the northern states within the last six years. These have generally been well managed, have been helpful, and have been a tremendous stimulus to the dairy industry of the country. The course in these schools is purely techincal, generally runs for a term of from four to six weeks, and the work being done by them is improving from year to year as more uniform preparation is being required of those who attend, and as the instructors become more familiar with their work.

Minnesota was the first state to establish a graded agricultural high school that should lead up to the college of agriculture in the state university, but which would be as complete in itself as the common high schools. This school has been in operation for eleven years, and the results seem to show its wonderful adapatation to the needs of our rural classes. It was established after the agricultural college course in the state university had proved a failure. It has been a success from the start, and has been improved as the needs of the student body showed an opportunity to make advantageous changes. In its management little attention has been paid to precedents, but every effort has been directed toward making it most useful to the student body. This is one of the few schools in this country which has been started in order to educate farmers' sons to be better farmers and to make better horticulturists and more of them.

The course here is comprised in three school years of six months each, commencing about the first of October and continuing until about the first of April. It is open to those of both sexes who have completed a common school course in English grammar, arithmetic, history of the United States and geography as prescribed by the state department of public instruction. All students must take the agricultural studies. As laid out it includes a high-school education in the common English branches. The subjects taught are agriculture, dairying, dairy husbandry, fruit growing, vegetable-gardening, study of breeds, handling grain and farm machinery, veterinary science, dressing and curing meats, plant propagation, forestry, soils and fertilizers, feeding, breeding, agricultural, dairy and domestic chemistry, botany, physics, zoölogy and entomology poultry keeping, farm blacksmithing, farm carpentry, drawing, sewing, cooking, laundering, social culture, home management, farm bookkeeping physical culture, vocal music, plane geometry, civics, algebra, English, military drill and domestic hygiene. Sewing, cooking, home management, laundering and social culture are taken by the girls instead of blacksmithing and carpentry. Physical culture is required of all students. Before graduation each student must have had a practical experience in fieldwork for at least one season. Special advanced work is often given to mature students in horticultural and other subjects.

On looking over the list of subjects taught there will be found several that are quite new and which indicate a departure from ordinary educational lines. For instance, the subject of cutting and curing meats was started on account of the general lack of information among farmers as to the proper way to dress the meat needed for home use, and to encourage neighborhood coöperation in raising and using home-grown meats. This division also prepares the meat for the school dining hall. Every effort is made to teach the

subjects from the standpoint of the tiller of the soil; so blacksmithing and carpentry are taught with special reference to their bearing on the problems of the farm, and the exercises consist in making whiffletrees and the irons for them, cold chisels, wagon jacks, clevises, chains, etc. In drawing, the exercises given most attention are plans of barns, houses, farm machinery, plots of farms, etc. In botany, the botany of our farm and garden crops is made most prominent, and in physics the illustrations are preferably taken from agricultural conditions. In fact, the aim has been to make the course of study brim full of the kind of instruction that will be most helpful to the students when they take up the cultivation of the soil, and to show them the possibilities of the surroundings of the agriculturist, for many a boy leaves the farm because he does not appreciate its opportunities.

The State of Minnesota has furnished a fine establishment for carrying on this work, and has put about $350,000 into buildings and their equipment. The dairy building is probably the finest in this country. It contains butter, cheese and other class-rooms, laboratories for testing milk, offices, a very nice, large live-stock lecture room which has a large platform where the stock under discussion is brought for illustration and study. A special building for horticulture and physics is now nearly completed, costing, with greenhouses and equipment, $35,000. Expenses are kept down to the lowest possible figure; board and washing are furnished at cost, text-books at a rental of $2 a year, and the total expenses for one school year need not exceed $85 for each student, including even heating and lighting of the rooms. Good dormitories are furnished, and an excellent library and reading room are always ready for use. The students have excellent literary societies, a good orchestra and band, a good gymnasium and basket ball team. Three hundred and sixty students attended last year.

Until 1897 girls were not admitted to the same courses as the boys, but a short course was provided for them in summer. In that year a special home building and dormitory was provided, and for nearly two years they have attended classes with the boys, and the results of this plan have been very pleasant. It has conduced to good order and gentlemanly conduct among the boys, and has added much to the social life of the school, and is a feature having so much to recommend it that it has evidently come to stay. About sixty girls attended last season.

The Minnesota college of agriculture, which requires for entrance the studies taught in the agricultural high school, is intended for educating teachers, and it is not expected that many will enter it. At present there are twenty-one students in attendance.

The total attendance in the whole agricultural department in the University of Minnesota last year was 483. The success of the system here described seems to show that the best part of the agricultural instruction now given in our agricultural colleges can be readily acquired by students of the high-school grade; that it is a mistake to require a college entrance examination of those who wish to gain a good working knowledge of scientific agriculture; that the colleges of agriculture should confine themselves to educating teachers of agriculture and kindred sciences; that few will attend agricultural colleges in order to become better tillers of the soil, and that they should not be expected to educate the mass of farmers and gardeners; that the farmers and gardeners of this country are willing to patronize agricultural schools as soon as they are made helpful and are put within their reach. The common statement that the boy is most apt to follow the pursuit with which he

is most familiar is here exemplified by about ninety-seven per cent of those who have attended the school of agriculture being found among horticulturists or on farms or in occupations closely connected with farm life. It is shown, too, that it is entirely practicable to hold such a school during the winter months, when the boys can most easily be spared from the farm, and that while the benefits of field work are not fully available in winter, yet with suitable greenhouses and illustrations this difficulty can be largely overcome, and is more than outweighed by the advantage of holding the session at a time when the sons of farmers can easily attend. And in having the boys on the farms of the state during the growing session so they do not get out of touch with practical country life. Besides, the students can gain a working knowledge of field conditions far better in working for practical horticulturists and agriculturists than by any field instruction that could be given to a large number of students in any educational institution. And the economic side is then kept continually before the student, which is very important.

It seems to me that in this country we have paid too much attention to the higher phase of agricultural education and too little to the education of the hard headed boys who have to do the practical work, and that we should profit by the experience of Germany, France and other European countries, and increase the agricultural schools of the lower grades. There are in Prussia, at least one hundred and two schools of agriculture of about our high school grade and they have introduced agricultural instruction into what would correspond to our district schools. Of these latter there are over one thousand in Prussia in the rural districts where the children are taught some of the rudiments of agriculture and most of these schools have a garden in connection with them. These low grade schools are being rapidly increased in number and are looked upon as being exceedingly helpful and desirable by the best educators in Germany and our experiment in Minnesota it seems to me, indicates that they would be fully as desirable here.

HORTICULTURE OF MONTANA.

BY PROF. S. M. EMERY, DIRECTOR AND HORTICULTURIST, MONTANA EXPERIMENT STATION, BOZEMAN, MONTANA.

Give us the halcyon days of "never change" or the time when history once written stands for all time, when new and varied experiences do not come rushing pell mell to the front, riding down and trampling into the dust, those of other days and the blessed Nirvana of the Buddhist will be attained; both students and authors will have reached the millennium.

Scientists having access to the reduced experience of the ages and likewise to field glasses so powerful that they can read the thoughts of the man in the moon, pretend, in a fashion, to predict, to foretell, and prognosticate from season to season, the workings of the weather. If they hit it, well and good. If they miss it, well—that is the fault of the season of course.

Those of us whose locks have been silvered by the flight of time, whose lot has been cast on the great northwestern frontier, where weather is made to order, know that each decade the gods give to us the very dregs of the weather cup, and that then we get the *worst* weather known to the oldest inhabitant. We know, too, that the trees able to take all the fickle, climatic changes which come to the border states of the Union and preserve unchanged

their general force of character, are not only good trees, but they are the trees to tie to.

Montana has many conditions—one of which is pretty well described in the words of one of her old settlers. He was stationed on the northern border, well across the state and in view of the main range of the Rockies. "We have had all kinds of extremes here this spring, floods, and three feet of snow on a level on the third day of May. On the eleventh of May there was a high wind, a wind that blew from sixty to eighty miles an hour, and for five hours it blew at the rate of thirty-five miles an hour, this is a very backward season."

And well it might be.

But the respect I have for Montana weather in general, compels me to say that such weather is abnormal here and the freaks of a freaky season may even be noticed in a state that possesses the best climate in the United States.

A passing reference to the unusual snowfall is perhaps permissible. The above mentioned statement is correct; the snow *did* fall; but, it did not stay; it went, and quickly, too; it was literally licked up and devoured by the Chinook winds, doing but little damage—comparatively; for spring lambs were coming then and often in unprotected quarters.

Little things of this kind are not feared by mountain men, strange climatic conditions prevail here, and we may profitably study some of them.

First, There is a great actual difference existing in conditions between Montana and the country to the east; country that is in the same parallel, between the western line of Montana and the Red River of the North that these differences of condition exist, is due solely to the environment of the mountains.

Montana covers 145,000 square miles, and a good third of this is pretty much on edge. If this third were flattened out, there would probably be a third more added to the area of the state, fortunately for her inhabitants though, this will never be done—or at least, not until we have "lost interest in the subsequent proceedings." This generous third consists of mountains whose mean altitude is over 8,000 feet above sea level.

Meteorologists tell us that a large per cent of the air currents, which, whilst often making life a burden, are also compensatory in moisture control, are present in the first 400 feet above the earth, and if we have natural barriers to these currents projected to a height of twenty-five times this distance, we certainly enjoy the means for changing conditions which prevail in any country where the wind pursues its even tenor for days at a time, unvexed by and bar to its progress. So it happens that there is but comparatively little wind, except in isolated cases; notably, the gateway of the Yellowstone river; whence it debouches from the mountains and out into the plains country. In making this change, it passes from the great natural basin of the National Park—with an altitude of 6,000 feet—down to the low lying levels of the Yellowstone Valley, much of which lies 4,000 feet lower. This river valley is a funnel, through which the air flows back and forth, the direction thereof depending on the temperature at either end of the canyon; it gives the residents therein, the full benefit of a steady breeze "the century round."

Per contra, that which in this case causes considerable discomfort, is really the mainspring of a great and growing business—live stock. Wherever fair soil and water are interassociated, alfalfa and wind are homogeneous terms. Then, too, the mighty besom of the air sweeps the winter ranges

clear of snow which would otherwise hinder open air grazing through the winter season.

Steady, continuous winds from the proper course, usually mean very hot or very cold weather—each in its proper season. The gigantic barriers thrown athwart the state from the northwest to the southeast, with their multitudinous divergent spurs, rob the winds of their power, and cause them to play in a minor key—as compared with their force and effect 500 miles to the eastward.

Again, the principal source of soil is from disintegrated rocks! Much of the formation of the Rockies is granite, this decomposes rapidly under the influence of the elements, and when mixed with humus—as it speedily is—forms the ideal soil for tree cultivation. To this disintegrated granite rock is undoubtedly added much matter originating in the volcanoes, which formerly were largely in evidence throughout this region, but have been extinct for ages. These outlying hills and valleys of ours are as rich as the world famed slopes of Vesuvius, where the vines bear in profusion their sun-kissed harvest of grapes. These hills and valleys of Montana have the same quality of soil; and the same titanic forces have created practically the same conditions.

These mighty wind breaks act also as conservers of moisture, their high lying peaks are clad with matchless white the year round, and the warm, heavily laden clouds—borne on the winds from the broad Pacific—give tribute to the land in life-giving moisture; whilst the plains country far to the east, is lying parched and dry.

Nor does the orchardist depend on the rains alone; the winter snow, lying as it falls, packed like ice and often in the form of slowly moving glaciers, gives down a little to the fierce heat of the long summer days, and the regular, steady supply of water in the mountain streams, is available for use, through the season of greatest need for moisture.

The position of the state—far to the north—gives us long summer days, and the rarity of the atmosphere gives concentrated power to the sun's rays. The first twitter of the early birds can be heard between two and three o'clock of summer mornings and medium print can be easily read by good eyes well along to ten o'clock p. m.

With heat, moisture and soil of the best, is it any wonder that trees—in common with other plant life—thrive to a degree that is remarkable and attain early and complete maturity, long before the same trees would under less advantageous conditions?

There are numerous conditions pertaining to tree life that are but imperfectly understood.

Why a tree should withstand 50 degrees below zero in one state and succumb at 35 degrees below zero in an adjoining state is one of the problems difficult of solution.

Experience has made me believe that available moisture and *condition* of soil are the main factors in tree growth and prosperity.

A steady and persistently low temperature, with soil congealed to a depth of—say from 4 to 6 feet—or far below the usual depth of roots, in a so called humid belt, but which is for the greater portion of the year literally arid, and we have all the conditions present for injury to wood. The crushing, grinding effect of excessive cold is manifested by the continuous contraction of the sap cells; and without any opportunity on the part of the tree to counteract this depleted circulation by a new supply of moisture, pumped up from below, new wood can neither be made nor nourished.

This means destruction, it can only be cured by removing the damaged wood with the pruning knife; by cutting back to sections of greater vitality. In doing this we have often to sustain, not only the loss of the new growth, but that of the entire tree. Yet it seems to me to be the only solution of a most perplexing problem.

We do know that many sorts of apples, crabs, pears, plums, peaches, apricots and cherries are succeeding well in Montana. We have recorded temperatures—ranging from 19 to 50 degrees below—to which the above mentioned trees were exposed. In 1898 there was 42 degrees below before the ground had frozen; a great loss was sustained; but strange to relate the loss was mainly confined to young and recently set trees; whilst the older and more valuable orchards came through with the loss of the fruit only.

The Montana State Horticultural Board is behind a systematic canvass of the orchards of the state, its object being to formulate a list of those trees which are planted in the state, together with the behavior of the different sorts under the effects of a season like the past; a season unprecedented in America in its harmful effects upon fruit trees.

This information will be available to the readers of the American Pomological Society and will be a valuable contribution to the cause for which the society so ably stands.

There is little doubt but that the root-grafted tree will prove itself to be a hardier tree than the budded. The "Duchess" [Oldenburg], the "Wealthy" and trees of similar degrees of hardiness have proved themselves sufficiently hardy to withstand any possible extremes of Montana weather. But I suppose the perplexing problem as to the most valuable varieties for the planter to set, will still exist, so many of the so-called semi-hardy trees have withstood the severest test—enough anyhow to cloud the judgment of the man wanting fruit that is both hardy and of a first class quality.

It is not always the most intense cold that kills. We have proved that point conclusively on the grounds of the Montana Experiment Station.

Selections were made of 125 different varieties of apples and crabs grown in the station nurseries for planting in a new trial orchard. These trees were dug between the dates of October 28 and November 14. They were heeled in by a very careful man, and securely buried on high ground two and a half feet below the surface. Between these dates the minimum temperature as indicated by the Fahrenheit thermometor averaged 23 3-5 degrees, the lowest being 2 degrees, the highest 33 degrees. No trees were dug whilst it was freezing, and there was no such exposure as would have caused the results as stated.

The trees had all received the same treatment, but of the sorts dug, the following have not leaved out at this writing, August 10; they doubtless will not do so now, and if they did, it would be too late for such growth to amount to anything, it would not possess sufficient vitality to supply needed food for future growth.

These trees were all under the same conditions as to propagation, irrigation, digging, burying, removal from the pit, heeling in and transplanting. The casual examiner would have seen no perceptible difference in the structure of the wood. All the new wood, as well as the old, was sound and plump in appearance, and apparently in the most perfect condition. It was not suspected that any physical reason existed in the tree to prevent growth, until it was too late to search for the cause by chemical analysis.

A microscopical examination of the sections of new wood, combined with a chemical analysis of the food supply of the past season, stored for the production of foliage, would undoubtedly have revealed the secret. To my mind, however, nothing is clearer than that one of two things occurred; i. e., either the cellular structure was impaired by the untoward freezing, or the elaboration of the food supply was cut short from the same cause. Few such opportunities are afforded to place one's finger on the exact time of serious injury, but this was one of such when the proof was absolute. Damage to trees is more often the result of an unpreparedness of the trees for sudden changes, rather than from the intensity of midwinter weather.

I am convinced that excessive damage or total destruction of trees is more a matter of maturity than anything else. *Well matured trees stand the test.*

Farther work will be done by us on these lines, substituting, perhaps, artificial cold for the genuine article, so that we may get at the proper combinations.

WHOLLY UNINJURED TREES ARE THESE.

Autumn Strawberry,	Duchess [Oldenburg],	Early Strawberry,
Blacktwig,	Florence,	Greenwood,
Early Strawberry crab,	Gano,	Gideon,
Golden Beauty,	Hibernal,	Montreal,
Hyslop,	Milton,	Orange,
Martha,	Pride of Minneapolis,	Ramsdell Sweet,
Okabena,	Transcendent,	Winter Sweet,
Russet,	Wealthy,	Wolf River,
Whitney,	Allens Choice,	Yellow Transparent.
Alaska,		

DEAD TREES ARE THESE.

Arkansas Black,	Belle de Boskoop,	Delaware,
Hubbard,	King,	Lawver,
McIntosh,	R. I. Greening,	Smith Cider,
Spitzenburg,	Shockley,	Utter Red.

TREES OF WHICH FOUR OUT OF FIVE ARE ALIVE.

Alexander,	Borsdorf,	Cole Quince,
Price Sweet,	Plumb Cider,	Queen Choice,
Tolman Sweet,	Van Wyck,	Walbridge,
White Arctic,	White Winter,	York Imperial.
Yellow Bellflower,		

TREES FOUR OUT OF FIVE DEAD, ARE THESE.

Baldwin,	Maiden Blush,	Rambo,
Early Harvest,	Roxbury Russet,	Scott Winter,
Gravenstein,	Sweet June,	Canada Red,
Mann,	Clayton,	Grimes Golden,
Ralls Genet,	Early Pennock,	Lowell,
Twenty Ounce,	Jacob Sweet,	Rolfe,
Early Red,	Milam,	Ribston *Pippin.*
Huntsman,		

MY THEORIES REGARDING PEACH CULTURE.

BY R. MORRILL, BENTON HARBOR, MICH.

First, The vitality of the young trees must be carefully guarded in the nursery and between the nursery and planter as a first class orchard cannot be grown from trees at all weakened by careless handling or exposure.

Second, Location must be high and fairly rolling with soil of proper character.

Third, When the orchard is set the soil must be given up to the trees and they must not be secondary to any other crop.

Fourth, The trees should be grown with the greatest possible vigor consistent with sound, well ripened wood, as we want the greatest possible bearing area in the shortest possible time.

Fifth, When trees come to bearing age they should be worked up to their capacity and never beyond it; this is a vital point in securing full and regular crops and long life for the tree.

HOW WE PRACTICE OUR THEORIES.

As far as possible I grow my own trees, budding from young bearing trees, those three to five years old preferred, the object being to secure early fruiting in orchard and absolute certainty as to variety and besides there is a wide variation in the quality of trees of the same variety, owing to "bud variation," and we are enabled in this way to select the best trees for "breeding with a pedigree."

When trees are grown in a nursery we never allow hand stripping of foliage, insisting that foliage must ripen naturally and fall before digging. I practice late fall digging, heel in at a low angle and cover with evergreen boughs to protect from extremes of weather. Then set very early in spring as the sap starts quite early in the peach, and any check given after it has started weakens the vitality and recovery is never complete.

The location for the orchard must be higher than the surrounding country to secure proper atmospheric drainage, and the soil preferred is either good sandy graveley loam having a dry and naturally well-drained subsoil and at least thirty feet above permanent water level.

For first two years some secondary crop may be grown, but it must be one that does not mature and make its heavy draft on the soil moisture earlier than August 15, as we must have the strongest possible growth up to September 1st, which must not be interfered with by the ripening of any other crop, as such interference puts the young tree into a semi-ripe condition too early, and as this is likely to be followed by wet and warm weather with strong flow of sap and a second growth of wood that will surely be seriously injured by severe winter weather and may be killed outright. I am satisfied that thousands of peach orchards have had their lives must shortened, or perhaps ruined by the owner's ignorance of the relation between these secondary crops, or the after culture, and the proper maturing of the peach wood and buds.

After the second year I begin culture by plowing about three inches deep with a gang plow, following this with a spring-tooth harrow and then with a smoothing harrow and later with a Breed weeder, going over the orchard with harrow or weeder twice each week until cultivation ceases. This is influenced so much by crop and weather conditions that no fixed rule can be given, but my orchards are cultivated from twenty to forty times each season. This plan secures the strong, rapid growth so desirable early in the season, as the culture begins just before or after the blooming period.

I practice the heading back and thinning out plan of pruning, and find it entirely successful in the hands of competent men. It is important

that all pruning of the peach should be done while growth is absolutely dormant. This plan makes large stocky bodies and strong limbs and crotches, enabling the tree to carry heavy crops of fruit without supports of any kind, and without injury to the limbs.

When a crop of fruit is established on a tree, I plan to allow the peaches to grow not nearer than six to eight inches apart and this thinning must be done before the pits begin to harden. There are two periods in which a peach tree gets a perceptible check in its growth. The first is the blooming period, and the second is the pit-forming period, and from this fact it is evident that the bloom should be reduced to a minimum by early severe pruning in years when there is an abundance of live buds and this should be followed by a thorough thinning of the fruit before the pit-forming period. By following this course trees go into winter strong and full of vitality and capable of wintering live buds and sound wood, while trees that are not controlled in this manner fail.

SYSTEM.

It is very important that all operations be systematized, using only the best implements, and putting up and marketing the fruit in the best possible manner.

The results of the above outlined plan of peach culture have been highly satisfactory. Since my first orchard was two years old it has never failed to give a fair to heavy crop of fruit annually, and my oldest trees, now ten years old, after bearing eight successive crops, are increasing in vigor and fruiting capacity and bid fair to furnish as many more full crops.

As for the financial returns I will only say that the peach is my most profitable crop, always selling above what is known as the top of the market.

THE VALUE OF NURSERY INSPECTION.

BY PROF. F. M. WEBSTER, OHIO AGRICULTURAL EXPERIMENT STATION, WOOSTER, OHIO.

Nursery inspection is purely an American innovation. Lately, other nations are coming to adopt this method of controlling the diffusion of insects and fungus pests, by placing nurseries under a system of surveillance, which, if faithfully carried out, by those whose duty it is to make the examination, and the owners of the premises, can but result in universal benefit to the nurseryman and the fruit grower.

The nearer that a certificate of inspection comes to meaning exactly what it represents to mean, the better it will be for all parties concerned. If it does not fulfil this requirement, then it is of no reputable value to any one, and represents a sad misuse of both labor and money. If, however, the inspection has been made with reasonable care, and the nurseyman does not permit the use of the certificate issued on stock that has not been inspected, then the document will materially add to the value of the stock upon which it is placed. It will mean what it represents to mean, viz.: that one whose business it is to recognize certain things, has examined the premises on which the stock was grown, and found no indication of the presence of these things.

No reputable inspector will, or has ever been willing to make the definite statement that these organisms did not occur in any nursery, hence, all reliable certificates of inspection simply show that an expert has not found evidences of the presence of certain insect pests or plant diseases. There are occasionally outbursts of criticisms to the effect that certificates are unreliable, and cannot be taken as indicating the condition of stock to which they are attached. Let me say that if the nurseryman has done his part faithfully, they do indicate the probable condition of such stock, and that is all that they propose to do. Entomologists are human, and therefore make an occasional mistake, and may overlook the San Jose scale in a nursery, on the first inspection of the premises, but they will be almost sure to detect its presence the second time they go over the ground. Besides, every annual inspection of a nursery makes a certificate of inspection more dependable.

It is unfortunate, for two reasons, that the first law to be enacted, the Maryland law, demanded certificates of absolute freedom from San Jose scale. First, inspections and certificates were innovations; and there were two or three entomologists in the United States, who obligingly allowed their names to be attached to that sort of a certificate, to enable nurserymen to ship stock into Maryland, and, second, it unfortunately gave nurserymen the idea that certificates were matters of form, intended mainly to enable them to ship their stock into Maryland, and not as showing its condition. Thus, inspection certificates were obscured by disrepute at the very beginning, and some few nurserymen have not, even yet, been able to disabuse their minds of the original idea. If the first Maryland law had been less rigid and not demanded impossibilities, its evasions would not have been so generally attempted. If the few entomologists on whose shoulders the brunt of the battle first fell, had held fast and refused to give a certificate of absolute freedom, in order to aid in evading the law, and insisted that their certificates must stand for higher and better purposes; if nurserymen had stood by these entomologists and each other in this matter, then certificates of inspection would have been born into this world unshadowed by suspicion and disrepute. Following the letter and breaking the spirit of the law is sure to prove disastrous to somebody. The nurseryman who attaches a certificate to uninspected stock may think he is doing a sharp trick, and that, in case of trouble, he can shift the responsibility on to the inspector, who never certified to absolute freedom, and therefore, could not say, under oath, that he had not overlooked certain insects and diseases, and that the stock infested had not passed under his inspection, as, once removed from the premises on which it is grown, identification is almost or quite impossible. This is the reason why I have always insisted that the premises of a nurseryman shall be included in his certificate. Nursery stock may come and go, and identification be rendered impossible, but the premises remain and can be located and identified, and will stand as proof of the faithfulness of the inspector. The criticism has been raised, that as an inspector cannot possibly inspect every tree in the nursery, therefore certificates are worthless. Now, meats, grain, liquors, etc., are inspected by sample. Given a block of nursery stock, we all know that there are but two methods whereby this can become infested, by insects or disease. Either these must come from surrounding vegetation, or they must be introduced on buds, cions, grafts or cuttings. If the surrounding premises are clear and free from certain pests, and the trees from which the buds, cions, etc., came are found to be also free, where is the use of inspecting every tree in the block? Will not these last

prove more than the stock itself? An inspector does not need to go over a nursery many times before he will know as much, or more, about its condition than the owner himself. Besides it is possible for an entomologist to learn more about stock that a nurseryman purchases in another state than either the grower or the buyer may themselves know. In short, if the growers will be honest in the information given an inspector, in regard to the source from whence they receive their buds and cuttings, they will add very materially to the value of their certificates, and make the labor of the inspector far less arduous and much more satisfactory to all parties interested. This course will pay in more ways than one.

For myself, I have always held that if nurserymen are to be kept under surveillance, they should also have the right to demand that the country about them shall also be kept above suspicion. A law that affects only the nursery row, and not the adjacent orchards and grounds in the vicinity, is only, to a limited degree, what it should be, and I would give little for a certificate that does not include the word premises. It is here that fumigation has its chief value, if properly done, but if not properly done it is worthless. But to substitute fumigation for inspection, will be only to make matters worse, instead of better. There must be both in order to get the greatest benefit. As nurserymen know each other pretty well, further explanation is unnecessary.

The nurseryman is both a scientist and a business man. His "art does but mend nature;" but he must buy as well as grow and sell. None but the smallest local concerns can do otherwise. He must of necessity mix the purchased stock with that of his own growing, and thus his stock will represent not only his caution or carelessness, as the case may be, but that of his fellows generally. Fumigating, carefully done, will reduce his danger from this source.

Occasionally I have seen such reasoning as this; if the San Jose scale is found on my stock, I can throw the responsibility on the inspector, who dare not say on oath that it was not present, and overlooked by him in his inspection. Just so! But, as I have previously stated, the premises are there to show the actual condition. Stock may go into the trade and become mixed so that it can never be recognized, but the letter files of the inspector, if brought into court, will often clear up a vast amount of obscurity, affording unexpected help for the innocent, but equally unexpected retribution for the dishonest and guilty. Be straighforward and use your best efforts to keep clear of suspicious stock. If the inspector is incompetent or careless, see that he suffers the consequences, for he of all men has no business to be either the one or the other.

The value of a certificate of nursery inspection, then, will depend upon the efficiency of the inspector, and the use that is made of the document in the hands of the nurseryman. Its reliability will increase year after year until it will indicate almost, or quite, the exact conditions of the permises of the party to whom it is given. If nursery inspection and certificates are in disrepute, it is because nurserymen of that character have made them so.

There are plenty of honest nurserymen in the country, and entomologists are doing their best to carry out their duties, faithfully, and with full confidence in each other, and I cannot see why nursery inspection and the entomologist's certificate of such, should not serve every legitimate purpose for which it is intended. There is in every profession, or calling a disreputable element, and it is to the better classes that we have always to look for

whatever of good there is in any system or regulation, and nursery inspection and the inspector's certificates are no exceptions. As in everything else, the earliest efforts were more or less crude and unsatisfactory, but as I have said, each year renders the certificate of inspection more accurate and reliable and it is to be hoped that nurserymen will see to it that no act of theirs shall detract from its reliability and usefulness.

Lastly, we must not forget that all the while we are, to a certain degree, setting the standard of foreign inspection and certification, and therefore foreign as well as domestic certificates of nursery inspection will be what the better and more reliable class of nurserymen make them.

THE RUSSIAN REMEDY FOR ROOT KILLING OF APPLE TREES.

BY PROF. N. E. HANSEN, SOUTH DAKOTA AGRICULTURAL COLLEGE, BROOKINGS, SOUTH DAKOTA.

The past winter has wrought widespread destruction in the northwestern nurseries and young orchards and the afflicted area extends far to the south. Hundreds of thousands of apple root grafts have been root-killed, and the tales of woe come from very many localities even in Missouri. The winter of 1872-73 will long be remembered by fruit men for devastation wrought, the winter of '84-5 was another, and now that of '98-99 is added to the list.

At Brookings we find apple root-grafts root-kill every winter unless deeply covered. Nearly six thousand were root-killed in the winter of 1896-7. Root-grafts that had made a good growth in 1897 were taken up in the fall of 1897 and wintered in cellar. Root-grafts made in the winter of 1897-8 were planted at the same time in the spring of 1898. Both lots root-killed. In all hardy varieties we find the scion alive and sound, but the American seeding root dead. Both Vermont apple and French crab seedlings root-killed. The Hibernal and other hardy varieties had not rooted sufficiently from the scion to carry the tree through; indeed, the past winter the scion roots of all (even Hibernal and Duchess) of the cultivated varieties winter killed. So that "trees rooting from the scion" will not be hardy enough in winters like that of 1898-9. Several hundred seedlings were grown in 1896 from seed of wild crabs gathered near DesMoines, Iowa, but all but one plant were killed the first winter. A similar number of French crab seedlings were planted in the spring of 1898, but not a solitary plant survived the past winter. Will the experience of the past winter change nursery methods? Probably very little, except in the northern nurseries. Commercial methods change slowly, and the test winters do not come often enough to compel a quick changing. Certain it is that the western American method of winter root-grafting makes possible the production of apple trees at prices lower than those of Europe with cheap labor.

Let us make a flying trip to the largest empire in the world, Russia, a country containing one-seventh of the earth's surface. We will find that the growers in the northern fruit-growing regions have had the same trouble with root-killing, that our tale of woe was theirs also years ago, but that they have met and solved the problem and are now masters of the situation.

In 1894, with the kindly assistance and advice of my teacher, Prof. J. L. Budd, the writer visited the Imperial Agricultural College at Moscow, Russia, and in 1897 the visit was repeated when sent on a tour of exploration by Hon.

James Wilson, Secretary of Agriculture, to secure new seeds and plants for the United States Department of Agriculture in the dry parts of eastern Russia, Central Asia, China and Siberia. Prof. R. Schroeder, the venerable head of the horticultural department, has been in the government service over fifty years. He said that the Russian method of preventing the root-killing of apple trees was to use the true Siberian crab, *Pyrus baccata*, as stock. The seedlings are transplanted into nursery rows and budded at the usual time in August. The trees make a good growth in the nursery, bear at least two years earlier in orchard, and are dwarfed somewhat in size of tree. In the southern parts of Russia, as at Kiev, where even French pears are grown, I found the nursery stocks to be mostly ordinary apple seedlings from Germany and France, as they were cheaper than apple seedlings of Russian origin, which were difficult to obtain in commercial quantities. (A similar state of affairs obtains in our eastern states where crab seedlings imported from France, or grown from imported seed, are at times cheaper than seedlings from seed saved at our cider mills.)

Pyrus baccata is the hardiest known species of the apple and is hardy even at the agricultural experiment station at Indian Head, about 350 miles west of Winnipeg on the Canadian Pacific Railway, where the thermometer goes down to 52 degrees or more below zero. It is found especially in the Transbaikal section of Siberia, east of Lake Baikal, where the climate is purely continental. The coldest month has a temperature of minus 28 degrees C. (or minus 18.4 degrees Fahrenheit), the hottest month 19 degrees C., (or 66.2 degrees Fahrenheit.) Difference between winter and summer temperature 42 degrees C. (or 75.6 Fahrenheit). The mean annual temperature is 2 3-4 degrees C., (or 27.05 degrees Fahrenheit). A Russian government report says: "As for the mean temperature of the vegetative period, although it is 1-2 degree below that of the cultivated zone of eastern Siberia, amounting to only 13.5 degree, yet the cereals, notwithstanding the constantly frozen soil in some places of this country at a depth of 1½ arshine (42 inches), ripen well, thanks to the more powerful action of the sun's rays, depending not only on the southerly situation of the Transbaikal, but also on the cloudless and transparent atmosphere, as compared with the cultivated regions of eastern and western Siberia.

"In reference to the amount of rainfall, the climate of Transbaikalia is also incomparably more continental than that of the agricultural zone of Eastern and Western Siberia. The quantity of moisture precipitated here in the course of the whole year does not exceed 290 millimeters (11.42 inches), instead of the 360 and 380 of the agricultural zones of Eastern and Western Siberia, while the winters are almost entirely snowless, with 13 millimeters (.51 inches) during the whole season. Fortunately the summer rainfall, as much as 200 millimeters (7.87 inches), is considerably higher not only than that in Eastern, but than that in western Siberia, and the conjunction of these conditions explains the fact that the Transbaikal country may even today be considered the chief granary of the whole Amour-Littoral region."

The above facts tend to show why *Pyrus baccata* does not root-kill in Russia, Dakota, or Assinaboia. Young seedlings of this species raised last year at Brookings from seed obtained by the writer while in Russia, as well as one year old trees secured in Russia at the same time, came through last winter in perfect condition.

I will describe a one-year-old tree of *Pyrus baccata odorata*, which survived the winter, whip-grafted on a piece-root of Vermont apple seedling. The

seedling was grown by a western nurseryman from Vermont seed. The scion was cut from a tree imported from Germany early in the winter of 1897-98. The graft was made in the winter of 1897-98, planted the following spring and made a growth of 17 inches the first year. Among a lot of several hundred root-grafts root-killed in the winter of 1898-99 (minimum temperature—40 degrees Fahrenheit), this tree was conspicuous for its vigorous growth from the terminal bud. Careful digging soon furnished the explanation. The scion of the original graft was alive and healthy; the Vermont apple root was dead and the sap had fermented. The scion had, however, thrown out a strong root; this was perfectly healthy and enabled the scion to begin a vigorous growth. The only part of the entire tree affected by the winter was the seedling root.

MINNESOTA EXPERIENCE.

In September, 1898, the writer called on Peter M. Gideon, the originator of the Wealthy and Peter apples, the Martha, Florence, Lou and October crabs, and many other varieties of apples and crabs. Mr. Gideon began his experiments in fruit culture about 45 years ago and has grown and sent out many thousands of seedlings, chiefly of Siberian crabs. Mr. Gideon's fruit farm is situated near the shore of Lake Minnetonka at Excelsior, Minnesota. In reply to a question Mr. Gideon said: "If the ground is moist in the fall an ordinary apple seedling will not root-kill; if dry it will. But a Siberian crab root will come out all right and not root-kill on dry soil while every American seedling root will winter-kill. Even a Siberian root sticking out of the ground after digging, I have known to form a terminal bud and make a tree. A mulch is always good in the fall to prevent root-killing. I have often had hardy varieties in nursery with all the American seedlings roots dead in the spring, but a single root which had come from the scion had survived the winter, and this pulled the tree through. We greatly need hardy stocks for the apple used in a commercial way. In my opinion, no hardier stocks could be grown than those of the iron-clad cross-bred Siberian seedlings I have sent out."

VARIETIES OF PYRUS BACCATA.

In this connection it will be of interest to give the late Dr. E. Regel's description of this species. Dr. Regel was for many years director of the Imperial Botanic Gardens at St. Petersburg. The following extract from Regel's Russian Dendrology (vol. IV, p. 269; St. Petersburg, 1874), was translated from Russian into German by a translator at the St. Petersburg Botanic Gardens, and the writer rendered this into English as follows:

THE SIBERIAN APPLE TREE, PYRUS BACCATA.

"The leaves are oval, tapering, flat, shining on the upper surface, light green, sharply toothed on the margin. The petioles are usually longer than one-half of the leaf surface. The fruits are borne on long thin stalks which are several times longer than the fruit and are attached to the same in a depression of the base [cavity]. The calyx is cast o fftowards the time or ripening, through which characteristic *Pyrus baccata* is easily distinguished from *Pyrus prunifolia*, to which it is closely related. *Pyrus baccata* flourishes throughout all Siberia into northern Japan and on that account deserves consideration,

because it is one of our best and hardiest trees for the garden. The large white or reddish blossoms are set on one-colored stalks arranged umbrella-fashion. The calyx is externally flat, on the inside downy, the style is flat *Pyrus baccata* is in full blossom the end of May and in June.

The cherry-like fruits of several of the varieties serve in the fall to beautify gardens and parks. The fruits of other varieties are used, when they have been touched by frost, for preserves, or, in spite of a certain acerbity, as a delicacy by the peasantry, as for example the fruit of *P. prunifolia.*

In the *Gartenflora,* 1862, and in the "Russian Pomology," Vol. I, figures g, i, k and l, the most beautiful varieties of this tree are figured. The varieties are as follows:

1. *Genuina.* The fruits are nearly spherical, approximately of the size of a large currant; the ripe fruits are yellowish purple. This variety is in its wild state the most widely distributed. Figured in Gartenflora, p. 364, fig. 2, Guimp. fr. Holzgen, p. 126.

2. *Praecox.* The fruits are very small, the size of a common currant, dull purple when ripe, trasparent after the first frosts. The flavor is milder. Figured in Gartenflora, p. 364, fig. 3. Russ. Pomologie I, fig. h.

3. *Oblonga.* The fruits are elongated oval, 5-8 inch in length and not much smaller in breadth, blood red when ripe.

4. *Aurantiaca.* The fruits are roundish oblate, often ribbed, when ripe orange colored with dark narrow stripes, 5-8 inch in length, 3-4 inch in breadth. Figured in Gartenflora, p. 364, fig. 4. Russ. Pomologie I, fig. i.

5. *Macrocarpa.* The fruits are roundish oblate, 3-8 inch in length and somewhat more in breadth, when ripe yellow with red on the sunny side.

6. *Cerasiformis.* The fruits resemble in size and form a moderate sized cherry, elliptical, ribbed, 5-8 inch in length and breadth, when ripe yellow, later scarlet red on the sunny side or over the entire surface. In fruit gardens this variety is known under the name "Chinese apple tree." The fruit is used chiefly for preserves. The tree presents a beautiful appearance in autumn. Figured in Gartenflora, p. 364, fig. l. Russ. Pom. I, fig. 6. Synonym; P. cerasiformis Turt.

7. *Conocarpa.* The fruits are conical with a broad base tapering at the apex, 5-8 inch in length, ribbed, blood red when ripe.

8. *Edulis.* Very similar to the variety *cerasiformis,* the fruit, however, is of more pleasant flavor. It is the best variety for preserves.

9. *Costata.* Fruit oblate round, ¾ inch in breadth, ½ inch in length, blood red when ripe.

10. *Sanguinea.* Similar to the preceding variety, the fruits are, however, not ribbed.

11. *Lutea.* Fruit the same as that of variety *genuina,* but when ripe yellow with red cheek.

12. *Obconoidea.* The fruits have a narrow base, are obconical, ribbed, ⅝ inch in breadth, when ripe orange yellow with red tracing."

In this connection it will be well to give Dr. Regel's description of *Pyrus prunifolia,* commonly called the large fruited Siberian crab, translated from the same source in the same manner (Regel's Russian Dendrology, Vol. IV, p. 266).

PYRUS PRUNIFOLIA, WILLD.

"A tree of medium size which attains a height of up to thirty feet and endures the severest frosts. The leaves are oval or broadly oval, obtusely

pointed, serrate. The petiole is usually longer than half the leaf, when young the petiole, as well as the leaf, slightly pubescent, later quite smooth. The leaves are light green, yet not so shining as those of *Pyrus baccata*. The leaves are sharply saw-toothed, the serrations short and sharply pointed. The flowers are large, white, sometimes with reddish cast, borne in great numbers on the ends of the short side shoots. The one-colored slender flower stalks are united in close clusters. The inner side of the calyx and the lower part of the pistil are usually covered with white pubescence. The calyx segments are presistent in the basin of the ripe fruit. This caracteristic distinguishes *Pyrus prunifolia* from *Pyrus baccata*. The slender fruit stems are longer than the ripe fruit and are set in the depression on the base of the fruit [cavity]. The flavor of the fruit is sour, somewhat bitter; there are, however, varieties with milder flavor; these varieties are in all cases the most resistant of our hardier Russian apple trees. *Pyrus prunifolia* is one of our trees with beautiful blossoms; at the end of May and the beginning of June this tree is covered with handsome white and reddish flowers. The form of the fruits is much varied; some of them are so beautiful that as they ripen in autumn the tree is decorated for the second time. These fruits are cherry-shaped, from one-half to one and one-half inches long, and cover the tree in immense numbers.

The varieties are as follows:

1. *Suaveolens*. Large flowers, reddish externally, fragrant, on which account this tree is adapted for gardens.

2. *Microcarpa*. Fruits small, oval, red at maturity.

3. *Oviformis*. Fruits ovate, when ripe yellow with red tracing. Figured in Regel's Gartenflora, p. 364, fig. II. Russ. Pom. I, fig. h.

4. *Conocarpa*. Fruits conical, with oval base, when ripe green with red on the sunny side.

5. *Intermedia*. The fruits are flattened—spherical, ribbed, yellow when ripe, blood red on the sunny side, 7-8 inch in length, 1 1-8 inches in breadth. Figured in Gartenflora, p. 364, fig. 9. Russ. Pom. I, fig. d.

6. *Chlorocarpa*. Fruits either spherical or flattened—spherical, when ripe, green with red on the sunny side.

7. *Xanthocarpa*. Fruits roundish-oval, when ripe yellow, 3-4 inch in length, less in breadth.

8. *Calvillea*. Fruits oval or nearly spherical, ribbed, when ripe scarlet-red, about one inch in length and breadth. In autumn this variety is very handsome. The fruits are used for preserving; they are very similar to *P. baccata cerasifera*, but are distinguished by the fact that the calyx segments do not fall off from the ripe friut.

Synonym. *P. cerasifera* Tausich var *calvillea*. Figured in Gartenflora, p. 364, fig. 8. Russ. Pom. I, fig. c.

9. *Macrocarpa*. The fruits are one inch in length and breadth, nearly spherical, ribbed, when ripe green. Figured in Gartenflora, p. 364, fig. 10. Rus. Pom. I, fig. i.

10. *Striata*. Fruits oval, one inch in length, when ripe yellow with dark red stripes.

Pyrus prunifolia flourishes in southeast Russia and in southern Siberia. It is propagated from seed. The varieties preserve their characteristics only when grafted.

Very similar is *Pyrus spectabilis* Ait. from China; this grows, however, usually in bush form and is covered every year with abundant reddish blossoms.

Pyrus Kaido, P. Ringo and *P. armeniacifolia* are garden varieties; they are not resistant to our winters.

LATER AUTHORITIES.

The full history of *Pyrus baccata* and *Pyrus prunifolia* in a state of nature and under cultivation is yet to be written. Since their introduction into America they have been grown in mixed orchards, especially in the western states, and very many hybrids with the cultivated apples have originated under cultivation. Many of these are too much subject to blight to be of value, while others are regarded as very valuable, especially in the prairie Northwest, owing to hardiness and productiveness. The true *Pyrus baccata* has been neglected, owing to small size of fruit, and ignorance of its value as a hardy stock.

As to the original home of these two species, Dippel gives *Eastern Siberia, China and the Himalayas as the native home of *Pyrus baccata,* and China and Japan (p. 398) as that of *Pyrus prunifolia.*

Fr. Th. Koeppen in discussing the indigenous distribution in Russia of *Pyrus Malus*† concludes as follows (page 417): "Finally, in this connction should be named *Malus* (*Pyrus*) *prunifolia* Willd, which form, according to Regel, is said to grow in southeastern Russia (?) and in southern Russia. Meanwhile from the whole Russian empire I find not a single certain locality where it has been found (Fundortsangabe). Ledebour gives only Siberia (and also this with a question mark), as the native habitat of this form."

Prof. L. H. Bailey refers crabs of the Transcendent and Hyslop type to *P. prunifolia* Willd., and considers them hybrids of the common apple and *Pyrus baccata.* After a visit to Berlin Prof. Bailey writes†† "Willdenow's type of *P. prunifolia,* preserved in Berlin, shows flowers and leaves, and has the botanical characters of the Transcendent and Hyslop crabs. It is almost unmistakably a hybrid of *Pyrus Malus* and *P. baccata.*"

Koehne§ gives Siberia and North China as the habitant of *P. prunifolia* and the *Himalayas,* China, Amur province and Siberia as that of *P. baccata.* Dr. Regel, as has been noted, makes the deciduous calyx segments the distinguishing characteristic of *Pyrus baccata.* This characteristic is also emphasized by Dippel and Koehne. Koehne mentions *P. prunifolia* as having taken part in the evolution of our cultivated apples. Koehne and Dippel both use the older generic name *Malus* instead of *Pyrus.* Dippel gives *P. baccata odorata* (p. 404), with fragrant blossoms, as being probably a hybrid; Koehne (p. 261) considers this to be a hybrid of *baccata* and *prunifolia* ("M. baccata x prunifolia") and states there are many such hybrids which for the most part can not be determined without the fruit. This *odorata* variety, noted as hardy at Brookings, was imported from the nursery of L. Spaeth, of Baumschulenweg, near Berlin, where Koehne made many of his observations.

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*Handbuch der Laubholzkunde. Vol. III, p. 404. Berlin, 1893.

†Geographische Verbreitung der Holzgewaechse des Europaeischen Russlands and des Kaukasus. Erster Theil, p. 404-417 in Vol. V. of "Beitraege zur Kenntniss des Russischen Reiches und der angrenzenden Laender Asiens." St. Petersburg, 1888. Auf. Kosten der Kaiserlichen Akademie der Wissenschaften herausgegeben von L. v. Schrenck und C. J. Maximowicz.

‡The Evolution of Our Native Fruits. p. 272.

§Deutsche Dendrologie, Koehne, p. 260. Stuttgart, 1893.

Dr. Schroeder of Moscow, Russia, told me of having had good results with *Pyrus prunifolia* as a stock but outside of Moscow I heard only of *P. baccata.*

The following article "Apple Seedlings for Stocks" was translated from Russian in the same manner as the notes from Regel's Russian Dendrology. It is from a work on "Commercial Horticulture" by Alexander Kondratevitch Grell (Moscow, 1897) p. 65:

APPLE SEEDLINGS FOR STOCKS.

Among the seedlings which are used for stocks, I give the preference above all to the Siberian "berry apple" (crab). There are two varieties of this species which are both used for the propagation of seedlings, viz., *Pyrus baccata var. cerasiformis aurea* and *Pyrus baccata var. cerasiformis rubra.*

The Siberian apple tree which is known in gardens under the erroneous name "Chinese apple tree" grows wild in southwest Siberia and northeast China, bears small, round fruits, which are golden yellow in the first named variety and reddish in the second named variety. To this I count also a third species, useful in the highest degree but as yet but little distributed among us, viz., *Pyrus prunifolia var. macrocarpa.* Both of these species and their varieties are very pretty small trees which are laden every year with innumerable yellow or red fruits and give an extremely heavy crop of small seeds. The seedlings of the Siberian apple do not form so thick stems as those of the cultivated apple. When one grafts any desired garden variety on a Siberian crab, the stem below the point of union always remains thinner than above the same, hence an outgrowth arises at that place. When, on the contrary, the Siberian crab is grafted on a garden variety, the reverse condition arises, i. e., the stem beneath the point of union becomes thicker than that above.

The local peasant nurserymen who are familiar with these characteristics, grow the Siberian crab for sale for stocks on forest or garden varieties*. The Siberian crabs propagated in this manner grow faster than those grown from seed. Aside from the fact that the varieties grafted on a Siberian crab form neither too thick a stem nor a too thickly branched top, I give to the Siberian crab seedling above all the preference, and for two reasons: (1) Varieties grafted or budded on the Siberian crab bear much more and earlier fruit and (2) suffer much less from frosts. In a severe winter in the Borokow district in the Kaluga province all varieties of the apples were killed with the exception of a few which had been grafted on *Pyrus prunifolia macrocarpa.* Only these few escaped without injury. Since that time this species has been known only as the "unconquerable" in the Borokow district and in Wereja. Hence it is not at all necessary to search for other wildings for stocks since there are present for us in *Pyrus prunifolia macrocarpa* characteristics of such immense value. Some say that varieties grafted on the Siberian crab are not long lived, but this assertion is wholly without foundation since a tree of *Pyrus baccata genuina* planted by me in Moscow in 1859 is still growing and bearing fruit, and at M. F. Essen's is found one that has already reached its fiftieth year. Next after the Siberian crab in hardiness and longevity comes the forest apple wilding, and after that come the seedlings of garden varieties.

* By this is meant *Pyrus Malus* which grows wild in parts of Russia.

The fruit of the Siberian crab is used for sauce, preserves, etc., and the seeds for the raising of new improved seedlings. After the ripe fruit has been gathered the cores must be removed. This is done quite easily. Take a narrow, thin strip of tin, sharpen one edge and wrap it around a slender lead pencil. The instrument is ready and by pressing this small tube through the middle of the fruit the whole core is removed and the flesh is left to be used for sauce, preserves, etc. A very good seedling for stocks is also *Pyrus Malus* which is found distributed far to the north. The seedlings of garden varieties are far inferior to the above named varieties. From six poods (216 lbs. avoirdupois) of garden varieties one obtains only one pound good large seeds, while from the same quantity of *Pyrus baccata cerasiformis* one obtains ten times, from *Pyrus prunifolia macrocarpa* six to eight times, and from *Pyrus baccata genuina* one hundred times as many seeds, only that they are very small."

THE PROBLEM BEFORE US.

It now remains to be settled by experiment which is the best form of the Siberian crab to use for stocks. Judging from the foregoing notes and from numerous inquiries made while in Russia, the writer is inclined to consider *Pyrus baccata* as the best for our use. It is the hardiest known species of the apple and the influence of hybridity will not come in as a disturbing factor in ascertaining results. Seed from Siberia is not yet obtainable in commercial quantities but with the opening of the new Siberian railway this difficulty will soon be obviated. Just east of Lake Baikal *Pyrus baccata* is said to occur in such abundance that a certain range of mountains is called "apple mountains." The writer is endeavoring at present to obtain more seed from this region.

The Transcendent and Hyslop crabs blight so badly at Brookings as to be worthless. The old Yellow or Red Siberian, with fruit the size of a cherry or less, may prove very useful, also the old Cherry crab; old trees, forty years old or more, are found scattered through the older parts of the west and at present are neglected because of small size of fruit. The seed of all such should be carefully saved. Mr. Gideon's plan should also be tested of saving seed from hardy hybrid Siberian crabs.

Experience has already shown that the cultivated apple makes a poor union in top-grafting upon the Siberian crab. Nor will root grafting on pieces of crab root be enough. No roots from the scion should be permitted. The stocks for a fair test should be handled much like the Mahaleb or Mazzard stocks for the cherry in the eastern nurseries, setting the stocks in nursery first, and afterwards, when established, budding or grafting the cultivated apples on them. It may largely do away with root-grafting in the winter, and hence make trees more expensive, but the method is worth trying. Perhaps both hybrids and pure seedlings will be too much subject to blight for the method to be successful in all localities. But certain it is, that the present method of growing apple trees on French crab or Vermont cider apple seedlings will not do for a considerable area of the northwest in test winters.

It will take many experiments to fully settle the question. Let all who can try a few and report results.

SUMMARY.

1. The ordinary American and French apple seedlings (*Pyrus Malus*) now used as stocks for the cultivated apple are not sufficiently hardy over a large part of the prairie Northwest in severe winters. This causes much loss from root-killing, and the hardy top, thus left without a root to support it, necessarily perishes.

2. The American wild crab (*Pyrus Iocnsis*) as found native at Des Moines, Iowa, winter-killed at this station and hence is not sufficiently hardy to use as a stock. It has not been found native in South Dakota save in the southeastern corner.

3. The experiments at this station show that the roots thrown out from the scion in root-grafts of the hardy varieties of the cultivated apple are hardy in ordinary winters, but did not prove hardy the past severe winter (1898-99), minimum temperature forty degrees below zero Fahrenheit.

4. The true Siberian crab (*Pyrus baccata*) is the hardiest known species of the apple and if it proves sufficiently exempt from blight may prove of great value as a stock in sections where root-killing is a source of trouble. Young plants of this species proved perfectly hardy the past winter on the grounds of this station.

5. Translations from Russian authorities are given to aid in distinguishing *Pyrus baccata* from other closely related crabs.

6. A root-craft of *Pyrus baccata odorata* upon the station grounds lost the American seedling root by winter-killing, but the tree was saved by the root thrown out by the scion, which proved hardy.

7. The Russian method of preventing root-killing by using the true Siberian crab (*Pyrus baccata*) as a stock, is described, and the method recommended for limited trial.

GERMAN EXPERIENCE.

Note.—Since the foregoing was written, several books have come to hand from Fr. Lucas, Director of the Pomological Institute at Reutlingen, Germany. Director Lucas is one of the leading pomologists in Germany, and is the author of numerous horticultural books. In his "Die Lehre vom Obstabau" ("Stuggart, 1898) p. 378, *P. baccata* and *P. prunifolia* are recommended as half-standard (semi-dwarf) stocks for the cultivated apple on dry shallow soils. In his "Vollstaendiges Handbuch der Obstkultur" (Stuttgart, 1894) p. 41, Dr. Lucas writes: "In recent years the seedlings of the medium strong growing apple tree, *P. baccata* are much liked as stocks for larger dwarf trees, because they grow weaker than the ordinary wildings, and yet stronger than the real dwarf stocks (referring to Paradise and Doucin)." Also on p. 79: "The apple tree, standing in a poor soil, when budded on *P. baccata*, still gives good and abundant crops, while in a moist and rich soil it bears better on Doucin stocks."

FRUIT REPORTS

COMPILED AND PRESENTED

BY THE

CHAIRMEN OF THE FRUIT COMMITTEES

GENERAL FRUIT COMMITTEE

BY

PROFESSOR L. R. TAFT, AGRICULTURAL COLLEGE, MICH.

COMMITTEE ON TROPICAL AND SUB-TROPICAL FRUITS

BY

FRANK A. KIMBALL, NATIONAL CITY, CAL.

FRUIT REPORTS

FROM CHAIRMEN OF STATE FRUIT COMMITTEES, COMPILED AND PRESENTED BY THE CHAIRMAN OF THE GENERAL FRUIT COMMITTEE.

To the President of the American Pomological Society:

Sir—In presenting the accompanying reports it gives me great pleasure to state that with few exceptions the members of the General Fruit Committee have responded to my circular letter. Several who have not as yet sent in their reports have written promising to do so in time for them to appear in the Proceedings. In a few cases no response has been received, and where the state was of much pomological importance a second selection was made and a report secured. Several of the committee report that although they selected their colleagues they were not able to procure reports from them, and hence were obliged to make the entire report themselves. On the other hand some of the chairmen not only sent in a report themselves, but enclosed one from each member of the committee, all of which have in most cases been transmitted as they covered different sections of the state or treated upon different interests and any attempt to condense them would result in depriving them of their local value.

In calling for the State Reports, it was thought best, in order to secure uniformity, to briefly outline the topics upon which a report was particularly desired, and early in April a letter was addressed to each member of the committee asking for their reports upon the following:

"(1) Fruit Sections.—What portions of the state are particularly adapted for fruit culture, and in what sections is the interest most extensively carried on? (2) Soil.—What kinds of soil are found particularly adapted to the various fruits, and at what elevation do they thrive best? What is the average price of good orchard land, and of bearing orchards? (3) Varieties.—Name from five to ten varieties of each of the different kinds of fruit that have been found of most value for commercial planting, indicating the more desirable kinds by two stars (**), those of less value, by one star (*), and if any new and promising sorts are included in the list, indicate them by using a dagger (†). (4) Cultivation.—To what extent are the orchards cultivated and what crops are grown in young orchards? (5) Cover Crops.—Are winter cover crops used, if so what crops, and what benefits are found from them? (6) Fertilizers.—What fertilizers, if any, are used, and are they generally considered profitable? (7) New Varieties.—What promising new varieties that have not been described in the reports of this Society have originated in your state? (detailed descriptions are desired). (8) Insects and Diseases.—What are the more troublesome insects and diseases and what remedies are found of most value against them? Are any of them becoming more troublesome? (9) Irrigation.—To what extent and in what sections is irrigation practiced and for what fruits is it necessary? What method is employed in obtaining and

applying the water? (10) Statistics.—Give if possible the area devoted to the various kinds of fruits. What are some of the larger orchards and what has been the value of the crops? At what price, f. o. b., must the various fruits be sold to repay the expense of growing? What is the estimated value of the fruits of various kinds, shipped from your state? (11) Evaporated Fruits.—With what fruits if any is evaporating practiced? What varieties are found best adapted for evaporating? What has been the average price secured during the past season and what profit per acre would this give the growers? (12) Hardiness of Species and Varieties.—To what extent have various species of fruits been injured by the winter? What has been the relative hardiness of the leading varieties of each?"

As will be seen from the replies, there is not a state, territory or province in North America where at least some attention is not given to pomology, and with a few exceptions they have extended areas where commercial fruit culture can be carried on to advanatage.

An attempt was also made to ascertain what sections of each state were best adapted to fruit growing and the elevations and soils that give good results with the different fruits. As the Fruit Catalogue of the Society will from a part of the Proceedings it was not thought desirable to secure lengthy lists of varieties that have been found valuable in the different states, but short lists of some of the better kinds have been included in most of the reports, and several new sorts have been described.

While it is evident that increased attention is being paid to the cultivation of orchards, especially by the larger growers, the importance of providing a soil mulch during the summer months is not sufficiently realized by the small grower, or by the farmer to whom fruit growing is a side issue. The value of winter cover crops in cultivated orchards is also becoming recognized by our best growers and oats seem a favorite for this purpose where crimson clover does not succeed.

Another topic related to insects and diseases and the remedies for them, but no new ones were reported and most of them yield to the ordinary remedies. While a few sections are as yet free from some of the more troublesome species it is evident that there are few states where it is possible to grow first-class fruit without spraying the trees with fungicides, and some form of arsenite is generally added. The San Jose scale has become quite widely distributed in some of the eastern states, as well as in parts of California and Oregon, and where it has obtained a foot-hold it is difficult, if not impossible, to eradicate it. While it has appeared here and there in the Central States, prompt and effectual remedies have in most cases been used and its spread has thus been prevented. While fumigation is undoubtedly the surest method of destroying it, lime, sulphur and salt washes and sprays are most commonly used on the Pacific coast. At first, whale oil soap, at the rate of two pounds to a gallon of water, gave best results in the east, but later experiments indicate that a cheaper and more effectual remedy will be found in crude petroleum, applied as a fine spray either alone, or at the rate of one part to three or four of water. Nearly as good results have been obtained with kerosene in water, but it should not be used alone.

The freeze of February, 1899, did immense injury to the fruit interests of the country, as few sections escaped. In the northern states thousands of trees were destroyed by "root-killing," the injury being most severe in cultivated orchards where there was no cover crop. A light covering of snow, or a growth of weeds, grass, or some sowed cover crop, greatly reduced, or en-

tirely prevented, injury to the roots, and, as a rule, trees upon well drained clay soil suffered less than upon sand. While the temperature upon elevated spots was generally higher than on the adjacent low ground, the trees upon the ridges often suffered most, especially if the snow blew away, or the soil was sandy.

Where the orchards were properly handled during the spring and summer, the trees that survived the winter have made excellent growth and promise a good crop for next year.

Very few of the states reported large canning, or evaporating establishments, the principal ones being in California, New York and Michigan, although increased attention is being given in Maryland and Virginia. While it is doubtful if it will pay fruit growers, as a rule, to engage in canning or drying on a commercial scale, the results where canneries or evaporators have been established show that they are not only of great value to the grower in taking his surplus product when the market is glutted, but that many of them that prepare a high grade of fruit aid in keeping up the prices in the local markets.

Respectfully submitted,

L. R. TAFT,
Chairman.

ALABAMA.

BY PROF. F. S. EARLE, AUBURN, CHAIRMAN.

In making my report as chairman of the State Fruit Committee for Alabama, I am hampered by the fact that so little interest is taken in commercial fruit growing in this State that of the gentlemen asked to act with me on this Committee all but one have failed to send in reports for their respective sections. It is not easy to understand why Alabama has taken so little interest in fruit growing, for the natural conditions are fully as favorable as in neighboring states where the business has developed to immense proportions. Signs are not wanting that this lack of interest is now passing away and at various points in this State, particularly in the northeastern and in the extreme southern portions, the planting of fruits is actively in progress.

Apples can be grown with some success in all parts of the State but we are greatly in need of more knowledge as to the varieties best adapted to the different regions. It is not likely that southern and central Alabama will ever grow apples on a commercial scale, but in the northern part of the State there are considerable areas that are very promising for apple growing. The strongest and moistest soils should be selected and the trees should be given the best cultivation. Suitable land is now worth from $5.00 to $15.00 per acre. There are no bearing orchards of more than a few acres. A provisional list of varieties would be Red June, Yellow Transparent, Red Astrachan, Horse, Kinnard, Winesap, York Imperial and Yates. Summer rot, blight, leaf rust and scab are the most troublesome diseases in the order named; while codling moth, green aphis and wooley aphis are the most injurious insect pests. Irrigation has not been tried. Apples were not at all injured by the freeze last winter.

Cherries are almost unknown in this State, but it is quite certain that some at least of the sour kinds will thrive in the northern portion. English Morello is perhaps the best suited to our conditions.

Grapes grow abundantly in all parts of the State, but do not ship well from the southern part of the State, as they often shatter badly and sometimes develop "ripe rot" in transit. Good shipping stock of fine quality is grown in the mountainous part of northeast Alabama. In fact, this is an exceptionally fine grape region, and a considerable acreage is being planted. Concord, Delaware and Ives are the leading varieties. All the usual diseases are known here, but as a rule they do comparatively little damage. A root disease, cause unknown, often kills vines after a few years, especially on sandy lands. Delaware has proved to be more resistant to this disease than any other variety. Niagara is particularly susceptible to it. There was little or no injury from the winter. The Scuppernong and other varieties of the *rotundifolia* type all do well, but they are especially adapted to the southern portion. In the moist coast soils they thrive with almost no care or attention and yield heavy annual crops. They are not planted for market, but are used locally for wine. In central and northern Alabama they were severely injured by the past winter.

Pears are being less planted than they were five years ago. Growers are greatly discouraged by the blight. Except for this one serious drawback southern Alabama is particularly well adapted to the Oriental pears. European kinds should not be planted, except in the northern part, and there they will do better if on Japanese roots. Kieffer and LeConte trees were considerably injured by the cold in middle Alabama, as they were filled with sap when the freeze came. The crop was an entire failure except a few Kieffers on the coast.

Peaches will grow in all parts of the State. Our best peach soils are the high ridges of red granitic clay found in eastern Alabama, north of the central part of the State. This is a continuation of the Piedmont region of Georgia. The next best peach lands are the reddish soils of middle and southern Alabama that are derived from the Lafayette drift. The largest Georgia peach orchards are in soils similar to these. Georgia varieties and methods of cultivation are entirely applicable in this State. Here, as there, the principal enemies are the curculio, brown rot and borer. On the sandier lands, and especially toward the far south, gummosis should be included in this list, if indeed it should not claim the first place. This mysterious disease makes the peach a very short-lived tree in many parts of the south. Only lands that are well drained naturally, and that have a red clay subsoil should be planted to peaches in southern Alabama and, even on these best lands, the orchardist should continue planting year after year so as to constantly have fresh young orchards coming on to take the place of those that fail. As a rule peach trees were very little injured by the cold in February, though the crop was almost entirely killed. Early blooming kinds like Peento were in some cases killed to the ground.

The above remarks on peaches will in a general way apply to plums also. In our choice of varieties we are largely confined to the Japanese. The European and American sorts fail here. The Chickasaws have little commercial value and the Wild Goose is very uncertain and short lived. The Wayland group alone among the natives seems to promise to be valuable for us. The trees are hardy and Golden Beauty has borne its fourth heavy consecutive crop this year, when nearly all varieties are a total failure. Ripening as late as these kinds do they should have some value for the southern markets. Among the Japanese kinds the early bloomers like Kelsey, Satsuma, Wickson, etc., were very badly injured by the February cold. The

later blooming kinds like Red June, Abundance and Chabot escaped without injury to the tree, but in most cases with loss of this year's crop. In some localities these kinds bore partial crops.

It has been impossible for me to gather any reliable statistics as to the acreage or market value of our fruit crops. That the interest is a very small one as compared with neighboring states is shown by the fact that there are not more than three or four points in the State where solid cars of fruit have ever been loaded for shipment.

ALABAMA, BALDWIN COUNTY.

BY W. W. JONES, SEMINOLE.

I submit herewith such information as I have been able to gather from reliable sources in this (Baldwin) county, with one item in regard to Fruitdale, Alabama, on the M. & C. R. R., and also an approximate estimate of peaches shipped from Washington county last year. One thousand acres will be planted to peaches in this section.

2. Soil. Sandy loam, with clay foundation, but not too retentive, allowing percolation of excessive rainfall to some extent and 150 to 300 feet elevation. From $2.50 to $10.00 per acre for raw land according to location, conditions, etc.; $40.00 per acre for bearing orchard.

3. Varieties: Plums. Abundance**, Burbank** and Simonii**, though all Japan types seem to be in congenial soil, etc. Peaches—Elberta for late and St. John for early. Of course all fruits adapted to our locality do well. I would especially recommend the Scuppernongs family of grapes as worthy of extensive planting for commercial purposes. Pecans are at home with us. Pears are, of course, subject to blight. Japan persimmons grow and bear finely.

4. Cultivation.—Fair to thorough cultivation given by owners. Potatoes, melons, peas and garden truck are grown in young orchards.

5. My own practice has been to cultivate thoroughly in July, then sow in cow peas, and allow pea vines, grass, clover, etc., to lay on the ground all winter and plow in the spring. This prevents washing and leaching of soil, and helps its mechanical condition, adds humus, etc. This year I have sown my orchard of twenty-five acres to velvet beans, will plow in the fall and sow to rye or vetch and turn under in the spring.

6. Not much used, although there is no question of the great advantage of the use of phosphoric acid and potash to feed our legumes and they in turn will furnish the nitrogen and surely build up the soil so it can raise anything with proper rotation.

8. Peaches.—Curculio and borer. Plums—curculio and brown rot, and the West India peach scale on plum trees. Kerosene emulsion, whale oil soap and other insecticides, and Bordeaux mixture as a fungicide. I do not think they are spreading.

9. Irrigation.—Not practiced.

10. 1,500 to 2,000 acres. Five to eighty acres are the average sizes, with 200 to 300 trees per acre. About fifty cents per crate (3 pecks, 6 baskets), covers cost of growing. Washington county about 50,000 crates, Baldwin 25,000 crates. About $150,000 worth of peaches are generally marketed.

11. Only practiced on a small scale, but it will surely come to the front in the near future. Pears and peaches $1.50 per crate, net 250 to 400 crates per acre. (300 trees at Fruitdale netted grower $870.00.)

12. Shortened crop one-third or over. With us figs are the only fruit killed down and they will bear again next year. Standard fruits as pears, peaches, plums, pecans, etc., have sustained practically no injury.

ARIZONA.

BY PROF. A. J. McCLATCHIE, PHOENIX, CHAIRMAN.

1. The principal fruit sections of Arizona are the Salt River Valley about Phoenix, the Santa Cruz Valley about Tucson, and the Verde Valley about old Camp Verde, the first of which is the most important one. Besides the above, there are many small mountain valleys where apples, pears, plums and some peaches are grown successfully. The best apples are grown at the higher elevations. In many cases the quality of the plums and peaches grown in the mountain valleys is superior to those grown in the lower warmer valleys.

2. Orchard land sells at from $50.00 to $100.00 per acre and bearing orchards at $75.00 to $200.00 per acre, irrigating water costing about two dollars per year additional.

3. The following varieties of fruits are grown successfully:

Apples—Yellow Bellflower**, White Bellflower**, Early Harvest*, White Winter Pearmain*, Gravenstein**, Alexander**, Borovinka**, Maiden Blush*, Transcendent crab*. Pears—Bartlett**, Winter Nelis**, Wilder, Santa Anna*, Patrick Barry**, Clapp *Favorite**, Diel*, Clairgeau*, Madeleine*. Plums—Wickson*, Prunus Simonii**, Burbank**, Satsuma*, Czar*, Marianna*, Red June**, Purple Gage*. Prunes—Agen (*French prune*)**, Sergent, *Robe de**, St. Catherine*. Apricots—Royal**, Newcastle**, Montgamet**, Blenheim* Hemskirke**, Moorpark**, St. Ambroise*, Peach*. Peaches—Boski**, Alexander*, Parsons Early*, Wager**, Oldmixon*, Stump*, Triumph**, Wheatland*, Newhall**, Lemon Cling*, General Lee**, Susquehanna**, Salway**, Bonanza**. Grapes—Thompson *Seedless***, Alexandria *Muscat***, Peru, *Rose of**, Salem* and Rogers No. 9**. Blackberries—Crandall. Strawberries Arizona *Everbearing* **, Crescent*, Wilson*. Oranges—Bahia (*Washington Navel*)**, Mediterranean *Sweet**, Valencia *Late***, Parson *Brown**. Lemons—Lisbon, Villafranca*, Pomelos, Triumph**, Champion*. Olives—Nevadillo**, Mission*, Manzanillo**, Columbella*. Figs—California Black**, Bulletin Smyrna*, White Adriatic*. Almonds—Ne Plus Ultra**, IXL**, Commercial*, King *Soft shell**, Nonpareil**, Sultana*. Dates—Seewah**, Amreeyeh**, Amhat*. Persimmons—American*. Mulberry—Persian**, Russian*. Quince—Champion**, Chinese*, Orange**,—Portugal*. Pomegranate—Sweet**, Lemon**, Papershell*.

Cherries, currants, gooseberries and raspberries have not been grown successfully in Arizona except in a few mountain valleys. The loquat occasionally fruits near Phoenix.

8. Orchardists have very few diseases and insect pests to contend with. The red spider injures almonds slightly and the imported dates are infested with a scale peculiar to that tree. No serious injury has yet been done by any insect or disease.

9. In all parts of Arizona, except a few small mountain valleys, all fruits are irrigated. The water is obtained from rivers, conducted to the farm in open canals and applied to the orchards in furrows.

11. Apricots and peaches are evaporated and raisins are made from the Alexandria *Muscat* and Thompson *Seedless* grapes.

CALIFORNIA.

PROF. E. J. WICKSON, BERKELEY, CHAIRMAN.

REPORT BY J. A. FILCHER, SAN FRANCISCO.

9. (a) Fruit is grown in all sections of California, excepting in the higher mountain and desert regions, and wherever fruit is grown irrigation is practiced more or less, excepting on the low alluvial lands along the rivers.

(b) The method most commonly employed is by gravitation through ditches made to run the water near the trees. In some instances these ditches are divided so as to cause the water to circle the trees or run on both sides of them; in other instances two ditches are made for each row of trees, one on either side. In some practically level and more arid sections the basin system is used. This consists of throwing up ridges of soil on lines extending both ways between the trees and then running water in the basin lying between the ridges. Where a thorough soaking is required and water is abundant, this method is considered preferable. In a few instances tiling is laid under the surface, and the water being turned through the tiles seeps out at the joints and affords what is called sub-irrigation. The preparation for this system is expensive, and though it economizes the water and produces very favorable results, it is not much practiced.

(c) Water is obtained from ditches, which divert it from mountain streams, and from wells. In a few instances water used for irrigation purposes is pumped from the rivers that flow through the districts to be irrigated. In California are many flowing or artesian wells. These, where obtainable, afford very cheap water. Where the water in the wells does not rise to the surface it is raised by pumps, and the pumps are propelled by wind mills, by horse power, by steam or gasoline engines, or by electric power. The gasoline engines have proven to be a cheap power, but electricity, which is gradually coming into use in some sections, promises to prove even cheaper.

10. (a) The estimated area of all kinds of fruit in California, including trees, vines and berries, is about 400,000 acres.

(b) The average value of the crop from bearing orchards is from $125 to $150 per acre. The average value of the crop for the total acreage, bearing and non-bearing, is about $75 per acre.

(c) To pay expenses, deciduous fruits (including grapes and berries) must be sold on an average at 1⅛ cents per pound, and citrus fruits at 1½ cents per pound. This includes boxing and packing.

(d) Estimating the annual aggregate exportation of fruit, wine and brandy and vegetables, at its selling price f. o. b., it amounts to about thirty million dollars.

The various kinds and estimated prices realized (gross) are as follows:

Kinds.	Pounds.	Selling price.	Value.
Green deciduous	139,464,400	At 2 c per lb	$2,789,288
Citrus fruits	361,317,800	" 2 c " "	7,226,356
Dried fruits	153,325,400	" 4 c " "	6,133,016
Raisins	995,592,600	" 3¾c " "	3,584,723
Nuts	11,631,600	" 6 c " "	697,896
Canned fruit	104,439,400	" 5 c " "	5,221,920
Vegetables (fresh)	57,127,600	" ¾ c " "	428,457
Canned vegetables	3,786,000	" 2½c " "	94,650
Wine	136,488,000	" 20 c per gal	3,412,200
Brandy	6,765,600	" 60 c " "	507,420
Totals			$30,095,926

CONNECTICUT.

BY T. S. GOLD, WEST CORNWALL, CHAIRMAN.

1. Fruit Sections—Practically every section of the State is favorable to fruit growing and, with the great diversity of soils and abrupt changes of elevation within very short distances, there are very few townships in the State that cannot grow all standard varieties of deciduous and small fruits. The most thoroughly developed fruit section is the Connecticut Valley region, from Middletown north, and along the main line of the N. Y. N. H. & H. R. R., in Hartford, New Haven and Fairfield Counties. Small fruits are mostly grown on the lower levels and peaches on the higher elevations. Apples for commercial purposes are mostly grown in Litchfield and Windham counties.

2. Soil and Elevation—Sandy loam soils are most cultivated in small fruits and peaches, while apples and pears thrive best on a soil with some mixture of clay. The best peach orchards in the State are at elevations of from three to six hundred feet and, while apple trees grow well and bear abundantly in the valleys, the brightest colored, best flavored and longest keeping apples come from the hilly lands of from six to twelve hundred feet elevation.

3. Valuation—$25.00 to $60.00 per acre for good land for orchards, location having more to do with it than productive value. Bearing orchards so seldom change hands that they practically have no quotable market value.

A good bearing apple orchard of winter varieties will give net annual profits equal to a valuation of $1,000 or more per acre, while a bearing peach orchard would be worth from $300 to $1,000 per acre according to age, location and variety. While it is not rare to find such results, these estimates must not be taken as an average, taking into account product, quality, markets, etc., though our market location is the best in the country.

Varieties: Apples—Baldwin**. Roxbury *Russet**, Rhode Island *Greening***, Peck *Pleasant**, Fallawater*, Red Astrachan*, Hubbardston*, Sutton*, Hurlbut*. McIntosh *Red**, and Gravenstein*. Pears—Clapp*, Bartlett**, Seckel**, Sheldon**, Bosc**, Anjou**, and Winter Nelis*. Cherries—Wood, Montmorency, Coe *Transparent*, Windsor and Tartarian, *Black*. Plums—Japanese varieties: Red June*, Abundance**, Burbank**, Chabot*, and Satsuma*. European—Imperial Gage**, Lombard*, Green Gage**, Pond*. Peaches—Mountain Rose**, Champion*, Elberta*, Oldmixon**, Stump**, Triumph*, Waddell*, Carman*, Frances*, Early and Late Crawford*, and Fox*. Strawberries—Excelsior, Clyde, Haverland, Glen Mary, Pride *of Cum-*

berland, Morgan *Favorite* and Gandy. Black Raspberries—Egyptian, Palmer, Kansas, Onondaga, Cumberland, Gregg. Red Raspberries—Worthy, Miller, Loudon and Cuthbert. Yellow Raspberries—Caroline and Golden Queen. Blackberries—Lucretia, Snyder, Minnewaska and Erie. Gooseberries—Smith, Downing and Columbus.—Currants—Wilder, Fay, Victoria and White Grape. Grapes—Green Mountain**, Worden*, Niagara*, Delaware*, Concord**, Brighton**.

4. Cultivation—Peach and plum orchards are generally very thoroughly cultivated from early spring until about the middle of August, while apples and pears are mostly in sod when in bearing; strawberries, potatoes and corn are the hoed crops most generally grown in young orchards, but many of our best cultivators are now more inclined to give young trees full use of the land from the start.

5. Cover Crops—Natural weeds and grasses that come up freely after summer cultivation is ended; cow peas and crimson clover and in occasional instances oats or rye.

6. Fertilizers—Decomposed stable manure is most largely used for small fruits and top dressing for apple orchards; leached and unleached ashes and muriate of potash. Peach and plum orchards are all liberally fertilized with fine ground bone 800 to 1,200 pounds per acre annually and from 400 to 600 pounds of muriate of potash.

8. Insects and Diseases—Canker worm, easily controlled by spraying twice, early, with one-half pound Paris green to fifty gallons of water. They are nearly extinct. Codling moth yields to same treatment. Apple maggot may be on the increase as there is no satisfactory treatment for it. Apple scab and sooty fungus of the apple skin are believed to be under the control of Bordeaux mixture. Peach scab, or sooty spots on side of peach, is prevalent in localities, doing great damage, a remedy is greatly desired. For rotting of peaches and plums on the trees, remove and bury the decaying fruit and in case of European plums spray with Bordeaux till fruit is half grown. Japan plums and peaches are not able to bear Bordeaux while in leaf.

9. Irrigation—This is practiced to the extent of a few acres in each place, in Simsbury, Glastonbury and North Haven, on strawberries, with profitable results. In two cases water rams are used, one of them being specially prepared and of very large size, while the other has a natural flow of water. Apparently the most successful mode of application was by spray from three inch hose.

10. Some of the larger orchards of apples are those of J. H. Merriman of New Britain and Mr. Hollister of Glastonbury, while of peaches the Hale Bros. of Glastonbury, Barnes Bros. of Yalesville and Cheshire, Geo. F. Platt & Son, Milford, A. C. Sternberg & Son, West Hartford, J. H. Merriman, Elijah Rogers and J. A. Gridley of New Britain have the largest areas.

11. Evaporation is not practiced, nearby markets taking the surplus at better price than evaporation would give.

12. Hardiness—Peach trees have been injured to some extent by the last winter, but apple trees and other trees escaped. No difference was noticed in the hardiness of different varieties. Ice storms breaking down the trees of all kinds sometimes do great damage in exposed situations, hence a

sheltered hill is always to be preferred as a guard against frosts, ice storms and the wintry blasts.

T. S. GOLD,
J. H. HALE,
N. S. PLATT,
R. S. HINMAN,
Committee.

DELAWARE.

BY PROF. G. HAROLD POWELL, NEWARK, CHAIRMAN.

1. Fruit Sections—New Castle county adapted to apple, pear, plum. Horticulture not developed. Kent county—Small fruits, grapes, peaches. Kieffer pear, apples, Japenese and native plums of the Wildgoose type. Sussex county—Peaches, small fruits, Kieffer pear, plums of the Wildgoose type.

The fruit interest is most largely developed in Kent and Sussex counties.

2. Soils—small fruits, peaches, Kieffer pears, plums and grapes a well drained loam, about equal parts of sand and clay with plenty of humus. Apples, a clay loam.

Good orchard land can be bought from $10 to $30 per acre. Bearing orchard land from $50 to $100 per acre.

3. Varieties—Apples—Astrachan**, Nyack *Pippin**, Maryland *Maiden Blush* **, Lankford**, Gravenstein*, Missouri *Pippin*†, Stayman Winesap†, Lilly *of Kent*†, Winesap**, York Imperial**. Pears—Kieffer**, Garber*, Elizabeth, *Manning***, Bartlett**, Angoulene**, Lawrence**. Peaches—Foster*, Elberta**, Late Crawford**, Reeves Favorite**, Mt. Rose**, Oldmixon**, Fox *Seedling**. Plums—Abundance*, Burbank**, Ogon*, Whittaker**, Wildgoose**, Milton†, Newman†, Smiley†. Strawberries—Bubach**, Tennessee**, Gandy**, Brandywine*, Seaford†, Greenville*, Haverland*. Red Raspberries—Miller**, Cuthbert*. Black Raspberries—Souhegan*, Kansas*, Palmer**, Mills*. Blackberries—Wilson**, Early Harvest**. Dewberries—Lucretia**.

4. All fruits except some apple orchards are cultivated during the growing season.

5. Crimson clover and cow peas. They increase nitrogen, supply humus, increase water-holding power of soil, indirectly liberate plant food from soil. Great benefit follows their judicious use.

6. Muriate of potash, bone, rock, kainit, clover. Usually employ muriate, bone or rock, and clover.

7. Shipley Late Red, Caper, Cannon, Dr. Black, peaches. Lilly of Kent, Jackson, Gibb, Kane, apples. Miller, raspberry (red). Seaford strawberry,

8. Insects—Peach and plum curculio, peach borer, peach aphis, San Jose scale, rose bug, grape flea bettle, various species of aphids, apple curculio, codlin moth.

Diseases—Monilia on stone fruits, peach yellows, apple, pear and quince blight, grape rots. Remedies—Paris green, for chewing insects. Kerosene, kerosene emulsion, and soap for sucking insects. Bordeaux mixture for fungi.

9 and 11. Irrigation and evaporation not in use.

12. Apples and pears uninjured. Plums—Native, uninjured. Japanese one-half crop. Red June, 75 per cent; Ogon, 75 per cent; Maru, 90 per cent; Burbank, 50 per cent; Abundance, 50 per cent; Kelsey 25 per cent; Satsuma, 10

per cent; Wickson, 10 per cent of a crop. Blackberry—Early Harvest frozen to snow line. Maxwell and Wilson injured less severely. Red Raspberry—Least injured, Miller, Marion Favorite, Brandywine, Winant, Kenyon. Greatest injury. Miller on poor ground, Cuthbert. Black Raspberry—Greatest injury, Onondaga, Mills, Mohler. Peaches—All buds killed throughout state. Injury to trees, Waldo, Bidwell Early, Imperial, Yum Yum, Greensboro, Waddell, Carman, Kite, Angel.

DISTRICT OF COLUMBIA.

BY W. N. IRWIN, 317 V ST. N. E., WASHINGTON, CHAIRMAN.

Fruit is grown in all parts of the District of Columbia in limited quantities. Soil generally sandy. Highest elevation about 300 feet. Land is valued at from $300 to several thousand dollars per acre.

Summer apples only are profitable, Red Astrachan, Early Strawberry, Early Harvest, Benoni and Maiden Blush are the leading kinds. Wealthy, Wolf River and Yellow Transparent are promising. Early Harvest and Erie blackberries lead. Carnation and Early Richmond cherries succeed well. Currants, Fay, Ruby and Victoria are profitable. Dewberries, Lucretia and Mayes bear well and are grown in a small way. Gooseberries, Downing, Houghton, Industry and Triumph succeed well.

Raspberries and strawberries are grown extensively on the alluvial soils of the eastern branch of the Potomac, and are sold on the market as "branch berries," bringing from 15 cents down to five cents per quart, as the season advances. Cultivation is the only sure road to success. Irrigation has never been practiced so far as I can learn. Good fruit locations, at low prices, in adjoining sections of Maryland and Virginia operate against fruit growing in the District.

DISTRICT OF COLUMBIA.

BY ALLEN DODGE, 2918 P ST. N. W., WASHINGTON.

The fruit section of the District of Columbia is very limited, lying chiefly to the north and east of Washington. The soil varies from stiff clay to loam and sand; the clay soil being best for apples and pears, the loam and sand for peaches, berries and melons. The elevation of the outlying cultivated land varies from 10 to 300 feet.

The price of land is high owing to nearness to the seat of government. The varieties of apples found most profitable are Red Astrachan, Early Harvest, Early Strawberry, Winesap, Benoni and Grimes Golden. Pears—Seckel, Angouleme, Bartlett, Howell and Louise Bonne. Peaches—Crawford, Mountain Rose, Oldmixon Free, Stump, Heath Cling and Smock. Currants—Red Dutch, Victoria and Fay. Gooseberries: Industry, Houghton and Crown Bob. Raspberries—Red Antwerp and Cuthbert. Strawberries—Sharpless, Thompson, *Lady*, Crescent, Bubach and Gandy. Cultivation—All young orchards are cultivated between the rows by growing tomatoes, potatoes, early corn, etc. Fertilizers—Bone meal, superphosphates and composts are considered essential. No cover crops are grown. Insects are the San Jose scale, codling moth and curculio.

FLORIDA.

BY W. S. HART, HAWKS PARK, CHAIRMAN.

All sections of Florida except the overflowed portions of the Everglades are adapted to successful fruit culture. Where the Everglades have been freed from water they have proven so valuable for fruit and truck growing that a movement is now on foot to drain a much larger area and prepare it for groves and truck farms. While all sections above overflow and some even lower are fruit growing sections, our range of fruits is a very wide one and no one section is well adapted or can possibly be made to profitably grow all of the leading market fruits of the State. The above facts being made clear your committee deem it advisable to adopt the plan of dividing the State into districts, as used in the official catalogue of the Florida State Horticultural Society, as the only means of briefly giving replies to the questions in your circular letter that will convey a correct idea of the conditions here. The plan is as follows: Northwest Florida, that portion of the State west of the Aucilla river. Northeast Florida, that portion between the Aucilla river and a straight line drawn across the State from the mouth of the St. Johns river to Cedar Keys. Central Florida, that portion between the line above referred to and the counties constituting South Florida. South Florida, the counties of Brevard, Dade, Monroe, Lee, De Soto and Manatee.

In the first of these divisions pears (of the Oriental race), peaches (of Persian and Spanish races), plums (of the Japanese race), grapes, strawberries and pecans are profitably grown.

Northeast Florida. Here the Peento and Honey peaches and their seedlings take the place of the Persian race and figs replace the pecans; otherwise the list is much like the first.

In Central Florida is found the home of the orange, while pomelos or grape fruit (*Citrus decumana*), peaches (of Peento and Honey types), grapes kaki, figs, loquats, the hardy varieties of guavas, and strawberries are also adapted to its conditions and are receiving more and more attention.

In South Florida, the pineapple is the king of fruits, while a long list of tropical and semi-tropical fruits, including the banana, guava, lime, lemon, mango, cocoanut, cherimoya, avocado pear, custard apple, granadilla, papaw, sapodilla, soursop, rose apple, star apple, mammee sapota and tamarind take the place of most of the fruits in the other divisions, except that the orange grows in great perfection in the more northern portions. Efforts are now being made to grow oranges on a commercial scale well down in South Florida, below the reach of injurious cold, but this is yet largely experimental.

Kaki, mulberries, and the scuppernong (*rotundifolia*) family of grapes are growing and are fruiting heavily in nearly all portions of the State.

Soils for oranges should always be above the level of frequent overflow, but may be of varying elevations and any one of several grades ranging from heavy, rich, black hammock land, over a marl foundation, to high and hilly pine land composed of white sand and humus underlaid with yellow sandy sub-soil. The ideal land is high gray hammock, over yellow sub-soil. Dark chocolate hardpan and oystershell lands should always be avoided. Pineapples seem to thrive on almost any poor grade of soil, or even on almost pure white sand, or almost pure coquina rock, but judicious fertilizing and partial shade greatly improve the quality and increase the size of the fruit.

Peaches of the Peento and Honey races take kindly to high, light, sandy soils, and are also grown with great success on the reclaimed lands of the Kissimmee valley.

The Persian and Spanish races of peaches and oriental plums thrive on the high lands underlaid with red clay. In northwest Florida virgin soil alone should be planted to peaches and plums. Pears and grapes also thrive on these lands, as well as in the more sandy soils of northeast Florida.

Bananas and figs prefer rich land with water not too far away, but not subject to frequent overflow. They also thrive on oystershell lands, the former doing best if well sheltered while the latter stands free exposure to the winds.

Good lands for orchards can be purchased anywhere from $5.00 to $100 per acre, while particularly choice locations often carry the price up to from one to three hundred dollars. It is difficult to put any price on bearing groves, as the kind of fruit, quality of soil and convenience to market and transportation lines, as well as bearing capacity at time of sale, widen the range from a few hundred to, in some cases, as many thousand dollars per acre. Of late, because of the hardships resulting from the late unprecedented cold waves, some orange, lemon and grape fruit groves that before the freeze of February 1895 were paying from $500 to three and four times that price per acre each year, have been forced on the market at prices ranging as low as their former annual profits, while a short term of normal winters, or artificial protection will make them more profitable than ever, owing to the increased demand for our fruits and the curtailed production.

Varieties: Oranges, Central and Southern Florida—Early, Parson *Brown*, Boone, Tangerona, Satsuma; Midseason, Homosassa, Centennial, Pineapple, Ruby, Jaffa, Daucy *Tangerine*; Late, Hart *Late*, Bessie. *Pomelos, (Grape Fruit) Central and Southern Florida—Aurantium, Hart, Seedless, Triumph, Walter. Lemons—Central and Southern Florida—Belair, Imperial (*Messina*), Villafranca, Genoa, (*Eureka*,) Sicily (*Sanford Thornless*). Limes—Central and Southern Florida—Mexican. Persian. Tahiti. *Kumquats, (Kin Kans), Central and Southern Florida—Marumi, Nagami. *Peaches—Angel, Bidwell Early. Bidwell Late, Elberta, Florida Crawford, Honey, Imperial, Kerr, *Jessie*, Jewell, Maggie, Oviedo, Peento, Taber, Waldo. Pears—Kieffer, LeConte, Smith. Plums—Burbank, Berckmans,Excelsior, Wickson. Grapes—Cynthiana, Niagara, Norton, Flowers, Thomas, Scuppernong, James. Kaki—Costata, Hiyakume, Okame, Taber No. 129, Tane-nashi, Tsuru, Yedo-ichi, Yemon. Figs, Northeast and Central Florida—Brunswick, Lemon. Mulberries—Downing, Hicks, Stubbs. Strawberries—Neunan, Wilson. Nuts—Paper Shell Pecan. Tropical Fruits—Pineapples, Southern Florida—Abachi (*Abakka*) Egyptian *Queen*, Cayenne *Smooth*. Porto Rico, Spanish, *Red* Ripley Queen. *Bananas, Southern Florida—Baracoa (*Red Jamaica*), Cavendish, Golden, Hart *Choice*, Orinoco. Guavas, Central and Southern Florida—Common Guava (P. Guajava) many unnamed varieties, White Winter, Cattley, Chinese. *Mangoes—Common (ordinary sort), Apricot, No. 11 (apple).

Orange groves are generally cultivated in the latter part of winter and the ground kept clean and mellow until about the time the rains commence, in late May or early June, when they are planted to cow peas, velvet beans, or beggar weed (*Desmodium tortuosum*), or left to grow to crab grass. Some orange growers are cultivating vegetable crops and tobacco in their young groves, but as these require fertilizer formulas that are unsuited to the oranges, its advisability is, at least, questionable. Clean culture as practiced

fifteen or twenty years ago has been almost wholly abandoned as wasteful and needlessly expensive.

5. Oats and rye are sown in orange groves as winter cover crops. They shade the ground, thereby protecting it from wash, furnish humus for the soil, pasture, grain or hay for stock and retard the starting of growth in the winter, when most danger of injury by cold exists.

6. Peach orchards require liberal fertilizing and frequent cultivation.

All of our crops are improved by the liberal use of fertilizers. About all of the leading brands of commercial fertilizers are used, the particular kind depending upon the needs of the fruit cultivated. Herein lies a fine point that I cannot take space to discuss.

8. Insects and diseases: Orange blight and Dieback, also Foot rot (Mal de Gomma). For the blight dig up and burn, for the Dieback, reduce application of organic nitrogen. A new remedy is spraying with Bordeaux mixture. For the foot rot dig the dirt from the crown of the trees and leave exposed. Of the insects troubling the orange trees there are several scales also white fly, red spider and rust mite. Sprays are used, but good culture and the encouragement of their insect and fungous enemies will best overcome the first two.

The peaches are troubled with root knot, borers and curculio. A remedy for root knot is to plant on newly cleared land. The borers have to be hunted out and killed. For the curculio jar the trees and catch in a barrow or pick stung fruit and destroy it.

There seems to be no unusual increase of insects or diseases affecting fruit at this time. What we have already require much study to overcome.

9. Irrigation plants in groves are being abandoned in many instances. A portion of Mr. John B. Stetson's four hundred acres of grove at De Land is irrigated from a stand pipe. He is covering many acres with slatted roof for winter protection. The cover will be partly removed when no danger from cold exists. Some growers cover so as to give half shade all the year. This doubles the moisture in the surface foot of soil in drouth, and also protects from cold in winter. Protection from injury by cold is the leading thought of the year among horticulturists of this State and many plans have been and will be tried during the year, some fully successful but much is yet to be learned in the line of reducing labor and expense while securing effective protection.

10. Statistics not available.

11. The evaporation of our fruits and the utilization of our surplus over what is marketed in a green state, or used at home, is a lesson yet to be learned.

A pomological work of much importance now going on in the State is the hybridizing of citrus fruits by Prof. H. J. Webber and Prof. W. T. Swingle, of the United States Agricultural Department and of pineapples by Prof. P. H. Rolfs, of the State Agricultural College and Experiment Station. These able scientists have already secured some hundreds of promising crosses, showing characteristics of both parents, but have not yet had time to produce and test the fruit results. One of the promising ends in view is the crossing of the sweet oranges *Citrus aurantium dulcis* with the *Citrus trifoliata*, which is deciduous, thereby getting a far more hardy sweet orange than now exists. Success has crowned the effort to the extent of securing many specimens that combine the characteristics of growth and foliage in varying degrees of both parents. The quality of the fruit is yet to be deter-

mined, but the progress already attained encourages the hope of ultimate success.

GEORGIA.

BY G. H. MILLER, ROME, CHAIRMAN.

Almost every portion of our State is adapted for cultivation of some class of fruits. In the north or mountain region, embracing that section of the State north of 34th degree of latitude, the apple succeeds admirably well, and its cultivation for commercial purposes is receiving increased attention. Some varieties also succeed well in middle Georgia, and a few, mostly early apples, in the southern section of the State. Peaches succeed in quite a large area in different sections of our State. It is hard to specify any particular section where they succeed better than in others. The peach interest is extensively carried on in middle Georgia, in Houston county, as a center, and in the northwestern, eastern and southwestern portions, although this industry is being developed in numerous other sections of this State, which takes the lead of the neighboring States in the production of peaches. Pears, principally LeConte and Kieffer, are more extensively grown in the southern and middle sections of the State. Plums and grapes succeed generally all over the State, and the same may be said of strawberries. Cherries of the Morello class succeed in favorable localities in the mountainous or middle region, but have but little commercial value in the southern or coast region. Mulberries succeed well and are largely planted for poultry and hogs. Figs are grown for home consumption in middle and southern Georgia; the chief drawback is that occasionally a hard winter kills them to the ground.

(2) Soils. We have a variety of soils on which fruits do well. A sandy loam with a clay subsoil is very desirable, as are the so-called red loamy lands of this State, which have usually more or less iron in them; the gray lands of this State are also suitable for fruits. In north Georgia the commercial peach grower aims to get an elevation above the adjacent valleys of from 200 to 500 feet, as such localities are practically exempt from late spring frosts. In other parts of the State, the elevated ridges or plateaus are considered the best localities. The average price of land suitable for orchards varies very much with the proximity to railroads, improvements, etc., ranging from $4.00 per acre to $40.00 per acre. Very few bearing orchards are offered for sale.

(3) Varieties. Owing to the difference caused by climatic influences to which we have already referred, it is not practical to give a list adapted to all parts of the State, but the following are more generally suited to cultivation in different sections than others.

Apples—Yellow Transparent*, Red Astrachan**, Red June**, Early Harvest**, Striped June*, Horse**, Carter Blue*, Buckingham**, Fall Pippin*, Ben Davis**, Mangum*, Rome Beauty*, Shockley**, Stephenson Winter*, Winesap**, Yates**, Arkansas**.

Peaches—Sneed**, Triumph**, Early Tillotson*, Mt. Rose**, Lady Ingold**, Lee*, Chinese Cling**, Oldmixon Free**, Elberta***, Emma**, Stump*, Lemon Cling**, Lemon Free**, Heath Cling**, Stinson**, Carman†, Waddell†, Dewey†, Mathews†.

Pears—LeConte**, Keiffer**, Seckel*, Howell*, Angouleme*, Bartlett*, and quite a number of other varieties in suitable localities.

Plums, of the Chickasaw type—Wild Goose**, Robinson**, Cumberland*. Of the European type for the mountain or middle region—Damson*, Green Gage*, Shipper Pride*, Lombard*. Of the Japanese plums—Abundance**, Burbank**, Chabot**; Red Nagate**, Wickson**.

Grapes (*Labrusca*)—Concord**, Delaware*, Ives**, Niagara**, Brighton*, Moore*, Diamond*. (*Rotundifolia*)—Scuppernong**, Thomas*, Flowers*, Tenderpulp*, James*. (Hybrids)—Salem*, Triumph*, Wilder*.

Cherries in the mountain and middle region in favorable localities—the Morello class, and Tartarian and Wood.

Mulberries—Downing*, Hicks**, Stubbs**.

Of strawberries, Hoffman is the best early variety in part of the State; in the northwest part, Michel is the best; Thompson, Sharpless, Wilson, Haverland and Bubach are old varieties that are still largely planted. Nut culture including pecans, walnuts, and chestnuts is largely on the increase.

Apricots and nectarines have but little commercial value in this State.

4. Cultivation. The commercial orchards as a rule receive good cultivation, being usually plowed early in the spring and then where the surface is smooth enough cultivated with harrows or cultivators of some kind until about the first of August. Cotton is grown to a great extent in young orchards for the first three years. Vegetable crops, including melons, are grown in orchards by some careful cultivators.

5. Cover Crops. There is not much attention paid to winter cover crops. Some plant peas in their orchard in mid-summer and allow the vines to remain as protection. Crimson clover is being introduced as a cover crop in a few orchards.

6. Fertilizers. If any is used in young orchards, some nitrogenous fertilizer is generally selected. After the orchard comes into bearing a larger percentage of potash is preferred.

7. New Varieties. Of promising new varieties of peaches, originated in this State, we will name Dewey, an early peach, ripening with Triumph, a free stone, vigorous grower and a heavy bearer, fruit of excellent quality; Schley, which ripens ten days earlier than Elberta, quality very good, free stone, yellow and a good bearer; Cooper, which resembles Elberta, and has its good qualities of prolific bearing, large size, good quality, free stone and about three weeks later than that variety; Mathews *Beauty*, as large as Elberta, yellowish flesh, free stone, skin yellow with red cheek, good quality, ripening about thirty days after Elberta; Hiley, claimed to be a seedling of Belle, about same size, skin almost covered with red, flesh white, free stone, ripens eight or ten days earlier than Belle. Of apples a number of new varieties are being introduced, which have at least a local value, but it is not proper to include them in a report until they are further tested. There is quite an interest in introducing new varieties of apples in our State, as varieties that originate with us appear to succeed better than those that are brought from the North and West.

8. Insects and Diseases. The San Jose scale has been introduced in a number of localities of our State, but our State entomologist has been very energetic in hunting out these localities. Infested trees are promptly dug up and burned and heroic means are being used to stamp out this insect, and we believe it is entirely eradicated from a number of places where it has

obtained a footing. There is some peach and plum rosette in some sections in this State, but, as fast as symptoms of the disease appear, the infested trees are promptly destroyed and by this means it is held in good control. In the greater part of the State these diseases are not known. Our growers are fully up to date in regard to remedies for insects, and fungus and other diseases Bordeaux mixture is the popular remedy for all classes of fungous diseases. For curculio, jarring is practiced by some. Many add Paris green to Bordeaux mixture and apply it for the benefit of the curculio.

9. Irrigation. Irrigation is not practiced to any considerable extent in this State. Some of our gardeners and truck growers use it to good advantage.

10. Statistics. We have no data from which we can get the area devoted to the various kinds of fruits, but we estimate the net value of the crop of peaches alone for 1898 at one million dollars.

11. Evaporating Fruits. There are a few evaporating plants, which are principally used for evaporating the surplus peaches.

12. Hardiness of Species and Varieties. The severe freeze of last February injured peach orchards, the loss varying from nothing to 25 per cent of the trees. Figs were cut down to the ground by the same freeze. We have not sufficient data at our command to enable us to report in regard to the hardiness of the different varieties.

IDAHO.

BY ROBERT MILLIKEN, NAMPA, CHAIRMAN.

1. There are two important fruit sections in the State of Idaho; the larger and more important being in the southwestern part of the State, occupying the valley of the Snake river and its tributaries. The interest centers in Ada, Canyon and Washington counties with small areas extending into Owyhee and Cassia on the south and Elmore and Boise on the east. The second section is in the northern part of the State centering in the lower valley of Clearwater river, and northward with Lewiston at the mouth of the Clearwater river and Moscow thirty miles to the north as the principal towns in the section.

2. The soil in the southwest sections or Snake river valley is of volcanic origin underlaid by extensive lava flows, and is made up largely of pulverized granite, volcanic ash and other materials of a similar origin. In the northern section, the soil, while possessing many of the characteristics of the former, bears evidence of being an immense lake bed, the soil being much richer in humus than in the other section.

In the southern section, European plums, apples, pears and cherries of the Morello and Duke types, are found to be particularly successful in the order named. Other fruits are produced to a limited extent but, owing to climatic conditions, peaches, apricots and the sweet cherries are not so successfully grown, except in a few particularly favorable places. In the northern section there are two distinct fruit regions, the lower being the valleys of the Clearwater and Snake and their tributaries, where the altitude does not exceed 700 to 900 feet, in which pears, peaches, sweet cherries, apricots and grapes are produced in the greatest perfection. To the north,

the land rises suddenly about 2,000 feet. On this tableland, apples, pears and plums, as well as sweet cherries, are very successful. In all parts small fruits are grown with great success. Good, unimproved orchard land can be purchased in the southern section at prices ranging from five dollars per acre to fifteen, according to distance from shipping points, schools and other conveniences. In the north, prices range higher, since the region is more thickly settled. In the southern section all cultivated land is under irrigation, while in the northern section only some narrow areas along the river beds are subject to irrigation.

3. The list of fruits indorsed by the Idaho State Horticultural Society is as follows: Apples—Summer, Yellow Transparent, Red Astrachan, Red June, Oldenburg, Early Harvest; Autumn, Gravenstein, Maiden Blush, Wealthy, Fameuse, Fall Pippin; Winter, Jonathan, Ben Davis, White Pearmain, Rome Beauty, Blue Pearmain, Winesap, Northern Spy, Baldwin, Yellow Bellflower, Walbridge. Prunes—Italian, Agen (*French, Petite*), Hungarian (*Pond Seedling*), German, Bulgarian, Silver. Pears—Bartlett, Winter Nelis, Anjou, Flemish *Beauty*, Idaho. Cherries—Early Richmond, English Morello, Black Republican, May Duke, Black Tartarian, Napoleon, Montmorency Large. Peaches—Early Crawford, Amsden, Late Crawford, Elberta, Foster, Lemon Cling. Plums—Bradshaw, Peach, Yellow Egg, Green Gage, Lombard.

4. Most persons grow hoed crops, as corn, potatoes or beans in the young orchards until the trees arrive at bearing age. This is the custom of persons of limited means. Those able to afford it often give the ground clean culture without any crop, believing that it is not good policy to rob the land of its fertility at the expense of the growing trees.

5. I have no knowledge of cover crops being used.

6. Upon the rich, virgin soil of Idaho it has not been found necessary to resort to fertilizers of any kind. In reality too rank and heavy growth of wood is the complaint rather than the lack of it.

8. San Jose scale and codling moth are the prevalent and most troublesome insects yet introduced and are quite prevalent in both sections of the State. For the scale, a vigorous application of sulphur, lime, salt and lye during the dormant season has been found effectual in its destruction, if taken before the insect has got too badly spread, but if very bad the ax and match are the best remedy. Idaho has an excellent inspection law with good police regulations under which this pest is less dreaded than formerly. The codlin moth prevails wherever apples are grown, except in some of the newer sections in the more remote valleys where they have not yet obtained a foothold, but it is only a question of time as it is steadily but surely spreading. The plum curculio and the various borers are not yet in evidence. Aphides of all kinds are very common, but outside of the apple root louse, or woolly aphis, do not cause much injury. Careful inspection of nursery stock has greatly reduced the prevalence of this insect, so that it is not much feared. In the southern section few fungous diseases have manifested themselves, the black spot and shot hole fungus being occasionally seen, but not to any alarming extent. In northern Idaho, pear blight has, during the past three years, spread quite extensively and caused serious loss in many neighborhoods, particularly in the southern part of Latah county, where pear growing has become quite an important industry.

9. That part of the State lying north of the central plateau and drained by Snake river and its tributaries is an arid region and no cultivation is

undertaken without irrigation. The same is true of a small area in the southeast corner of the State draining into Salt Lake, Utah. Water is obtained from the rivers and is applied through canals and ditches, and distributed in the orchards and gardens by furrows. Flooding is carefully avoided.

10. Fruit growing is becoming one of the greatest industries of Idaho. Of it Hon. Alexander McPherson, of Boise, State Horticultural Inspector, writing in April, 1898, says: "There are about 30,000 acres of orchards in Idaho; of this amount 10,000 acres are apples, 12,000 acres prunes, 3,000 acres pears, 2,000 acres peaches, 1,000 acres cherries, 1,000 acres apricots, nectarines and almonds, 300 acres grapes, and 700 acres small fruits, about one-half of which are bearing. Irrigation is largely practiced in southwestern Idaho, and a failure of crops has never been known. This part of Idaho seems to be the home of all deciduous fruits, especially of the apple, pear, prune, and all small fruits. Idaho possesses some advantages over other States in addition to a wonderfully productive deep soil: First, the mild winters are of sufficient duration to cause the trees and vines to shed their foliage and remain dormant for a period of about three months, thus giving them a rest and time to recuperate; second, it is a well known fact that the more sunshine, with a proper degree of heat, the great the perfection of fruits and flowers, being larger, higher colored, and of a more delicious flavor. The soil of Idaho possesses three per cent of oxide of iron, which gives color to the fruit and red cheeks to the consumer.

11. In the southern section the principal disposition made of the prune crop is evaporation. Apples and other fruits, when the markets will not justify shipping in the fresh state, are evaporated. The prunes most grown for evaporation are Italian, French (*Petite d'Agen*), and German in the order named. In apples no attention is paid to the varieties, and all in excess of the market demands are used.

12. Little trouble is experienced as to hardiness in the southern section since winter killing is a rare occurrence; local conditions seem to have more influence upon the susceptibility to winter injury than variety. No material injury was done during the past winter. In the northern section much injury was done to peaches, apricots, sweet cherries and European grapes, but I am unable to report as to the relative hardiness of the different kinds.

ILLINOIS.

JONATHAN PERIAM, CHICAGO, CHAIRMAN, BY T. E. GOODRICH, COBDEN.

This report is made for the extreme southern part of Illinois, and to cover about ten counties.

Fruit growing is very extensively carried on; in some places to the exclusion of everything else. All of the fruits grown in the temperate zone thrive well here. Few points in the United States can produce so great a variety of fruits and vegetables as Southern Illinois. Peaches, pears, apples, all of the small fruits, tomatoes, melons, asparagus, rhubarb, peanuts and sweet potatoes, are shipped by the thousands of carloads annually.

The soil is as varied as the locality. Yellow and red clays, black alluvial bottoms with sections of sandy loams.

The southern portion, extending as is does to a point south of Richmond, Virginia, gives an earliness to its products that frequently places them in Chicago and other cities in time to secure good prices.

The peach is at home in this latitude and soil, and thrives exceedingly well. No case of yellows has ever been found here. The only drawback to its culture are late spring frosts and curculio. The latter can be destroyed and the fruit saved by collecting and killing the beetles on corn cobs, chips, pieces of bark, etc., placed on the ground touching the trunks of the trees. The bugs can be readily found under these each morning and killed.

Of varieties of peaches, Elberta**, Ede**, Oldmixon Free**, Thurber**, Reeves Favorite** and Smock** are generally planted and are deservedly popular. May Beauty, the Crawfords, Picquet and Champion are also planted, while varieties like Alexander, Hale, Schumaker, Waterloo, Briggs May, etc., are virtually discarded.

Pears thrive unusually well and, were it not for the blight, the output would possibly be beyond the demand. Varieties succeeding are Anjou, Angouleme, Bosc, Flemish *Beauty* and Rostiezer. Bartlett, Howell and Louise Bonne are so subject to blight as to be practically worthless here and are but little planted. The variety most planted now is the Kieffer, but how long its good looks will atone for lack of quality time alone can tell.

Of apples the early varieties are in the lead for the reason that our climate ripens the winter varieties so early in the autumn as to impair their keeping qualities. The leading early sorts are Yellow Transparent, Red Astrachan, Cooper Market, Oldenburg, *Duchess of*, followed by Gravenstein, Ramsdell Sweet, Keswick, Sops of Wine, Maiden Blush, Summer Queen, Lowell, Ben Davis and Winesap. Early Harvest and Red June, once very popular here are no longer planted. The latter is too small, and the former too easily bruised and does not carry well.

Cultivation—Cow peas are sown in peach orchards in the summer of the non-bearing years and plowed under for fertilizer, to be followed by rye in the fall, which is turned under the next summer when fully headed out. Apple orchards are frequently seeded to clover which after a term of years, is plowed under for fertilizer. The general practice is to plant hoed crops, such as Irish and sweet potatoes in the young orchards for the first three or four years and then give the land entirely to the tree.

Commercial fertilizers are used to a large extent both on garden crops and orchards with gratifying results. Stable manure is also used where obtainable.

Large quantities of apples are evaporated each year, there being numerous stock companies operating plants that buy thousands of bushels as they are taken from the trees. The farmers by the aid of their own force dry the refuse or second quality, and ship the sound fruit. Quantities of peaches, pears and black raspberries are treated in the same way. Of varieties of apples for this purpose the Ben Davis is most used, as its white flesh is transferred into a salable article with less fuel than most any other.

Of insect enemies curculio and codlin moth are the most troublesome and cause a greater loss than all others combined. Of diseases the blackberry rust is causing great losses to planters of that fruit.

No irrigation of consequence has been attempted. It is feared that the present low price of fruit will not justify a sufficient outlay to make it profitable.

INDIANA.

BY PROF. JAMES TROOP, LAFAYETTE, CHAIRMAN.

1. Fruit Sections—More or less fruit is grown over the entire State, but the principal fruit sections are situated in the northern, northeastern, eastern and southern portions of the State. The southern half of the State is especially adapted to the growing of fine fruit of all kinds, although very fine apples, pears, plums and some peaches are grown along the northern border.

2. Soil—The finest apples and pears are grown on the strong clay loam underlaid with limestone. A lighter soil is desirable for peaches and plums. The price per acre for good fruit land varies from $10.00 to $75.00 per acre, depending upon the location, nearness to market, etc. I know of no bearing orchards being sold, but as high as $190.00 per acre has been offered for an orchard just coming into bearing.

3. Varieties: Apples—Ben Davis, Grimes *Golden*, Smith *Cider*, Winesap, Oldenburg, Maiden Blush, Wealthy, Yellow Transparent, Baldwin (in north), Stark. Pears—Kieffer, Bartlett, Flemish Beauty, Anjou, Angouleme, Howell, Seckel, Sheldon, Lawrence, Louise Bonne. Peaches—Elberta, Crawford Early and Late, Smock, Oldmixon Free, Heath Cling, Goldendrop, Stump, Wheatland, Mountain Rose. Plums—Wildgoose Newman, Robinson, Shropshire, Arctic, Shipper Pride, Green Gage, Lombard, Burbank, Abundance. Cherries—Early Richmond, Montmorency, Dyehouse, English Morello, May Duke, Wood, Windsor. Quince—Orange, Meech, Champion, Missouri, Rea. Grapes—Worden, Concord, Ives, Campbell, Brighton, Salem, Agawam, Niagara, Diamond, Pocklington. Currants and Gooseberries—Pomona, Red Dutch, Fay, Victoria, Wilder, White Grape, Downing, Champion, Houghton, Smith. Blackberries—Snyder, Stone, Taylor, Erie, Briton, Minnewaska, Eldorado. Raspberries—Gregg, Palmer, Ohio, Kansas, Conrath, Nemaha, Eureka, Hilborn, Cuthbert, Marlboro, London, Shaffer, Columbian, Miller. Strawberries—Bubach, Haverland, Clyde, Warfield, Jerry Rusk, Greenville, Brandywine, Ridgeway, Hoosier, Gandy.

4. Cultivation—Very few persons practice cultivating their orchards more than one or two years; many not that long. Corn, beans and potatoes are the crops mostly grown in the young orchards.

5. Cover Crops—Crimson clover is grown by a few, but as it does not stand the winters many prefer rye; by far the greater number sow nothing. Cover crops are used to prevent washing and also to retain the soluble plant food.

6. Fertilizers—Very little is used after the orchard is planted. Some use cow peas which are plowed under, but the greater number use nothing.

7. New Varieties—Jerry Rusk and Hoosier strawberries originated in Delaware county. They are both staminate varieties and bid fair to rival Bubach and Haverland in productiveness and quality. There are numerous other seedlings that have not been introduced for general cultivation.

8. Insects and Diseases—The canker worm, San Jose scale (in certain sections) and plum curculio are among the most troublesome insects to handle, and plum rot and apple scab among the diseases. Where thorough spraying with Bordeaux mixture, Paris green, whale oil soap and kerosene emulsion is practiced all of these pests are easily managed.

9. Irrigation—Not practiced to any extent; now and then there is one who uses sub-irrigation on a small scale with very good results, mostly for small

fruits. In the gas belt, gas engines are used for pumping and the water is conveyed through tile.

10. Statistics—No figures are at hand giving the areas devoted to orchards. In the southern portion of the State there are orchards which range from 25,000 to 40,000 trees. The number of bearing trees of all kinds is given by the last report of the Bureau of Statistics as 9,752,000. Acres devoted to small fruits, 35,221. Value of fruit and fruit products sold, $647,510.00.

IOWA.

BY EUGENE SECOR, FOREST CITY, CHAIRMAN.

While Iowa is not especially noted as a fruit State it is fairly well adapted to horticulture. The southwest quarter of the State seems particularly well adapted to most of the fruits grown in the North, both by reason of its climatic conditions, and its loess formation. Its elevation averages seven to nine hundred feet. Some large orchards have been planted in this section. A good many apples are exported from this corner of Iowa in fruitful years.

The varieties of most value as shown from past experience are: Ben Davis**, Jonathan**, Ralls *Genet***, Grimes**, Fameuse**, Oldenburg**, Wealthy**, Red June**, Winesap**, Lowell**.

Cherries—Early Richmond, English Morello, Dyehouse, Ostheim, Montmorency.

Plums—De Soto, Wyant, Hawkeye.

Grapes—Concord, Worden, Moore *Early*.

The climatic conditions of the south half of the State do not greatly differ, but the conditions are more favorable to fruit growing on the Missouri slope.

The State differs so greatly in latitude, altitude and geological formation that fruits need to be adapted to the varied conditions. The North half of the State requires especially hardy varieties. No peaches are grown in this section but plums are quite at home, that is, the *Americanas*.

Of apples in the section just referred to, the favorites with planters are Oldenburg**, Wealthy**, Yellow Transparent**, Longfield**, Whitney**, Hibernal**, Haas**, Plumb Cider**.

One of our esteemed citizens and eminent horticulturists has originated two varieties which are worthy of mention. One is Patten *Greening*, an apple resembling Rhode Island *Greening* in size and color but not so good for dessert. The originator claims, however, that it is the most profitable apple for evaporating ever produced; very hardy, good bearer, season—Fall. The other is Patten Fameuse, which is admired by some of our most discriminating horticulturists. Said to be more hardy than its parent (Fameuse); fruit large, finely colored, striped with red, constant and heavy bearer, hangs well to the tree, agreeable in flavor and bears young. Season, Fall. These two are being tried extensively in the extreme North.

The Russians also have many friends where the hardiness is essential. But the tendency to blight among the latter, added to a tendency to drop prematurely, to ripen too early in the season and low quality have stimulated the effort to produce American seedlings adapted to our especial environments and improving tastes.

The peculiar conditions in the north half of the State are: Forty-three degrees latitude, far removed from modifying ocean currents, high altitudes—800 to 1,400 feet, and generally drift soils from more recent glacial epochs. Fruit planting is on the increase and many orchards of one thousand to two thousand trees are planted. One orchard covers about one hundred and sixty acres.

Cultivation—Experience is proving that cultivation pays in the orchard as well as on the farm. Hoed crops are sometimes raised between the trees while young, but thorough, shallow cultivation during May, June and the early part of July seems to produce best results.

The injury to fruit trees the past winter has been quite severe in some parts of the State, notably in central and southern sections. The per cent of injured and killed as reported by the Secretary of our State Horticultural Society is as follows:

Apple trees, injured 25 per cent, killed 17 per cent. American plums, injured 13 per cent, killed 9 per cent. European plums, injured 38 per cent, killed 30 per cent. Japanese plums, injured 33 per cent, injured 45 per cent. Cherry, injured 16 per cent, killed 10 per cent. Pear, injured 32 per cent, killed 33 per cent. Peach, injured 13 per cent, killed 79 per cent. Grape vines, injured 22 per cent, killed 53 per cent.

It is possible that many of the injured will recover.

Notwithstanding the unprecedented winter, fruit growers are by no means discouraged. Great crops of all the hardy fruits are raised in alternate years, and the question of how to preserve it until the glut is over in the market is an interesting and growing one.

Cold storage is much discussed and the success of others who have practiced it is desired.

KANSAS.

F. WELLHOUSE, TOPEKA, CHAIRMAN, REPORT BY A. H. GRIESA, LAWRENCE.

Your committee would report that the fruit sections are in the eastern portion of the State, and in the western part where it can be irrigated which is done to some extent along the Arkansas river. In the eastern portion of the State fruit is grown successfully on bottom and high prairie land. The most successful growers are those that plant selected kinds only, while those that grow everything, mostly fail to succeed.

The best paying apples are Missouri *Pippin*, Ben Davis, Winesap, Jonathan, York Imperial and Grimes Golden. The best peaches are Rivers, Champion, Elberta, Shipley and Ringgold. The Crawfords, Early York, Foster, Hale and Bokhara No. 3 are not worth the room they occupy.

Of plums, in the eastern section the American and Japanese kinds do well. The Europeans rot here, while in the irrigated section along the Arkansas the European class all do as well as in the most favored section of the country. No rot, disease or insects affect them there; and the fruit ripens to perfection. Kieffer is the best market pear, the Seckel, Sheldon, Angouleme and a few others do well; the other kinds are too liable to blight. In cherries the sour kinds only are to be planted; among them the Early Richmond, English Morello, Ostheim are the best. The quince was the most

seriously injured by the past winter; to some extent the raspberries and blackberries and old peach trees, while young trees in good vigor are not hurt.

The cheapest fertilizer for orchard and farms is to plow under the growth of weeds in summer; they grow to a great size and furnish much humus to the soil.

The Kansas raspberry, which has in a few years become the raspberry for commercial planting from the east to the west, originated here, as did the Superb apricot, which is valued for its very superb quality and color.

Another Kansas seedling is the Cardinal raspberry. The plants are of strong growth, hardy and free from disease, and the fruit, which is produced in great abundance, is large and resembles Shaffer in quality, but is firmer and brighter in color. The season is that of Snyder blackberry.

CENTRAL KANSAS.

BY S. S. DICKINSON, LARNED.

Sandy land with clay subsoil at our elevation of 2,100 feet is among the best. Price of orchard land, $5.00 to $30.00 per acre. Bearing orchards are not for sale. Missouri *Pippin*, Winesap, Ben Davis, Gilpin, Willow *Twig*, Wagener, Rome Beauty and Jonathan for late. Grimes *Golden*, Huntsman, Fall Pippin, Maiden Blush and Fall Wine for fall. Early Harvest, Red June, Sweet Bough, Early Cooper, Early Pennock, Red Astrachan and White Graft for early sorts. Most farmers cultivate and raise potatoes and early crops and turnips for five to seven years. No fertilizers have been used except manures. I am using cow peas and soy beans for cover crop.

Codlin moth and blight. For spraying, Bordeaux mixture and arsenities are best. For all scale insects I use pure oil, oil and water and kerosene emulsion; have tried crude oil, it is not so effective. Irrigation is not used here, but it would be beneficial in August and September, when the crop is heavy. Fifty per cent of this county is good orchard land. Twenty-five acres of orchard one to sixteen years planted, only 20 per cent of trees in bearing, have in 1898 netted $1,000. Prices at orchard 25 cents to $1.25; out of cellar, $1.50 to $2.00, the culls paying all expenses. Trees hurt by winter are Pearmain, Jonathan, Lawver, Rhode Island *Greening*, Tompkins King and Northern Spy. All peach trees were top-killed. European plums, 60 per cent, Japanese 75 per cent hurt, and quinces 80 per cent killed outright. As compared with a full crop all early and summer varieties will give 100 per cent; Missouri *Pippin* and Winesap 40 per cent, and all others 20 per cent.

WESTERN KANSAS.

BY C. H. LONGSTRETH, LAKIN.

2. Soil—Heavy clay loam is the best, but any of our soil is good enough, except when very sandy, and there is little or no difference in high or low lands, as elevation cuts but little figure in a local way—our general elevation here is about 3,000 feet. The price of good orchard land is from $3.00 to

$10.00 per acre, and of bearing orchards from $50.00 to $75.00 per acre. 3. Missouri *Pippin,* Ben Davis, Winesap and Jonathan for apple; Wildgoose and Robinson for plums. Pears and peaches are not profitable. Grapes—Concord and Worden. 4. Cultivation—Thorough cultivation is given to all fruits in the early part of the season, planting vegetable or other crops that require cultivation between the trees. 5. Cover crops—Ground should never be left bare in winter; we are using sorghum sown broadcast late in August as a cover crop. Red clover would be as good and possibly better, but is more difficult to grow. Cover crops prevent blowing of the soil, preserve fertility and add humus to the soil. 6. No fertilizers are used so far. Fertility of soil can be kept up by using some kind of cover crop to be left on the ground and avoiding the growing of crops of any kind after the trees come into bearing. 8. Insects and Diseases—The codling moth is the greatest pest we have, and there are no other insects to speak of. We spray thoroughly, but while in some seasons we lessen probably the codling moth by spraying, as a rule, I doubt if it does any good. The best and *only remedy* is to prevent their breeding, which means eternal vigilance, watching and by spraying, gathering and destroying all fruit effected before the insects can perfect themselves. 9. Irrigation—Fruit can be and is in some seasons grown fairly well without irrigation, but as a rule irrigation must be used to obtain any satisfactory success. The method practiced is both by pumping from wells and from rivers. Wind-mill power used principally for pumping, with open canals or ditches to carry water from the river. Flooding system is used in applying the water.

To make a success of fruit growing in Western Kansas requires close study and attention, but this same rule applies everywhere equally as well.

LOUISIANA.

BY PROF. F. H. BURNETTE, BATON ROUGE, CHAIRMAN.

1. The State is divided roughly into three fruit sections; the northern portion, where peaches, pears, persimmons (Japan), plums and apples do fairly well; the southeastern portion, where the same fruits except the apple thrive; and the lower Mississippi river region, where the orange lands are located. These three sections grow fruit commercially to some extent, and there are other fruits that thrive in all parts of the State, namely, dewberries, strawberries and figs.

2. With the exception of the orange lands the sections named have a sandy soil, and have the highest elevation in the State. There are very few orchards in the States and the price can hardly be estimated. In the orange section, where young orchards have already been set, the price ranges from $50.00 to $200.00 per acre, and bearing orchards bring from $500.00 to $1,000.00 per acre. In other sections well suited to orchard planting the price of land varies from $2.50 to $10.00 per acre, according to location.

3. Varieties: Northern Section, Apples—Red June**, Red Astrachan**, Horse**, Summer Queen*, Shockley*. Peaches—Elberta**, St. John**, Mamie Ross**, Early Crawford*, Amsden*. Plums—Wild Goose**, Abundance*, Burbank*, Chabot*. Grapes—Diamond**, Delaware**, Ives**, Concord*, Champion*, in very small areas. Strawberries—Tennessee *Prolific***,

Michel**, Thompson**, Parker Earle*, Greenville*. Eastern Section, Apples—Red June**, Red Astrachan**, Early Harvest**, Cullasaga*, Shannon*. Peaches—Elberta**, Rivers**, Lee**, Taylor*, Alexander*. Plums—Abundance **, Burbank**, Robinson**, Chabot*, Wildgoose*. Grapes—Diamond**, Champion**, Herbemont**, Delaware*, Dracut Amber*. Japan persimmons—Hiyakume**, Yemon*. Strawberries—Cloud**, Michel**, Hoffman**, Thompson*, Stevens. Lower Mississippi, Oranges—Louisiana Creole**, Navel**, Mandarin**, Tangerine**, probably 5,000 acres.

No crops are grown in the orchards, in the sandy sections, as a rule, and only such cultivation as will keep the land clean is given. Where crops are grown, cotton and potatoes are most used, with occasional sowings of cow peas as a fertilizer.

5. No cover crops are required.

6. Commercial fertilizers are used but sparingly. Cow peas are often grown and turned under and occasional dressings of cotton seed meal are given. The opinion seems to be that fruit trees grow too rapidly and that fertilizers make the growth even more luxuriant and more subject to the attack of fungous diseases.

8. The curculio and the tree borers are the two most troublesome insects. While the careful growers use every means to destroy them. others do nothing, and the result is an abundance of wormy fruit and short-lived trees. The various scale insects of the orange are also very troublesome, but are generally treated successfully by the usual scale washes. Among the more troublesome diseases are pear blight and the fruit rots. All fungous diseases are very troublesome, as at the time they do the most harm the rains are so frequent that the fungicides cannot be kept on the trees.

9. Irrigation is not used for fruit in Louisiana, and is only employed in the rice districts, where large pumping plants are used to lift the water from the bayous to the irrigating canals.

11. No fruits are evaporated in Louisiana.

12. The winter of 1898-9 was the most severe on record, the mercury going down to —13 degress in North Louisiana and to 6 degree above zero in the southern portion of the State. The oranges, figs and many ornamental trees were killed to the ground, and many others were severely injured. Very few specimens of fruit ripened this year. Only a few peaches were grown—mostly Elberta. Apples were not hurt, but plums, pears and peaches suffered severely. Some of the trees being in bloom at the time of the frost were killed back to the trunk. The question of hardiness did not seem to confine itself to the variety, but to the locality where the wood ripened best and the early growth was retarded. The sandy sections suffered less than the alluvial and clay soils.

MAINE.

BY PROF. W. M. MUNSON, ORONO, CHAIRMAN.

All parts of the State now settled are suitable for some kinds of fruits. There are, however, limitations in kinds and varieties. The small fruits thrive in all parts of the State; apples and pears are most extensively grown in the southern and western counties; and plums and cherries, as commer-

cial crops, are confined to a few limited areas in the Penobscot, Kennebec, and Androscoggin valleys. The section of the State best adapted to commercial orcharding is found south of the 45th parallel of latitude and west of the Penobscot river. The industry is at present most prominent in Androscoggin, Cumberland, Kennebec, Sagadahoc, Oxford and York, together with the southern parts of Franklin, Somerset, Piscataquis and Penobscot counties. There are very few large orchards in the State, but fruit, as a market product, supplements other farm crops.

The soil best adapted for the apple—particularly the Baldwin, which is the most important variety—is a strong, rocky loam, preferably upon a hillside where perfect drainage is assured. The best fruit is obtained at an elevation of 300 to 800 feet. Land suitable for orchard culture, and in favorable localities, may be obtained for from $5.00 to $50.00 per acre, depending on the condition as to freedom from rocks and distance from railroads. Bearing orchards are worth $40.00 to $75.00.

The varieties of fruits of greatest importance in Maine may be briefly summarized as follows:

Apples—Baldwin**, Ben Davis**, Roxbury *Russet**, Hubbardston*, Northern Spy**, Rhode Island *Greening**, Tompkins King*, Yellow Bellflower**, Gravenstein*, Stark†, Sutton†. Pears—Angouleme**, Anjou*, Bartlett**, Bosc *, Diel*, Lawrence**, Louise Bonne**, Sheldon*. Plums—Burbank†, IImperial Gage**, Lombard*, Bradshaw**, Bavay*, Arctic*. Cherries—Tartarian, *Black* Early Richmond, Montmorency (Ordinaire), Morello. Blackberries—Agawam **, Snyder. Currants—Fay**, Albert, *Prince***, Victoria*, White Grape*, Gooseberries—Downing**, Smith*, Whitesmith†. Raspberries—Cuthbert**, Loudon†. Strawberries—Bubach**, Crescent, Clyde**, Greenville*, Haverland*, Warfield*, Sharpless*, Carrie†. Dewberries, grapes and quinces are not grown commercially.

Thorough cultivation is exceptional in the orchards of Maine. This lack of culture is partly due to the fact that orcharding is made simply a part of the general farming operations, and partly to the character of the soil used for orchard purposes—many of the most productive orchards being upon rocky hillsides which cannot be plowed.

In the few instances where clean culture is practiced, a cover crop of rye is sometimes used with good effect. The ground does not "wash" during the winter, and is ready for working earlier in spring. Small fruits are usually given a winter protection of marsh hay or evergreen boughs.

Concentrated fertilizers have been used but little. Stable manure, and wood ashes are frequently used and many growers mulch the trees heavily every few years with hay.

Among the more important insect enemies of the apple, the apple maggot *Trypeta pomonella*, the American and forest tent-caterpillars, *Clisiocampa Americana* and *C. disstria*, with the bud moth, *Tmetocera ocellana*, and the leaf roller, *Teras minuta* are the most destructive. For the first named pest there is no satisfactory remedy. The most effective treatment of affected orchards is to pasture with hogs or sheep, that all windfalls may be destroyed and the number of insects thus reduced. For destroying the other insects named, systematic spraying with arsenical poisons is usually effective. The forest tent-caterpillar frequently migrates from the neighboring forests in destructive numbers and some method besides spraying must be employed to save the orchards. A band of tarred paper placed about the

trees and smeared with a mixture of lard and sulphur has proved a most effective barrier. The caterpillars collect in masses below the bands and are then destroyed by crushing, or by a strong alkali wash. The leading insect enemy of the small fruits, aside from the common "currant worm,"—is the current trypeta, *Epochra canadensis*, and the cane borer. For the first, spraying with Paris green or hellebore is effective; for the second, no remedy, save destruction of the fruit, is known; for the last, cutting and burning the affected canes is recommended.

Of fungous diseases, the more important pests are the apple scab, *Fusicladium dendriticum*, "mummied fruit," *Monilia fructigena* and black-knot, *Plowrightia morbosa*; for all of which systematic spraying with copper sulphate before the buds expand, and with Bordeaux mixture after, is the approved remedy.

Irrigation is not practiced in any of the fruit growing sections of the State, and it is doubtful if the expense would be warranted.

From the fact that so much of the fruit is scattered along the highways, by line fences, and in isolated blocks, it is not possible to give even approximately correct data concerning the area devoted to the various kinds. The largest orchard in the State, that of Mr. Phineas Whittier, Farmington Falls, contains about 6,000 trees, two-thirds of which are in bearing. Comparatively few orchards, however, contain more than 1,000 or 1,500 trees, and a far greater number 100 to 500 (mainly apples).

Apples only, have as yet been evaporated, and not enough of these to determine the best varieties. Very little of the best fruit has been either evaporated or canned—the culls and seedling fruit being devoted to this purpose.

As to the hardiness of species and varieties, it may be said that, with the exception of peaches and quinces, all of the fruits commonly grown at the north will thrive in Maine, and in a few favorable localities even peaches are grown for commercial purposes.

Of fruits not commonly receiving attention the blueberry should be mentioned, though little has been done in the way of its systematic culture. The wild lands in the southern part of the State, however, as a result of slight care in burning and harvesting, yield an average annual return of about $50,000 and it is believed that this income may be greatly increased by systematic treatment.

MANITOBA.

BY S. A. BEDFORD, BRANDON, CHAIRMAN.

The Experimental Farm of which I have charge is located in the western portion of Manitoba and is about 1,200 feet above sea level, open rolling prairie generally.

1. That portion of the Province lying in the Red River Valley is the most suitable for fruit growing but, even there, not over 100 persons are engaged in large fruit growing.

2. Well drained black loam soil has proved best; no sales of orchard lands.

3. Transcendent crab and *Pyrus baccata* in its smallest and hardiest forms are the only ones to winter safely here at Brandon, in fact in any part of the Province west of the Red River Valley.

4. Orchards all kept cultivated on the surface.

5. No winter cover crops.

6. No fertilizer needed as the soil is naturally very rich.

7. No new varieties fully tested.

8. Sun scald is the worst enemy of fruit trees here; wrap the trees with brown building paper. The borer is not known this far west.

9. No irrigation here.

10. No shipments of fruit from this part of the Province, not 100 acres devoted to all kinds of fruits in the entire western fourth of the Province.

11. No fruit evaporated here.

12. Fruits have escaped well this winter.

On this farm we have tested 187 varieties of the so-called hardy apples and not half a dozen are living at this date and not one of the half dozen is thrifty. We have had but little better success with either plums or cherries when imported, but our native plums selected from those found growing in the woods are quite hardy and very promising.

Small fruits such as currants (all kinds), raspberries of the hardier varieties such as Philadelphia, Turner and Reeder, Houghton gooseberries and Hilborn black-cap are all hardy here and bear well.

Native plums, *Prunus pumila*, high bush cranberry, juneberry, currant, buffalo berry and raspberry are sometimes cultivated with success.

MANITOBA.—EASTERN HALF OF RED RIVER VALLEY.

BY W. G. FONSECA, WINNIPEG.

1. Fruit Sections—Apples of the crab class such as Transcendent, Hyslop, Siberian and Tetofski, thrive in all sections, on high and dry elevations composed of rich, sandy loam; our elevation above sea level is 738 feet. The Winnipeg district is well adapted for fruit culture; along the banks of the Red River, crab apples and all of the small fruits and native plums thrive well; soil is a sandy loam. The Portage La Prairie region is composed of a heavier soil and there success has crowned the efforts of a citizen in the production of Oldenburg. On the banks of the river a standard apple has been successfully grown at St. John by the Bishop of Ruperts Land, but unfortunately no information can be got as to where the trees came from or as to name; nevertheless these small beginnings carry hope for the future. Mr. W. B. Hall, of Headingly, on the banks of the Assineboine, has been very successful in apple culture for the last twenty years. The Transcendent and Siberian crabs, Red and Yellow, have borne heavy crops and are readily sold. Soil same as banks of Red River. Mr. Major of Rildenan, on the banks of the Red River has given attention to native plums, and strawberries, in sufficient quantities to market. All small fruits do well and are produced in considerable quantities. Increased attention is being directed to their commercial value. Currants, white, red, and black, need no protection. Raspberries do well, Cuthbert, Golden Queen and Thompson *Early Prolific* are hardy, and need very little protection; all black varieties require protection. Gooseberries—Houghton is most reliable here. Industry is also hardy and a great bearer. Lancashire is being introduced. This fruit is not subject to mildew owing to the dry atmosphere of our Province.

Insects—The canker worm is our worst enemy. It feeds upon the negundo and apple leaves as they unfurl. They are sectional in their choice doing

most harm in the city. The tent caterpillars attack plum trees and are very injurious. We also have to contend with the aphis.

MANITOBA.—THE RED RIVER VALLEY.

BY A. P. STEVENSON, NELSON.

1. Fruit Sections—In the western half of the Province very little progress has yet been made in apple growing, but fair success has attended the efforts of some in the eastern half, or the Red River Valley portion of the Province. One of the most favorable localities there is that portion along the eastern slope of the Pembina mountains which is partially wooded.

2. Soil—Principally clay loam. Land was cleared of oak or hazel scrub. Elevation 800 to 900 feet above the sea level. Average price of the land $15.00 to $20.00 per acre.

3. Varieties—Of the large apple Lieby**, Ostrokoff**, Blushed Calville**, Wealthy*, Russian Gravenstein*; Crabapples—Transcendent**, Hyslop**, Sweet Russet**, Virginia**, Phillips*, Minnesota*.

4. Cultivation—Find best results when orchard is under cultivation, crops are grown among trees, principally small fruits.

6. Fertilizers—No fertilizer has been used in any orchard to my knowledge, no necessity having yet arisen for use.

7. New Varieties—Have heard of none.

8. Insects and Diseases—Except the flat headed borer (which appears to be getting more troublesome) we are quite free from all trouble in this respect. No blight has yet been noticed on any trees.

9. Irrigation—No irrigation is necessary, the rainfall being sufficient.

10. Statistics—There are no large orchards in this locality; there are a few of fair size, planted principally with crab apple trees, that yield fine crops of excellent fruit. Later, trees of the large apple were planted and, in favorable locations the results are so far encouraging.

12. Hardiness of Species and Varieties—Sun scald is one of the chief causes of injury to the trees. The Leiby is certainly the hardiest of all large apples grown in this neighborhood; the Transcendent holding the same place among the crab apple trees.

MASSACHUSETTS.

BY J. W. MANNING, READING, CHAIRMAN.

1. Nearly all sections of the state except rough, hilly and boggy lands will admit of the culture of large and small fruits.

2. Such lands as will produce good corn or vegetables are adapted to the fruit crops, and intensive cultivation even under unfavorable conditions will often result in the most perfect fruit. Some of the best apple, pear and peach orchards are at elevations of 800 to 1,000 feet.

3. Plum culture has in recent years been quite profitable in poultry yards, or where spraying has been used to control the curculio. The new Japanese varieties seem well adapted to this state. Among the more desirable varieties of apples are Baldwin**, Hubbardston*, Rhode Island *Greening**, Ben

Davis*, Gravenstein**, Roxbury *Russet**, Porter*, Tompkins' King*, Maiden Blush*, Williams *Favorite**, Red Astrachan*, Oldenburg, *Duchess of**. The above varieties are well known in the market and cover the season. Jacobs Sweet†, McIntosh†, Yellow Transparent† for home use, and Sutton* are a few of the promising new sorts.

4. Cultivation—It is the common practice to cultivate young orchards with hoed crops for a number of years and then allow them to remain in sod, but no fruit will grow well in grass on high, dry or rocky land, although on rich alluvial soil or along the base of hills fair results can be secured without cultivation.

5. Cover Crops—Little attention has been paid to the use of cover crops in orchards for winter protection and the banking of soil around young trees is about all the winter protection that is commonly given.

6. Fertilizers—Stable manure, especially from cattle is desirable on all soils and nearly all of our orchard lands need plant food to promote the vigorous growth of the tree and to give better quality to the fruit. Aside from stable manure, wood ashes are much used as an orchard fertilizer.

7. New Varieties—Little reliance is placed upon new kinds, as comparatively few prove of value. The Jacobs Sweet apple has been known for twenty years as a winter sweet variety, and while it is not likely to supersede the older varieties it is a most desirable kind for home use; it originated in Medford, Mass.

8. Insects—Borers in the trunks of apple and peach trees are quite troublesome, but can be controlled by frequent examination. The tent caterpillar and codling moth do much harm to the foliage and fruit if not sprayed with arsenites. Diseases—Black knot on the plum and the yellows on the peach are the most troublesome diseases of those fruits, and the only remedies are the prompt digging of the peach trees and cutting off diseased branches from the plum trees and burning them. Peach yellows will often appear in trees that are half a mile from the infected orchards.

9. Irrigation—The artificial use of water is but little resorted to except for small fruit plantations.

11. Evaporation—Little attention is paid to the commercial evaporation or canning of fruit.

12. Winter Injury—Few complaints have been made of the winter killing of the larger fruits except peaches, which have suffered considerably in some orchards, but where the trees have been cut back to uninjured wood and have received good cultivation a vigorous growth has been sent out and they have apparently recovered. All apple and pear trees are considered hardy and give profitable results, but grape culture is seldom remunerative on account of the low prices that can be secured, owing largely to the fact that better grapes, put up in inviting packages are brought in from other states.

MICHIGAN.

BY CHAS. W. GARFIELD, GRAND RAPIDS, CHAIRMAN.

My report to the committee on catalogue dealt with varieties quite extensively so that this statement from Michigan will touch briefly other phases of Michigan Pomology.

Organizations—The State Society: The State Society devoted to horticulture is the successor to the Michigan Pomological Society, organized in 1870. Its field has been broadened, but pomology must ever be its leading feature. The hope of its best friends is that it will not make the market side of fruit growing too prominent, but will devote its attention largely to amateur fruit culture. The Society holds a prominent place among the rural organizations of the State and its literature has been very effective in educating our people to high standards of excellence.

Auxiliary Societies—Some years ago the State Society under the able direction of its venerable president, Mr. Lyon, organized the State very completely into a system of societies, with the State Society as parent, and about thirty associations auxiliary to it. The plan has, in these later years, not been carried out as perfectly as it was formerly, but the result has been the continuance and development of most of these auxiliaries, as local societies very effective in moulding the practice of their localities.

Market Organizations—Here and there in the leading market fruit regions have risen associations and clubs devoted to the financial interests of the members. These have been forceful factors in calling the attention of buyers to the State, perfecting the style of packages, securing railroad conveniences and concessions, and in some places have so far affected the method of marketing as to eliminate the direct shipment of growers entirely from the scheme of marketing, thus reducing their cares and anxieties and allowing them to center their energies upon the growing of the products.

Farmers' Institutes—A new system of organization has arisen in our State which is doing more to educate the general farmer in the matter of fruit culture than all other methods combined. The State Board of Agriculture has developed a plan of Farmers' Institutes directed by an able superintendent, K. L. Butterfield, reaching every county in the State. In this work the leaders of the State Horticultural Society have been engaged as instructors and thus the normal work of the Society has developed men who have by means of the Farmers' Institutes reached with their advanced ideas the uttermost parts of the State.

Agricultural College—The State Agricultural College, with its able ally, the Experiment Station, is doing good work in matters of pomology. The very best bulletins have been issued on fruit subjects and find their inspiration in the painstaking work at the College and South Haven Stations. These bulletins are distributed broadcast through the State and excerpts of them are made by the newspapers of the State. Special bulletins have been issued in times of need when technical advice upon some menace to the fruit interests was needed at once and the entire press of the State is alert in spreading information of this character.

Forest Elision—Great changes in the conditions effecting the cultivation of fruits have appeared in our State, and these changes are connected intimately with the rapid removal of our great forests which in an early day had so modifying an influence upon our climate. In the south part of the State the results have been most apparent. Certain varieties have dropped out altogether and the question of hardiness, which had little importance forty years ago, is today a vital one. Hence the importance of the forest as connected with pomological problems has led to earnest and exhaustive discussions in fruit growers societies upon the duty of the State in formulating a forest policy, and largely as a result of this discussion we have a State Board of Forest Commissioners who will make a thorough study of the forest prob-

lem, and we are expecting legislative action that will be of great value to Michigan as a fruit growing State.

Insects and Diseases—We believe that the visitations of injurious insects and diseases have been aggravated by the elision of forests. Cultivated orchards have become a prey to the attack of insects and microbes that once confined their depredations to forest growth. Our State has been alert in combatting these insidious enemies and has an officer whose whole duty it is to inspect orchards and vineyards and nursery stock, giving the danger alarm when needed and using severe measures for repression and suppression of these enemies to fruit culture. All of our organized work of this kind has an intimate connection with the Agricultural College thus rendering available the latest information developed by our scientific experts.

Orchard Cultivation—We are making some progress in thorough cultivation. The most successful orchardists are the most thorough cultivators. There has ceased to be any interest in the counsel of men who advocate orchards in sod or utilizing the ground of bearing orchards for any other purpose than the development of the fruit crop. Our practice, however, is not as good as our knowledge, and "line upon line and precept upon precept" must be followed a long time before the farmer whose orchard is simply an auxiliary to the farm will recognize the vital importance of treating his trees as fairly as his corn and potatoes. The importance of discretion in cultivation is not so deeply clinched in our practice as it should be. Too many follow the general rule of stopping cultivation at some date rather than suiting the time to the needs or the dangers in the individual cases. This whole question is closely connected with that of

Cover Crops—Our orchardists are awakening to the importance of having the ground covered when cultivation ceases and what crops to use for this purpose has been a matter of study. Crimson clover has been so variable in its growth that its employment is not general, although there are indications that we are developing a strain of seed that will stand our winter climatic conditions. Buckwheat is used somewhat by men who hate weeds and find in its use as a cleaning crop a satisfaction. There is a growing use of oats which seem to serve several purposes well. Oats check the growth of weeds, make an admirable winter mulch and do not obstruct the spring cultivation. Rye, which has been used a good deal here, has been more recently abandoned because of the difficulty of getting it under ground if the spring proves to be unusually dry.

Market Questions—These questions are in the lead among our growers. The money side of pomology is the absorbing one, and next in importance to growing an attractive product for the consumer, is the question of reaching him quickly with a package that serves its purpose so as to commend it to the buyer. Hence it is that the style of package has become an absorbing matter and our manufacturers are changing their styles to suit the growers' purposes. Bushels and half bushels are very popular for early apples, pears, peaches and even plums. There is a tendency for small fruits to work into a package of thirty-two boxes in two flat cases that are bound together, making a bushel package. Shallow boxes are preferred as showing the fruit to better advantage. There is a strong tendency also to differentiate and magnify the position of middlemen or handlers. This is a decided reaction. The grower finds that to do his work well he must not be hampered by the trials of marketing and offers inducements for the buyer to come to him and each morning take his product off his hands. This method emphasizes the importance of honest

packages and firm fruit. I am sorry to say we are far behind in this matter. We have not learned that it is better to throw away inferior fruit than mix it with our best.

Climatic Notes—Last winter was a severe one, our orchard interests suffered intensely. It had been so long since we suffered such a scourge that we had forgotten what to expect with a temperature of -30 and what to do after we had experienced it. A belt of country close to Lake Michigan in the southwest part of the State suffered it least and the eastern territory over on the Huron, St. Clair and Erie side was not treated so harshly as the interior and middle west. The reliefs of ground suffered with the valleys because of the bareness of the soil which led to serious root injury. It gave us a test of varieties which we have not had since the early '70's. We have had emphasized to us that the body is the weakest part of a tree and that a little protection to it is worth a great deal in such an emergency. We have learned, too, the wonderful recuperative power of trees in which a spark of life has been retained. Orchards that were pronounced dead in early spring have come out with the loss of but few trees. We will try and remember that it pays to give injured trees every possible chance to recover, but that the wisest process is not severe pruning when the vitality is low. Shortening in injured branches is wise but wholesale elision of large limbs is tree murder. We have also learned the wisdom of not allowing trees to overbear, even though they exhibit great vitality. The great thing to conserve is tree vitality and vigor. A reasonable length of life accompanied by reasonable crops of fruit.

Dangers and Needs—Carelessness in choice of orchard location is now inexcusable. There is enough knowledge, if well disseminated, to prevent blunders in locating orchards. The beginner has the experience of the veteran to draw from and the profits are not so large as to enter it carelessly and unequipped with information. Tree planting without preparation of the land is also without excuse. On every farm to which an orchard is to be added there is opportunity for choice of location and thorough preparation of the soil. The man who starves his trees or steals the nourishment that belongs to them with another crop is deceiving himself and plotting his own defeat. In the anxiety to get the quickest and largest money returns there is danger of neglecting the quality in fruits. The same soil will grow a Red Canada, a Jonathan, or a Wagener that develops a Sheep Nose, a Ben Davis or a Cabashea. We can afford to grow the best, if it is not done at too great expense, and this is a problem worth working out. A certain amount of attention and work is required to obtain good results in orcharding, and the temptation is to undertake too much and neglect some details. We see these examples everywhere in our State. Then there is the temptation to specialize on the fruit that pays best. Mixed husbandry in fruit growing is as important as in general farming, and the wise fruit grower not only prays for intelligence, but for a level head in time of success with any specialty.

There is still room for more organizations. By means of these information becomes disseminated. One can trade on the ignorance of his fellows for a time, but in the long run it is safer to have our business associates as wise, as thoughtful and scientific as we are. We need more knowledge of fruits and fruit growing disseminated through our schools. It is more important for a country boy, or girl, to know how to graft, or strike a cutting, than to solve a problem in quadratics; and a well disciplined mind can be developed by aid of the science that underlies success in pomology, as surely as in the translation of Latin sentences.

We need greater enlightenment among consumers. The buyer should know a good thing when he sees it, and the demand will be a stimulus that will bring the supply. So I hail with delight the forming of horticultural societies that are formed of growers, consumers and handlers. Through them I have a large hope for the future of fruit culture.

MINNESOTA.

A. W. LATHAM, MINNEAPOLIS, CHAIRMAN. BY J. S. HARRIS, LA CRESCENT.

The best fruit sections, so far, are found to be the somewhat broken country extending, some forty miles wide, along the Mississippi river, up to latitude 45, the two southern tiers of counties across the state and the more elevated lands in the region generally known as the "Big Woods," west of the twin cities.

The fruits most generally grown are apples, native plums, grapes, raspberries and strawberries. Apples are generally found to succeed best on clay loam or limestone soils, at an elevation of 1,000 to 1,200 feet above the sea level, and from 50 to 400 feet above valleys along rivers and streams or smaller water courses; but some very good orchards are found in the broader valleys. The native plum succeeds almost everywhere. Grapes generally do the best on southern slopes of bluffs and southern shores of lakes, in a sandy, loam soil, at an elevation of 50 to 200 feet above the water level of the rivers and lakes. All varieties as early as the Concord usually produce good crops of excellent fruit that ripens before the autumn frosts.

Strawberries and raspberries succeed remarkably well over a large portion of the State, and are being grown extensively in many localities for commercial purposes, but in most sections the raspberries require being laid down and given some winter protection. Blackberries have been planted quite extensively in the southeastern part of the State, but are not found very profitable and are losing favor.

Pears and *domestica* plums have not, so far, been produced with any encouraging degree of success. The difficulty with pears seems to arise from blight, the trees seldom living to reach a bearing age, and those that do perishing after producing the first or second crop. The Russian varieties endure little, if any, better than the others. With the *domestica* plum the difficulty appears to be from a lack of hardiness.

In the southeastern part of the State a few varieties of the sour, or pie, cherry are succeeding very well, but the fruit buds were injured by the cold of last winter.

Varieties: Apples—Antonovka*, Borovinka**, Gideon*, Russian Gravenstein*, Hibernal**, Longfield**, McMahon*, Northwestern *Greening**, Oldenburg *Duchess of***, Peach *Montreal***, Switzer—, Tetofski**, Wealthy**, Wolf River*, Yellow Transparent*.

Crabs or Siberian Hybrids.—Beecher**, Brier**, Gibb*, Hyslop**, Martha*, Minnesota**, Orange*, Transcendent*, Whitney*.

Apples not catalogued.

	Size.	Form.	Color.	Flavor.	Quality.	Season.	Use.	Origin.	
Charlamoff.....	5-6	r. c	y. r. s.	m	good	e. m.	d. m.	Rus.	**
Malinda.....	5	r. c.	g. y.	sweet	5	l. w.	k. m.	Vt.	*
Okabena.....	5-6	r. ob.	r. s.	m	6	m.	k. m.	Minn.	*
Patten *Greening*.	6-7	r. ob.	y. l.	m	6	m.	k. m.	Ia.	**
Peter.....	5-6	r.	r.	m	8	m. l.	k. m.	Minn.	*
Peerless.....	6-7	r. c.	r. s.	m	7	m.	k. m.	Minn.	†

Blackberries—Briton**, Snyder**.

Cherries—Bessarabian†, Dyehouse†, Montmorency†, Morello**, Richmond**.

Currants—Prince Albert**, Holland, *Long Bunch***, Red Dutch Improved**, Versaillaise*, Victoria**, White Dutch*, White Grape**, Wilder†.

Gooseberries—Downing**, Houghton**, Pearl†, Red Jacket*.

Grapes—Agawam*, Barry*, Brighton**, Champion*, Concord**, Cottage*, Diamond*, Janesville*, Martha*, Moore *Early***, Niagara**, Pocklington*, Prentiss*, Victor*, Winchell*, Woodruff†, Worden**, Campbell Early†.

Plums (*P. Americana*).—Cheney*, DeSoto**, Forest Garden**, Hawkeye*, Rockford*, Rollingstone**, Weaver*, Wolf*, Wyant**.

Raspberries—Columbian†, Shaffer*.

Doolittle*, Eureka†, Gregg*, Kansas*, Nemaha**, Ohio*, Older**, Palmer*, Souhegan, Brandywine*, Cuthbert**, Loudon**, Marlboro*, Turner*.

Strawberries—Bubach*, Crawford*, Crescent**, Cumberland*, Downing*, Enhance*, Gandy*, Greenville*, Haverland*, Jessie*, Michel*, Van Deman*, Warfield**, Bederwood**, Wilson*, Woolverton*, Clyde†, Glen Mary† Splendid**, Lovett*.

A considerable number of seedlings and little known varieties of apples have been looked up and reported to the State Horticultural Society, but we have not had opportunity to observe their condition since passing through the last hard winter.

MINNESOTA.

REPORT BY WYMAN ELLIOTT, MINNEAPOLIS.

1. The southern and central portions are best adapted for fruit culture, and the interest is there most extensive.

2. Heavy clay soils on high elevations.

3. Orchard land is worth thirty to one hundred and fifty dollars per acre, while bearing orchards bring two hundred to two hundred and fifty dollars.

4. Clean cultivation is best adapted for dry and arid regions. Vine crops.

5. Winter rye and late sown oats. Retain the snow as a protection.

6. Barnyard manure as a fall mulch is profitable.

7. Many new seedlings are being tested with great promise.

8. The forest tent caterpillar and apple gouger are the most troublesome insects and for the former collecting the eggs and destroying the nests have been found most practical.

9. Frequent rains obviate the necessity, if good cultivation is given.

12. The past winter has destroyed many of the half hardy and tender varieties. The hardiest apples are Oldenburg, Hibernal, Wealthy and Malinda, and are hardy in the order named.

SOUTH EAST MINNESOTA.

BY J. C. HAWKINS, AUSTIN.

Fruit Section. Includes fully the south one-third of the State. The best soil for the tree fruits is a sandy loam underlaid with clay or limestone. Our best orchards are on a north or northeast slope at elevations of from 1,100 to 1,165 feet.

Cultivation is generally practiced and attended with good results. Clover is the best cover crop. For fertilizing, barnyard manure is extensively used with good results; no commercial fertilizers are used in this section. Irrigation is not practiced. No fruits are evaporated. The price of land in this country runs from $35.00 to $75.00 per acre. The only diseases, if they may be called diseases, are sun scald and twig blight, and they are on the decrease, as our orchardists have learned to control them to a very great extent. Insects appear to be on the increase and the fruit grower who does not spray his fruits will be left in the lurch.

Varieties of apples that are especially adapted to this section are Oldenburg, Hilbernal, Longfield, Malinda, Wealthy, Repka Malenka, Anisim, Cross 413, Charlamoff, Patten, Wolf River and a long list of crabs and hybrids such as Whitney No. 20, Minnesota, Sweet Russet, Early Strawberry, and others. Last winter swept away all plums except the *Americana* varieties, of which the list is a long one. At the head are Aitken, New Ulm, Hawkeye, Wolf, Surprise, DeSoto, Rollingstone, Gaylord, Cottrell, Cheney, and a long list of others that are all good, hardy and productive. Cherries will never succeed here as they require a deep gravel subsoil. They were nearly or quite all wiped out in this section last winter.

Of new varieties we have nothing that has been tested. Ditus Day's seedlings are the most promising at this time. The hardier varieties of grapes are grown here in a small way. Several small vineyards are fruiting quite heavily. Small fruits of all kinds that had winter protection produced wonderful crops of fine fruit, but where no protection was given were killed entirely.

MISSOURI.

BY L. A. GOODMAN, CHAIRMAN, WESTPORT.

1. Nearly all portions of the Ozark Region, especially the high table lands, which are underlaid with a red clay or a gravelly shale. This is rich in iron and potash and gives color and quality to our fruits. Also the uplands along our rivers and creeks and the table lands over all the State if they have a good subsoil. Missouri has more good fruit land than any other State, as all of the soils above mentioned are well adapted to fruit growing. The red clay, the sandy loams, the loess, all the bluff lands along our great rivers, and even the prairie soils if they have a porous subsoil. In fact the kind of subsoil is if anything more important than the soil itself, for you can help make the soil, but cannot change the subsoil. Invariably the higher elevations are the best.

Prices of orchard lands are so variable that it is hard to make a general statement. The best of the Ozark lands can be had for $8.00 to $15.00 per acre. Many of our bluff and timber lands along our streams can be had from

$10.00 to $20.00 per acre. Closer to our towns and best farming communities the fruit lands will cost $20.00 to $30.00 per acre.

3. Varieties: Apples—Gano**, Ben Davis**, York Imperial**, Clayton**, Winesap*, Jonathan**, Rome Beauty*, Grimes*, Maiden Blush**, Mammoth Black Twig [Arkansas]*, Ingram, Huntsman*, White Pippin*, Early Harvest **, Lowell*. Pears—Kieffer**, Seckel**, Bartlett**, Anjou*, Sheldon*, Angouleme**, Clairgeau*. Plums—Wildgoose**, Miner*, Abundance*, Burbank*, Damson**, Lombard*. Peaches—Champion**, Mountain Rose**, Reeves Favorite*, Family Favorite**, Elberta**, Mrs. Brett*, Oldmixon Free**, Oldmixon Cling*, Picquet**, Wheatland**, Late Crawford*, Salway**. Cherries. Early Richmond**, Ostheim*, English Morello**, May Duke*, Wood*, Wragg†. Grapes—Concord**, Worden**, Moore *Early***, Goethe*, Norton*, Niagara*. Strawberries—Crescent*, Warfield**, Capt. Jack**, Bulbach*, Haverland**, Bederwood**. Raspberries—Kansas**, Hopkins**, Cuthbert*. Blackberries—Snyder**, Taylor*.

4. Cultivation: Young orchards are generally well cultivated in corn, potatoes and other crops. The older orchards are sown to cow peas or clover, the former being plowed under every year and the latter every second year.

5. Cover Crops: Cow peas and rye are most used. Usually the corn stalks are left on the ground. Good cultivation pays well and cow peas are the best cover crop.

6. Fertilizers: Barn-yard manure, cow peas, clover and ashes are all profitable. The cow peas are the best and cheapest.

7. New Varieties: Apples—Hopewell, Shackleford. Peaches—Evans, Elberta, Dewey Cling.

8. Insect and Diseases: Codling moth, curculio, gouger, canker worm, woolly aphis, borers, root rot, apple scab, peach leaf-curl, bitter and black rot on the apple, grape rot, and peach rot during very wet periods.

Remedies used: Bordeaux mixture, blue vitriol, kerosene emulsion, Paris green, London purple.

Irrigation: Practiced very little and only for berries and celery, but is very profitable where water can be had cheap enough.

10. Statistics: It is impossible to give even a fair estimate of the orchards. There are very many orchards of 1,200, 1,400 and 2,000 acres. Many of 100 to 400 acres, and thousands of lesser size, both of peach and apple. Fruit growing is spreading rapidly and the State will become a vast orchard both of apple and peach.

11. Evaporated Fruits: Apples are evaporated in large quantities and other fruits in smaller amounts. Berries and peaches are canned quite largely.

12. Hardiness: Both apple and peach have been injured badly by the cold of February, which reached twenty-five to thirty degrees below zero. Grapes, raspberries and blackberries also were badly injured. Location seemed to have more to do with the hardiness of varieties than the varieties themselves.

NORTHWEST MISSOURI.

BY N. F. MURRAY, OREGON.

1. The best fruit sections of the northern half of the State are found along the streams and consist of bluffs and rolling lands originally covered with timber. A good deal of this land is yet in timber. The very choicest of all

these lands for fruit growing is what is known and reported by geologists as the loess formation in the northwest corner of the State along the Missouri River. This class of land ranges in price from ten up to forty dollars per acre, the lower price being for the unimproved, and the higher for common farm lands in the hills more or less improved and having small orchards Bearing orchards are seldom sold in this section, as the fruit often brings from forty up to three hundred dollars per acre in a single year. I have seen one hundred dollars per acre refused for young orchards just coming into bearing (six years old), on land that was worth only $5.00 per acre without the orchard. The friable lands of the Missouri River bottom are good for apple growing, but quite a large part of this bottom land is what is called Gumbo (black, waxy land), and is not fit for fruit trees. Apple orchards thrive and bear best in the bluff formation and in the coves, heads of hollows, or draws, and on the sandy bottom lands of the Missouri River, where fruit is found more often than elsewhere, the hill tops and level ridges being less certain. The high hill-tops and yellow ridge lands are best for peaches, which do quite well in some sections along the river in Northern Missouri.

Five best varieties of apples are Ben Davis**, Jonathan*, Winesap*, Gano **, York Imperial*. Peaches—Champion**, Elberta**, Crosby*, George 4th*, Oldmixon Free*. Pears—Seckel*, Angouleme*, Kieffer**, Garber*, Howell*. Plums—Abundance*, Burbank*, Wild Goose**, Miner, Blue Damson*. Cherries—Early Richmond**, English Morello**, Large Montmorency*, Dyehouse*, May Duke*. Grapes—Moore *Early***, Worden*, Concord**, Niagara*.

Many new fruits are being tested, but it is hard to get reliable reports. The Ingram apple is a new variety that is doing well in Southern Missouri, especially so on the red lands. It is a winter variety similar to the Janet, [Ralls *Genet*,] but larger and darker in color. Our experiment Station is testing a great many new varieties of fruit but I am not prepared to make a report on them at present.

All young orchards are cultivated more or less for the first few years in corn, potatoes and other cultivated crops, and then are mostly sowed to red clover, but few have the close care and attention they ought to have. Red clover is growing in favor wherever it has been tried, as it produces the dark green foliage necessary to insure crops of fruit. Very little commercial fertilizer is used in Northern Missouri, as nothing seems to give as good results as barn-yard manure and red clover. Most troublesome of all insects is the codling moth and the worst diseases are blight and root rot. Some of the fruit centers of the State are as follows: St. Joseph, Oregon, Chillicothe, Carrollton, Princeton, Hannibal, Louisiana, Weston, Kansas City, Lee's Summit, Olden, Mt. Grove, Willow Springs, West Plains, Koshkonong, Neosho, Springfield, Lebanon, Rolla, Jefferson City, Booneville, Republic, Billings, Pierce City, Sarcoxie and Columbia.

We seldom have any serious injury to the leading varieties of apple, pear, peach, plum, grape and the small fruits in our State, but our past winter was an exception and many suffered great damage by the severe winter. It is safe to say the injury to the nurseries of the State was fifty per cent of their total value, while to young orchards under three years of age it was ten to twenty per cent. To peach orchards, all ages, an average of thirty-five per cent, while other fruits suffered more or less, and I believe it will take five years to restore our orchards to their bearing capacity prior to the damage of last winter.

There is a wonderful fruit interest springing up all through Southern Missouri, a large portion of which is admirably adapted to fruit growing, as good land can be had near railroads at from two to ten dollars per acre, and in some places by taking several thousand acres it can be had at seventy-five cents per acre. While some of it is underlaid with minerals, a large portion of it is excellent for fruit growing and stock raising, the country is very healthy, the climate mild, winters short and water plenty and pure.

Cow peas thrive here and should be grown to add humus to the soil. It seems from our experience that cow peas are the thing for Southern Missouri and red clover for Northern Missouri.

The apple crop of 1899 is variously estimated at from one-fourth to one-half a crop for the State, but putting all reports together we believe one-third of an average crop is about correct.

The value of the fruit crop of the State will run from eight to twenty million dollars annually. It is mostly sold in the fresh state as prices are too high to pay to evaporate in general, although there are some sections where, owing to high express charges and the perishable nature of some of the fruits, it pays to evaporate and can, and the interest in these two lines is growing rapidly.

The unusual damage of last winter was not so much from the low temperature as from the soft unmatured condition of trees and plants when the winter set in, and both together were too much for nearly all varieties when growing in exposed places.

NEBRASKA.

F. W. TAYLOR, LINCOLN, CHAIRMAN.

REPORT BY G. A. MARSHALL, ARLINGTON.

The clay, timbered hills of the eastern part of the State and the canyon lands of Western Nebraska are best for raspberries and blackberries unless the land is under irrigation. Good orchard land in Eastern Nebraska is worth from forty to sixty dollars per acre, while bearing orchards bring from one hundred and fifty to two hundred dollars per acre, but farther west the price is lower.

Varieties: Apples, summer and autumn—Yellow Transparent†, Oldenburg **, Wealthy**, Utter; winter, Winesap**, Ralls *Genet**, Ben Davis**, Grimes Golden**, Jonathan**, Gano†, Arkansas†. Cherry—Early Richmond**, English Morello**, Montmorency**, Ostheim*, Terry†, Early Morello. Plums—Miner*, Forest Garden*, Wolf*, Wyant*, Stoddard†, Wild Goose*, Lombard*, Shipper *Pride*†. Pears—Flemish Beauty*, Sheldon*. Peaches—Alexander**, *Early* Rivers*, Hills Chili*, Wright**. Grapes—Concord**, Worden**, Moore**, Raspberry—Palmer**, Nemaha**, Kansas†. Blackberry—Snyder**. Currant—White Grape**, White Dutch**, Victoria**. Gooseberry—Downing**, Champion*, Houghton*, Pearl†.

Many varieties of apples were severely injured by the winter, Ben Davis worst of all. Peaches and apricots were in most cases killed to the ground and European plums and all kinds of cherries, were much injured.

NEVADA.

BY R. H. McDOWELL, RENO, CHAIRMAN.

1. Fruit Sections: The question of soils, varieties and fruit sections has not received much attention.

Little damage has been done by insects, the most troublesome being the flat-head borer. All orchards need irrigation, for which the water is carried in ditches and furrows.

The following varieties seem most promising: Apples—Pewaukee, Ben Davis, Baldwin, Green Sweet, Tolman, Wealthy, American Blush, Rhode Island *Greening*, Tompkins, King, Northern Spy and Fall Pippin. Pears—Wilder, Clapp Favorite, Vermont Beauty, Bartlett, Seckel, Angouleme, Idaho. Plums—Lombard, York State *Prune*. For a commercial orchard it does not pay to have more than five varieties, but these should be grown to perfection and the fruit must be picked and packed with great care and each package branded before it goes to market.

NORTHEAST NEVADA.

BY WILLIAM SMILEY, DEETH.

1. Nearly all parts of the State are experimenting with fruit of different kinds.

2. Our table and bench lands near the foot of the mountains, where the altitude is not too great. Fruit trees thrive best at from 3,000 to 5,000 feet. The average price of good orchard land with free water right, cultivated but not planted to trees, is from ten to thirty dollars per acre according to location.

3. Red Astrachan, Oldenburg, *Duchess of*, Gravenstein, Fameuse, Wealthy, Jonathan, Winesap, Gano and Arkansas (*Black Twig*).

4. All our orchards are cultivated.

5. None are used.

6. No fertilizers are used.

7. Gano, Lawver and Utter.

8. The only insect is a green louse which has appeared this year for the first time. This causes the leaves to wither and fall.

9. Everything requires irrigation, the water being run in furrows along the rows.

10. The orchards are too young to give an estimate of the income, but we have a home market for all the fruit that can be raised for some years to come.

11. Very little attention is paid to evaporating fruit as there is a ready market for green fruit.

12. There was little injury from the winter.

NEW HAMPSHIRE.

BY PROF. F. WM. RANE, DURHAM, CHAIRMAN.

Most fruits are grown to a greater or less extent in the State. The fruit sections have never been distinctly outlined. The comparatively small amount of coast doubtless has its advantages in moderating the climatic conditions so that a few peaches and grapes are grown, which otherwise would be impossible. Throughout the southern portion of the State the Baldwin apple is the main commercial fruit crop. Other varieties of apples as well as a conglomeration of varieties of other fruits are grown throughout this section, but not on a sufficiently large scale to base much dependence upon them. Plums do well here with comparatively little care. During the past two seasons peaches have yielded very heavily. The varieties most commonly fruited are Mountain Rose, Early Crawford and Foster; Elberta seems to be a failure.

Orchards generally speaking are neglected; cultivation is seldom resorted to.

Insects and diseases are very prevalent and account for the slight advance made in orcharding. The apple maggot and a dry rot spot disease, besides the codling moth, tent caterpillar and canker-worm are quite common and therefore discouraging.

With modern orchard methods, however, it is believed that New Hampshire offers exceptional opportunities. Even at present the apple crop is one of the best paying, and this under such poor conditions. Apples sold on the average in 1898 for $2.25 per bbl. for firsts and $1.50 for seconds. Small fruits bring good prices generally.

NORTHERN NEW HAMPSHIRE.

BY J. D. HOWE & SON, LANCASTER.

Coos county, or rather that section of the State north of the White Mountain range is not so well adapted to fruit culture as the central and southern parts, but with careful selection of varieties and fairly good care, many kinds of apples, pears, plums, cherries and the small fruits can be raised with profit, and grapes can be raised with some success. A fairly rich, loamy soil, not too dry, at a good elevation is best for all kinds and we are convinced by experience and observation that a northern or northwestern slope is better for the location of an orchard than a southern or southeastern; presumably for the reason that the changes from heat to cold are not so radical in the former as in the latter locations.

For apples for commercial use we would recommend Fameuse,**, Wealthy **, Jewett, (*Nodhead*)**, Porter*, Tolman *Sweet*, Bethel**, McIntosh**, Twenty Ounce*, Bellflower*, Northern Spy*, Stark** and Ben Davis*. Of the earlier varieties, Yellow Transparent**, White Astrachan*, Red Astrachan**, Peach **, Oldenburg**, St. Lawrence**, Alexander* and Fall Jenneting* all do finely in this locality, but owing to their poor keeping qualities are not so desirable for market.

We have succeeded in raising as a real success only two varieties of pears, the Flemish Beauty and Clapp. Louise Bonne and Vermont Beauty seem to be doing fairly well.

Nearly all varieties of plums, except Wildgoose, are doing well. Bradshaw, Canada Egg and Lombard are best, followed closely by Arctic, Saratoga, St. Ann, Green Gage, Chautauqua, Saunders, Abundance and Damson. Several varieties of cherries grow with more or less success, but on the whole think the old red cherry grown here for years is the best. For grapes (not for profit), we would recommend Concord, Delaware, Niagara and Moore.

The culture of small fruits is carried on successfully. The high or bush cranberry seems well adapted to our climate and is worthy of mention.

The cultivation of orchards in this section is the exception rather than the rule, grass being allowed to grow among the trees. Could the grass be kept out and the land cultivated, as is practiced in the fruit section of the west, the business would be very much more remunerative than it now is.

Well composted manure and wood ashes spread broadcast are the chief and the best fertilizers.

The borer is the worst enemy to the fruit tree. The forest caterpillar came upon our orchards for the first time in hordes last season and has already commenced its work of destruction in greater numbers than last year. A strong composition of paraffine or Fairbanks Gold dust, kerosene and water, as hot as it will do to use on the trees, is instant death to this pest. We apply it with a spray pump as they cluster about the trunks and larger limbs.

It would be difficult to give with any degree of accuracy the amount of land devoted to fruit raising in this or adjoining counties. We have an orchard of about four hundred trees. The apple crop of 1898 was a fairly good one and was worth in our home market $3.00 per barrel. The plum crop was very abundant and sold at from eighty cents to $1.00 per peck.

NEW JERSEY.

BY I. J. BLACKWELL, TITUSVILLE, CHAIRMAN.

1. Fruit Section—New Jersey is a great fruit farm, beginning with Cape May County, where strawberries, tomatoes and melons ripen early and produce good crops. Peaches, apples and pears are productive throughout the State. The peach is now grown most in the northwestern part of the State; strawberries are extra fine and productive around Hilton. Early apples are grown extensively in the southern half of the State, and winter apples in all sections north of and including Monmouth county. Currants, blackberries, grapes, cherries, plums, peaches, pears and apples are produced in paying quantities in all parts of New Jersey.

2. Trap-rock soil gives the best results. New Jersey has about all grades of soil. The southern half varies from sand to loam; the northern is mountain land, generally with some heavy clay soils. The heavy clays are not good fruit lands, unless thoroughly drained; limestone soils are the best for apples, peaches and pears.

3. Varieties: Apples, northern part of State—Baldwin**, Pound Sweet*, Fameuse*, Wine, *Hays**, Rhode Island *Greening**, Northern Spy*, Cooper, Market*. Central part of the State—Smith Cider**, York Imperial*, Bough**, Alexander**, Broadwell**, Cooper Market**, Early Ripe*, Williams *Favorite* **, Garrettson**, Long Island Russet**, Nero†, size medium; color red with lighter stripes; from round flattened; quality 8; season January; for dessert, cooking or market; origin; Princeton, Mercer county. Shone† size large; form round, conical; color red, shaded darker with lighter spots; flavor mild

or sub-acid; quality 9; season March; for dessert, cooking or market. Origin Harbourton, Mercer county.

Southern section of the State—Winesap**, Bough**, Williams *Favorite*, and many other varieties do well here. Peaches—Stevens Rareripe*, Elberta **, Stump**, Oldmixon Free**, Mountain Rose**, Champion*, Moore Favorite **, an old Massachusetts peach, is one of the very best peaches in New Jersey, freestone; size 8 to 10; form, round, oval; high color; flesh white, red at stone; quality 10; season late; use dessert or market. Pride of Franklin†, size 10; form round; color, skin and flesh yellow; free; quality 10; season late; use dessert, cooking or market; very much like late Crawford, about five days later, extensively grown in North Jersey. Plums—Bleecker *Gage**, Red June†, Hale†, Abundance**, Imperial Gage*, Prince *Yellow**, Richland*. Pears—Angouleme*, Anjou*, Bartlett**, Clapp *Favorite**, Kieffer*, Seckel*, Worden-Seckel†. Quinces—Bourgeat†, Champion**, Orange**, Rea**. Raspberries, *occidentalis*—Kansas*, Hilborn*, Gregg**. Raspberries, *strigosus*—Cuthbert**, Marlboro*, Loudon†. Cherries—Downer**, Elton**, Spanish**, Tartarian, *Black***, Late Kentish**, Montmorency Ordinaire**, English Morello**, Richmond**. Blackberries—Early Harvest**, Minnewaska*, Eldorado*, Lawton**. Grapes, *exotic*—Black Hamburg*; grapes, *V. labrusca*—Concord**, Diamond**, Moore *Early***, Niagara**, Worden*, Ulster*. Currants—Holland*, Cherry**, Fay**, White Grape**, White Gondouin**. Gooseberries—Chautauqua*, Industry*, Pearl*, Downing*. Strawberries—Downing**, Gandy**, Sharpless**, Champion *of England*†. Chesnuts—Advance*, Alpha*, Giant *of Japan**, Reliance*, Success*, Superb*. Mulberries—Hicks*, Downing*, New American*. Mr. John R. Parry of Parry, N. J., says that nearly all kinds of the chestnuts in the catalogue do well here, also Persian walnuts.

4. Cultivation—Peaches are usually kept clean and the soil mellow during the whole season. While the trees are young, corn is grown but the last crop before bearing is usually buckwheat. Apples and pears are cropped until of bearing age, usually with corn or potatoes. Many farmers grow crops all of the time, usually at the expense of the fruit. Strawberries are set in the spring and are carefully cultivated the first summer; after fruiting they are turned under and some other crop grown. Currants, raspberries, gooseberries and blackberries are supposed to be kept clean and the soil mellow during the growing season.

5. Cover crops are not much used, Crimson clover is used some.

6. Fertilizers—Commercial fertilizers are used some throughout the State. Crimson clover is used considerably in the lower part of the State, also potash and bone, and stable manure. The best fertilized orchards pay the best.

7. New Varieties—The two apples in the list for central New Jersey. More than half the apples in central New Jersey are Smith *Cider*. Next on the list is the Nero and where known Shone comes next.

8. Insects and diseases—Codling moth, curculio, apple scab, ripe rot; the list is increasing. Spraying with arsenites is used for codling moth and curculio, and Bordeaux mixture for scab; ammoniacal solution is used for ripe rot.

9. Irrigation—Not used, a harrow kept everlastingly at it is all the irrigation needed for apples, peaches and pears. The time is soon coming when irrigation will be thought very useful for strawberries and the small fruits generally, and we probably would find irrigation beneficial to all orchard fruits in August, as the dry weather of that month kills far more fruit buds than are destroyed by the cold.

Nearly all varieties are hardy here, strawberries need a winter covering to keep the ground from freezing and thawing. Raspberries and blackberries are generally hardy.

NEW MEXICO.

L. BRADFORD PRINCE, SANTA FE, CHAIRMAN, REPORT BY PARKER EARLE, ROSWELL.

1. All of the upper portion of the Pecos valley where irrigation can be commanded i. e., from McMillan to Roswell. About Roswell and Hagerman there are nearly fifteen hundred acres in orchard—mainly in apples.

2. The soil of this region is a strong clay loam quite rich in lime, potash and phosphoric acid. The elevation is about thirty-six hundred feet. Orchard lands with water rights can be bought at about $40.00 per acre. Bearing orchards are not often sold. They are a valuable investment as they will pay interest on a large sum—two or three thousand dollars per acre.

3. Ben Davis, Jonathan, Missouri *Pippin*, Winesap, Rome Beauty, Ralls *Genet* and Yellow Bellflower are among the varieties that give good satisfaction. All succeed admirably and can carry whole clusters of stars.

4. Crops are not generally grown in orchards, which are well cultivated.

5. Winter crops are not needed.

6. Fertilizers are not used.

7. No promising new variety.

8. No insects or diseases. We leave these little matters to our eastern friends, who consider New Mexico as a desert and the home of savages.

9. Irrigation indispensable—Springs, artesian wells and reservoirs.

10. The largest orchard is five hundred acres, four years old, just coming into bearing.

Fruits must be sold f. o. b. at about ten cents a bushel to repay cost of growing, but this does not cover cost of packages or of harvesting.

Apples sell to net about one dollar per bushel, to date. Not many orchards in bearing yet. The few old ones pay well, individual trees sometimes yielding from $10.00 to $25.00 in a season.

11. No evaporation.

12. All species and varieties are hardy. The only losses are from spring frosts. Apricots and Japan plums rarely bear. Peaches fail three years out of four. All late blooming kinds are sure croppers.

Finally. This is, probably, everything considered, soil, climate, freedom from insects, absolute security from blights, scabs, mildews and other fungi; as well as from geographical situation and easy distance to export points, the most valuable apple region in America.

NEW YORK.

BY PROF. WENDELL PADDOCK, GENEVA.

1. Central and western part, especially on borders of Great Lakes and around inland lakes, the Hudson River region, and Lake Champlain apple region.

2. Clay loam for pears, apples and quinces. Gravelly loam for stone fruits and small fruits. Argillaceous shale soil for grapes. Price of land depends on location. Would range to fifty and one hundred dollars per acre. Many of the best orchards cannot be bought.

3. Apples—Maiden Blush**, Oldenburg**, Hubbardston**, Rhode Island *Greening***, Baldwin**, Ben Davis**, Northern Spy**. Pears—Bartlett**, Bosc**, Anjou**, Lawrence**, Kieffer**, Angouleme**, Winter Nelis** and Seckel**. Plums—Field**, Bradshaw**, Hudson *River Purple***, Bavay**, King *of Damsons***, Italian Prune**, Czar**, Gueii**. Peaches—Early Crawford**, Late Crawford**, Eiberta**, Stevens**, Horton Rivers**, Chili**. Cherries—Windsor**, Schmidt**. Grapes—Concord**, Niagara**, Delaware**, Worden**, Catawba**, Brighton**, Moore *Early** and Lindley*.

4. Quite general among progressive growers, and clean cultivation is given, followed by cover crops. Small fruits are many times planted between the rows of larger fruits, as well as hoed crops in young orchards.

5. Some extent. Red clover, crimson clover, rye.

6. Stable manure, ashes, potash and phosphoric acid in various forms, quite generally used and considered profitable.

8. Insects—codling moth, tent-caterpillar, canker worm, pear psylla, borers, curculio, San Jose scale. Getting worse in many localities. Diseases, apple and pear scab, peach yellows, peach leaf-curl, Monilia rot of stone fruits, black rot and downy mildew of grapes, gooseberry mildew, cherry and plum leaf spot, apple canker.

9. Not practiced to any extent.

11. Apples and black and red raspberries. Quinces sometimes.

12. Past winter did comparatively little injujry. Peach, apricot and sweet cherries suffered most.

NORTH CAROLINA.

BY PROF. W. F. MASSEY, RALEIGH, CHAIRMAN.

I have tried in vain to get reports from the members of the Committee. One member writes today that the last report was so bad for the state, and the report this year must be worse, that he does not want to make any. The fact is there is hardly any fruit at all this year except a few apples in the mountain country and grapes everywhere. Living here in the poorest fruit section of the State, it is hard for me to form an individual opinion in regard to many things that succeed in other sections. For instance, no Bigarreau or Heart cherry will fruit here at all, while they do finely west of the line of the Southern Railroad, eighty miles west of here. Gooseberries and currants will not grow here at all, while in the mountains they are fine. Few apples are of any value here, while the mountain country is the finest apple region in the country. Peaches are fine in the elevated sand hill country seventy miles south of here, while here they seldom fruit and are inferior when they do. The climatic troubles that surround this particular section are very harrassing to one trying to get information.

NORTH CAROLINA.

REPORT BY J. S. BREECE, FAYETTEVILLE.

1. Fruit Sections.—The Cape Fear section is naturally adapted for the production of strawberries, blackberries, dewberries, Muscadine grapes, Morello cherries, plums—especially Japanese varieties—peaches and pears. Figs and Japanese persimmons usually thrive but were killed down the past winter, by a temperature three degrees below zero. Pecans, filberts and some varieties of chestnuts are quite successfully grown. Apples and raspberries do well but are not entirely adapted to the climate.

2. Well-drained, porous soil is best for peaches, and locations above the general surroundings are safest from frost in the spring. All other fruits do well on any soil that is in condition for cultivation. The price of good orchard land varies, $5 to $20 per acre. Orchards are generally planted as adjuncts to the home and their value cannot be readily determined.

3. Varieties: Strawberries—Thompson. Raspberries—Red—Marion, Miller and Loudon. Dewberries—Lucretia. Grapes—Muscadine, Scuppernong, Mish, Thomas, James, Delaware, Concord, Niagara. Cherries—Dyehouse, Early Richmond. Plums—Ogon, Botan, Chabot. Pears—LeConte, Garber, Kieffer. Peaches—Sneed, Triumph, Rivers, Mountain Rose, Crawford Early, Elberta, Oldmixon Free, Stump, Worthen, Cowper, Keyport, Salway, Bilyeu. Apples—Early Harvest, Sweet June, Horse, Bonum, Winesap, Yates. Crabapples—Florence.

4. Cultivation.—Orchards are generally given clean cultivation, except when sown with cow peas. Young orchards are cropped with corn or cotton, but no cover crops are used.

6. Fertilizers.—Three parts cotton seed or cotton seed meal to one part acid phosphate is used mostly to supplement what is produced by mules and horses. Orchards are not usually fertilized except by applying manure to crops grown in them. Small fruits are fertilized liberally with stable manure or cotton seed meal and phosphate.

8. Insects and Diseases.—The curculio is so eminently chief among all insects that everything else is insignificant in comparison. If it is not getting worse, it certainly is not less troublesome. I think it is encouraged by forests near the orchards.

9. Irrigation.—Not used, as it is not needed.

12. Hardiness of Species and Varieties.—No fruits were injured.

NOVA SCOTIA.

CHAS. E. BROWN, YARMOUTH, CHAIRMAN, REPORT BY F. C. SEARS, WOLFVILLE.

While fruit growing has been practiced to a certain extent in Nova Scotia ever since the French settled at Grand Pré, it is only within recent years that it has become one of the leading industries of the Province. In 1867 only seventeen thousand barrels were exported, but the fruit plantations were gradually enlarged and in 1896 five hundred thousand barrels of apples were shipped from the Province, the greater portion of which were raised in

Annapolis Valley, a section which is justly famed for the ease with which the trees may be grown, as well as the superior quality of its fruit. Of the other fruit districts, Pictou county and the section in the southwestern part of the Province, embracing parts of Queens and Lunenburg counties, have given apple culture the most attention. The apples of these districts are noted for their keeping qualities, which is ascribed to the fact that the orchards are in sod.

In cultural methods there is great variation among different growers, but it is becoming every year more common to find the orchards thoroughly cultivated from the opening of the season until about August first. Sometimes root crops are grown between the rows, but more often the entire land is given over to the use of the trees. After cultivation ceases, the orchard is usually seeded to some cover crop, buckwheat and clover being most commonly used. The cover crops are left on the land during the winter and turned under the following spring. Barnyard manure is freely used and has been the only fertilizer employed, but now the use of commercial fertilizers is increasing. Of these, ground bone and muriate of potash seem to be most satisfactory, although hardwood ashes, where they can be secured in sufficient quantities, have proved a most excellent fertilizer for bearing orchards. Muriate of potash has given excellent results in a number of orchards that made a splendid growth of wood each year, but did not produce much fruit. After the potash was applied, the fruit crop was greatly increased and the orchards are now noted for their exceptionally large yields.

OHIO.

BY W. W. FARNSWORTH, WATERVILLE, CHAIRMAN.

1. The northern part of the State, bordering on the lake, is nearly all adapted to the cultivation of all the fruits grown in this latitude. This may be called the fruit section of the State. In the southeast part of the State, and in some of the southern portion, fruit is also largely grown. The northern part is especially adapted to the cultivation of grapes and peaches.

2. Grapes usually succeed best on clay or shale soils with high elevation and lake exposure; peaches on sandy or gravelly soil or well drained clay. A good elevation affording atmospheric drainage is desirable, as is also nearness to large bodies of water, especially on the windward side of orchards.

In the northern portion of the State, orchard land is worth $75 to $125 per acre; in southeast and central from $40 to $80, and in the southern $20 to $75.

3. Varieties.—Strawberries—Crescent*, Lovett**, Bubach*, Haverland**, Carrie† Clyde†. Black Raspberries—Eureka**, Conrath*, Gregg*, Munger† Cumberland†, Lotta*, Red Raspberries—Miller*, King**, Cuthbert*, Loudon**, Columbian†. Currants—Cherry**, Fay*, Victoria**, Wilder†. Gooseberries—Downing**, Houghton*, Columbus†, Industry*. Blackberries—Snyder**, Eldorado**, Erie*, Minnewaska*. Grapes, white—Winchell*, Diamond**, Niagara**, Hayes*; black—Moore *Early**, Campbell Early†, Nectar*, Worden**, Concord**; red—Ulster*, Delaware**, Moyer*, Catawba**, Lindley*. Cherries—May Duke*, Dyehouse*, Early Richmond**, Montmorency**, English Morello**, Windsor**, *Black* Tartarian*, Yellow Spanish*, Napoleon*, Ida*. Peaches—Alexander*, Rivers*, Mountain Rose**, St. John*,

Champion**, Elberta**, Early Crawford*, Oldmixon Free**, Crawford Late*, Chairs Choice*, Kalamazoo†, Beers Smock*, Salway*, Quinces—Orange**, Champion*. Plums—Red June*, Burbank**, Niagara**, Duane Purple*, Gueii*, Lombard**, Arctic*, Imperial Gage*, Italian Prune**, French Damson†, Monarch†, Grand Duke†, Bavay**. Pears—Giffard*, Wilder†, Clapp *favorite**, Bartlett**, Howell**, Angouleme**, Kieffer*, Lawrence**, Anjou*, Apples—Early Harvest*, Red Astrachan*, Yellow Transparent*, Oldenburgh**, Wealthy**, Maiden Blush**, Benoni*, Sweet Bough*, Fameuse*, Hubbardston*, Northern Spy**, Rhode Island *Greening***, Baldwin**, Grimes Golden**, Jonathan**.

4. As a rule, corn or potatoes are grown in the young orchard and then it is condemned to enter the regular farm rotation, with rather more than its share of pasturing. A few of the more progressive farmers give thorough culture.

5. Only by a few specialists. I find they protect the roots and add humus and fertility. Rye, oats, crimson clover, cow peas and Canada field peas are used.

6. Stable manure and some ashes are used and are usually found profitable.

8. Curculio, codling moth, San Jose scale, and borer among the insects, and pear blight, plum rot, apple scab and peach yellows among the diseases. Spraying and jarring the trees for curculio and removing and destroying yellows and blight are the best remedies.

9. Irrigation not much practiced.

11. Little evaporation is done in our State.

12. The varieties suffering from the winter are about as follows: Apples—Grimes Golden. Pears—Bartlett, slightly. Peaches—All kinds, more or less. Plums—Bavay, Niagara, Lombard and a few others.

ONTARIO.

BY PROF. H. L. HUTT, GUELPH, CHAIRMAN.

On account of the pressure of work, it has been impossible for me to give the attention to this report for the Pomological Society that I would have liked, but I now enclose the reports from the four members of the Committee. These reports are from widely different sections of our Province, and they are prepared by men well posted in fruit matters.

REPORT FOR NORTHERN ONTARIO.

BY G. C. CASTON, CRAIGHURST.

1. That portion lying south of the 45th parallel.

2. Soil.—Loamy soil for most fruits, and rolling land with natural drainage. Price of land varies from $30 to $75 per acre.

3. Varieties.—Apples—Northern Spy**, Baldwin**, King**, Ontario**, Ben Davis*, Seeknofurther*, Canada Red*, Fameuse**, Mann*. Early and fall varieties: Oldenburg**, Yellow Transparent*, Alexander*, St. Lawrence*, Wolf River*, Hare Pipka†, McIntosh*.

4. Cultivation.—Too often sown to grain and grass, especially by the general farmer. Professional fruit growers give cultivation and in many cases grow small fruits between rows of trees.

5. Cover Crops.—More attention is now being paid to the importance of cover crops. Rye and clover protect the roots in counties of light snowfall and severe frosts.

6. Fertilizers.—Barnyard manure, hardwood ashes, soiling with clover. Plowing in clover and applying hardwood ashes at the rate of forty bushels per acre give good results.

7. New Varieties.—Kean's Seedling, a promising fall apple. Medium to large, oblate; skin dark green, splashed with red; calyx partly closed, in a broad, shallow basin; stem short, stout, set in a deep, narrow cavity; flesh crisp, juicy, sub-acid; good for cooking, medium for dessert. Season, October and November.

8. Insects and Diseases.—Tent caterpillar, codling moth, curculio, aphis and oyster-shell bark louse. Remedies, Paris green, kerosene emulsion. When spraying is regularly and properly attended to, very little trouble is caused by these pests.

9. Irrigation is not necessary here, although some seasons are dry, and crops are shortened by reason of dry weather, it is not so general or pronounced as to call for irrigation. Mulching for small fruits and frequent and thorough cultivation is about all that is necessary throughout this section.

10. Statistics.—For the county of Simcoe, probably 6,000 acres are in orchard and garden. In the Georgian Bay district large quantities of plums are grown. Nearly all varieties succeed and produce regular and heavy crops of the finest fruit. This section is not excelled, if equaled, in America for plum culture. It also produces the finest apples in the world, which cannot be excelled in point of quality. Plums are shipped by the carload and are usually cheap, owing to large production. Apples usually bring $2 per barrel, f. o. b., for the winter varieties. Early varieties bring from $1.25 to $1.50 per barrel. At these prices apple growing pays. Late varieties are mostly stored and repacked for export to British markets during winter.

11. Not much as yet has been done in evaporated fruits. This branch of industry will no doubt grow with the enlarging area of fruit culture.

12. Hardiness.—This is a subject that requires careful attention from fruit growers. The climatic conditions of the Province vary much in surprisingly short distances, owing to proximity to or distance from large bodies of water that nearly surround the Province. As to apples, the introduction of Russian and other hardy varieties is extending the area of apple growing much farther north than was once thought possible.

Many of the older varieties and higher priced sorts, such as King, Northern Spy, Baldwin, Greening, etc., are rather tender, where planted at a distance of say twenty or thirty miles inland from the lakes. But they can be grown successfully over most of the section south of the 45th parallel, and indeed in many localities north of that by top grafting them on hardy stocks. Such varieties as Oldenburg, Alexander, and the best of the Russians, seem to find a congenial climate in the northern part of the older settled counties and grow to great perfection. If the transportation and marketing of these fruits (which is now in the experimental stage) proves successful, the area of profitable apple culture will be enlarged to a very great extent.

REPORT OF NIAGARA PENINSULA.

BY M. BURRILL, ST. CATHERINES.

1. That portion of Ontario known as the Niagara district, which is largely contained within the counties of Lincoln and Welland, is devoted to fruit culture to a great extent. Although a considerable quantity of apples, berries, grapes and other fruits are grown in Welland and the higher parts of Lincoln, it is in the strip of country lying between the lake and the rocky escarpment known locally as "the mountain," that the more tender fruits are chiefly produced. The breadth of this strip at its eastern limit in Niagara would be some six miles and at Grimsby (thirty miles to the west) between one and two miles. The average width is possibly four miles. As a general rule the soil near the base of the "Mountain" is of a strong and fairly heavy character, and grapes and plums occupy a considerable share of this ground. Nearer the lake, where the soil is of a lighter description, peaches are more extensively grown. The elevation of most of the good peach orchards is fifty to one hundred feet above the lake level.

2. The general testimony is, that while plums, pears, grapes and apples will succeed admirably on the heavier soils, sand is to be preferred for the peach, cherry and raspberry. The price of land has practically not advanced during the past ten years. Fairly good, unimproved lands, well adapted to fruit can be bought from $75 to $100 an acre.

3. The leading varieties found most profitable here are: Apples—Baldwin, Greening, Oldenburg, Gravenstein, Northern Spy, Cranberry Pippin, Blenheim Pippin, Golden Russet. Pears: Clapp, Bartlett, Clairgeau, Bosc, Kieffer, Angouleme, Anjou. Plums—Bradshaw, Imperial Gage, Abundance, Burbank, Lombard, Washington, Yellow Egg, Bavay. Peaches—Rivers, Hynes Surprise, St. John, Early Crawford, Jacques Rareripe, Late Crawford, Chili, Longhurst and Smock. A good many Elberta, Fitzgerald and Crosby have been planted the last few years. Cherries—Richmond, Montmorency, *Black* Tartarian, Yellow Spanish, May Duke, Windsor. Grapes, black—Moore Early, Champion, Worden, Concord, Rogers Nos. 4 and 44; red Moyer, Delaware, Rogers No. 9 and 15, Salem and Brighton; white, Niagara, Strawberries—Van Deman, Haverland, Williams, Warfield, Dominion and Clyde. Raspberries, black—Gregg. Hilborn, promising new variety. Smith Giant; red, Marlboro, Cuthbert. Blackberries—Kittatinny, Lawton, Snyder. Gooseberries—not profitable; Downing, Pearl, Whitesmith are most grown. Currants, red—Fay, Cherry, black—Naples, Lee.

4. Of the apple orchards about half are in sod and about half cultivated. Peach, pear and plum orchards, vineyards and berry plantations are usually cultivated thoroughly.

5. Winter cover crops are not used to a large extent, an occasional seeding of rye and lately crimson clover being the chief covers.

6. Fertilizers are quite largely used, chiefly bone meal, analyzing from 16 per cent to 22 per cent phosphoric acid; muriate of potash, and one or two mixed fertilizers. Wood ashes are also far more highly valued than they were some years ago.

8. Diseases and Insects.—Pears: Blight, no great amount of difference on cultivated and uncultivated ground. Souvenir *du Congress*, Clapp and Bartlett are most subject to blight. Plums: *Monilia* is the worst disease of the

plum. Even in orchards well sprayed it destroys quite a percentage of the crop in moist seasons. Very little late spraying is done here. Curculio is the worst insect but it is in check fairly well where spraying is thoroughly done. Peaches: Yellows, curl leaf and *Monilia* in the earlier varieties. Leaf curl was very slight during 1899, but many orchards were seriously injured in 1898. The peach borer and the curculio are the worst insects attacking the peach. Very little spraying of peaches is done, consequently a large proportion of the early varieties drop prematurely or are "wormy." Cherries: *Monilia* is the greatest trouble and of insects, curculio and the black aphis; the latter is especially troublesome on sweet cherries. Grapes: The powdery mildew is particularly troublesome on Rogers varieties and Brighton. The disease, yellow leaf, is also rather widespread. Apples: Scab, leaf blight, and of insects, codling moth and tent caterpillar. I doubt whether half the orchards in this district are sprayed.

9. No irrigation is practiced in this section of the country.

10. During the last few years a fair amount of evaporated fruit has been put up, but the industry is not a large one and does not affect prices, as does the larger and more important industry of canning.

12. From twenty to forty per cent of the peach trees were killed this winter. The injury was severe on high lands as well as low. There was not much distinction as to kinds of soil or varieties. To plums some injury was done as also to sweet cherries. Raspberry plantations also suffered severely. Rather a light crop of peaches will be obtained this year, although many orchards along the lake are fairly well loaded. Rivers, Chili, Wager and Longhurst were the hardiest.

REPORT FROM THE SOUTHWESTERN PENINSULA.

BY W. W. HILBORN, LEAMINGTON.

1. The section bordering the north shore of Lake Erie is well adapted to fruit culture.

2. The peach, which is our great specialty, succeeds best on sandy or gravelly loam, from seventy-five to one hundred and fifty feet above the level of the lake. Berries succeed better on lower land, which retains the moisture better.

3. Varieties—Apples—Baldwin**, Golden Russet*, Ben Davis*, Rhode Island *Greening*, Northern Spy**, Oldenburg**, Stark*, Yellow Transparent*, Tompkins King*. Blackberries—Agawam**, Eldorado*, Gainer**, Kittatinny**, Minnewaska*, Snyder*, Taylor*. Cherries—Elton*, Late Kentish**, Montmorency**, Richmond**, Spanish, Yellow*, Napoleon*, Schmidt Bigarreau**, Windsor**. Currants—Cherry*, Fay**, Victoria*, Raby Castle**, Wilder**, White Grape*, Lee *Prolific*, Champion**. Grapes—Agawam*, Brighton*, Catawba*, Concord**, Lindley**, Diamond**, Moore *Early*, Niagara**, Wilder*, Worden**. Pears—Clairgeau**, Anjou*, Clapp*, Angouleme**, Bartlett**, Lawrence*, Howell*, Louise *Bonne*. Peaches—St. John**, Early Crawford*, Fitzgerald**, Brigdon**, Barnard*, New Prolific**, Longhurst**, Golden Drop**, Lemon Free**, Smock**, Banner†, Salway*. Plums—Abundance*, Burbank*, Duane *Purple*, Gueii*, Imperial Gage*, Lombard**, Bavay*, Saunders*, Bradshaw*. Raspberries—Cuthbert**, Loudon*, Brandywine*, Hilborn**, Gregg*, Tyler*, Kansas*. Strawberries—Crescent**, Bederwood **, Bubach**, Williams*, Wilson**.

4. Cultivation—Nearly all orchards are cultivated and most of them thoroughly. The crops grown in young orchards are corn, potatoes, tobacco and other vegetables.

5. Crimson clover and rye are the principal cover crops used. They are of much benefit to ripen up the new growth of wood in the autumn, and to cover the soil during the winter, thus protecting the roots of the trees from the sudden changes experienced during that season and to add fertility to the soil.

6. Barnyard manure and wood ashes are the principal fertilizers used in this locality. Commercial fertilizers have been used to some extent, but have not given general satisfaction.

7. Banner peach is one of the most valuable new fruits that have originated in this locality. The fruit is large, round; skin yellow, partly covered with red; flesh yellow, fine grained and of best quality; pit small. It ripens the last of September, or first of October, with Smock, and is the best of its season.

12. Usually most varieties of the peach are quite hardy in this locality Last winter, however, was an exception. During the month of February the weather was continuously cold for two or three weeks; about fourteen degrees below zero was the lowest point reached, but there was no snow on the ground and the long continued cold dried out the soil to such an extent that the air was admitted to the roots of the trees, and about ninety-five per cent of the peach trees were killed at the roots, as were from thirty to fifty per cent of the plums and some apple, pear and cheery trees. The blossom buds were not injured but came out in full bloom only to wither and die with the tree.

Peaches have been planted very largely here. They have succeeded quite well in the past and usually give about three crops in four years. Several thousand acres have been devoted to this fruit in the county. Good peach land is worth from $100 to $300 per acre.

Borers and leaf curl have been the chief enemies to the peach, as we have not yet had yellows in our trees. The cherry also succeeds well as we have practically no black knot. Green aphids and monilia, or fruit rot, are the greatest sources of trouble with these fruits. Small fruits succeed admirably here and larger quantities of strawberries and raspberries are grown and shipped to Detroit and nearly all parts of Ontario and to Montreal. All varieties of grapes do well, but the low price has deterred many from planting The Catawba will ripen perfectly in most seasons.

OTTAWA VALLEY.

BY W. T. MACOUN, HORTICULTURIST CENTRAL EXPERIMENTAL FARM, OTTAWA.

1. Only the hardiest of the large fruits succeed well here but nearly all the varieties of currants, American gooseberries, raspberries, strawberries and a considerable number of grapes do well.

2. Opinions differ much in regard to the soils for the different fruits. As a rule the heavier soils are preferred for all kinds, but land which is liable to bake is not often chosen. The higher elevations are usually selected for large fruits, provided there is a sufficient amount of moisture in the soil.

Small fruits do well on lower land, if the drainage is good. The average price of good land is about $50 per acre. There are so few bearing orchards in this section of the country that it would be very difficult to decide what they might be valued at.

3. Apples—Yellow Transparent*, Oldenburg**, Wealthy*, Wolf River*, McIntosh**, Winter St. Lawrence**, Fameuse*, Pewaukee*, Scott Winter*. Pears—Bessemianka, Sapieganka. Plums—Varieties of the *domestica* group bear well here occasionaly, but are not grown on a commercial scale. The improved American varieties have not yet been grown extensively, but Cheney**, Wolf**, Stoddard*, DeSoto* and Forest Garden* are among the most promising. One of the hardiest of the *domestica* group is Glass**. Cherries—Cherries propagated on Mazzard and Mahaleb stocks have in most cases been winter killed. Varieties which succeed best in the district are Ostheim**, Minnesota Ostheim**, Besserabian**, Vladimir*. Grapes—Grapes are not grown in this district on a commercial scale, but many varieties ripen well here. Among the most promising are Moyer*, Delaware**, Brighton**, Moore *Early**, Worden*, Herbert** and Diamond*. Red Currants—Fay**, Wilder**, Red Dutch*, Raby Castle*, Ruby*. White Currants—White Grape*, White Gondouin**. Black Currants—Lee*, Black Naples*, Victoria**, Success†, Gooseberries—Pearl**, Downing**, Houghton*. Red Raspberries—Marlboro**, Cuthbert**, Heebner†, Dora†, Herbert†, Sarah†. White Raspberries—Golden Queen. Black Caps—Hilborn**, Older**. Blackberries—Snyder*, Agawam*. Strawberries—Glen Mary**, Clyde**, Haverland**, Brandywine*, Warfield*, Buster†.

4. Few orchards are cultivated in this district, unless small fruits are planted between the rows.

5. Cover crops are not general, as few orchards are kept cultivated. Where cover crops are used, they are considered very beneficial in preventing root killing. Common or mammoth red clovers are usually used for this purpose. Occasionally on light soils lucerne is also used with good success.

6. The principal fertilizers used are barnyard manure and wood ashes, and good results are had from them.

8. The most troublesome insects are codling moth, tent caterpillar, forest tent caterpillar and curculio, all of which are kept in check by the timely use of Paris green, four ounces to forty gallons of water. The most troublesome diseases are apple scab, fire blight, gooseberry mildew, anthracnose of the grape and raspberry, shot-hole fungus, plum blight. All of these, with the exception of fire blight and gooseberry mildew are prevented or kept in check by Bordeaux mixture, but while keeping the foliage of the gooseberry free from mildew, it does not prevent the disease from affecting the fruit. Potassium sulphide has given better results with the fruit, but has injured the foliage. The forest tent caterpillar and the tent caterpillar have been more numerous during the past two years. The shot-hole fungus also seems to be more troublesome.

9. Irrigation is not practiced in this section of the country.

10. No statistics are available as to the area devoted to the various kinds of fruits in the Ottawa Valley. The area in fruits in the counties along the St. Lawrence is about 35,000 acres, and much the smaller part of this is in the Ottawa Valley. There are no very large orchards in this Valley. The apple is the principal large fruit grown.

11. There is no evaporated fruit industry in this part of the country.

12. Trees came through last winter, for the most part, in good condition. A few apple trees were root killed. The blossoms, however, on cherry and plum trees were badly injured, and there is but a small crop of these fruits this year. Small fruits also came through the winter well, and there is an abundant crop of currants, raspberries and strawberries.

OREGON.

BY E. L. SMITH, HOOD RIVER, CHAIRMAN.

Apples, pears, prunes and cherries do well in all parts of the State where the elevation does not exceed 3,000 feet, while peaches and grapes attain their greatest perfection in southern Oregon, and in the hot tributary valleys of the Columbia river east of the Cascade range.

More than one hundred commercial evaporators were erected in 1898, and the Secretary of State Board of Horticulture furnishes the following: A careful estimate places this year's output of cured prunes at 700 car loads of 24,000 pounds, equaling 16,800,000 pounds; evaporated apples, 6 cars, 150,000 pounds; fresh or green apples, 500 carloads, 11,250,000 pounds; fresh or green prunes, 150 carloads, 3,750,000 pounds; fresh pears, 100 carloads, 2,500,000 pounds; fresh plums, 75 carloads, 1,875,000 pounds; strawberries, 75 carloads, not weighed, a total of 1,606 carloads of green and dried fruits. The cured prune crop alone at three and one-eighth cents per pound, amounts to $525,000, and dried apples at five and one-half cents equals $82,500. As a by-product of the latter, 20 tons of apple peelings, heretofore thrown away, have been used in making an excellent article of jelly, and, in addition this season, small apples have been utilized as "chops" and exported.

This year, 1899, there will not be more than fifty per cent of last year's production. This is accounted for by the fact of a large crop last year and a very unfavorable spring for fertilization this year.

Our most troublesome insects are the San Jose scale and the codling moth. Lime, sulphur and salt are found to be a specific for the former and frequent spraying with arsenites of soda gives us about ninety per cent of sound apples.

No state grows fruits of greater excellence than Oregon, but we are forced to dispose of too great a proportion of them in a raw condition, and frequently in unwilling markets. We evaporate many prunes, but we should manufacture other fruit products and there is a lack of information as to the best processes, and the American Pomological Society could do nothing that would help us so much as to prepare a manual giving us this information, together with description and cost of the necessary apparatus for the economical manufacture of all commercial fruit products.

NORTHERN OREGON.

BY EMILE SCHANNO, THE DALLES.

1. Fruit Sections—The best are along the Columbia river and its tributaries, and along some of the creek bottoms that enter into the John Day and DesChutes rivers, and the foot hills along the Cascade range.

2. The soil, along the creek bottoms is a sandy loam and on the elevated lands we have a basaltic formation. Along the river bottoms we generally raise peaches, cherries, plums and, in fact, all kinds of fruit, while on the elevated lands, apples do best. The price of orchard land in my district is from $10 to $30 per acre.

3. The best fruit for commercial purposes is the apple; and the following always command a ready market: Yellow Newton, Baldwin, Spitzenburg, Winesap, Ben Davis, Jonathan, Gravenstein and Tompkins King (the two latter being strictly fall apples).

4. The fruit growers here usually cultivate their orchards with light cultivators after shallow plowing.

5. While the orchard is young, the orchardists, as a rule, raise a crop of vegetables of some kind in the orchard, but after the trees are three or four years old, the growers cease to raise anything in this way.

6. We never make any use of fertilizers in this section of the country.

7. We have a few new varieties. There are two varieties of cherries that are new—one known as the Bing and the other as the Lambert. Both are good. Then there are two new apples—one called the Yakima and the other the Klickitat, but they resemble the Baldwin so much that I have about concluded that they are the Baldwin itself. My advice to the fruit grower has always been not to acquire a fascination for new varieties of fruit, but to stay with the old standard varieties.

8. We have the codling moth, San Jose scale and green aphis. Otherwise our trees are not diseased. To destroy these pests we use Paris green to spray for the codling moth, and lime, sulphur and salt for the San Jose scale; we have a half dozen different washes for the green aphis, such as rosin, kerosene emulsion, etc.

9. There is some irrigation done along the creek bottoms, where water is convenient. Farther than that there is but little. We do not as a rule find it necessary to irrigate orchards.

10. In my district there are about 6,000 acres in different kinds of fruit. Apples take the lead, then come the Italian prunes, plums, pears, peaches, cherries and a few apricots.

11. The principal fruits that are evaporated here are Italian and French prunes. They generally bring in the market when they are dried about four or five cents per pound.

12. The Italian is one of the hardiest prunes. A good many apples are hardy, but such as are raised here, viz.: Yellow Newtown, Spitzenburg, etc., are very tender, and experience teaches that the tenderest are the best.

OREGON—UPPER WILLAMETTE VALLEY.

BY A. SHARPLESS, GOSHEN.

2. For prunes and cherries second bottom land that has been cleared of timber and is thoroughly drained is by far the best. Other lands will produce these fruits but not with the same degree of excellence or quantity per acre. The presence of white fir timber is an unfailing sign that land is adapted to first class prune growing. Our bottom land will not bear apples with as good keeping properties as the hills where a sufficient depth of soil, say six or eight feet is found. For the Gravenstein apple, however, the

bottoms are better than the hills and the Willamette Valley will produce better Gravensteins than either Southern or Eastern Oregon.

3. Of prunes Italian is excellent, but, where the land is adapted to them, the Agen (*Petite*) if thinned, is more profitable. The Pearl prune, a seedling of the Agen, was during the past winter more resistant to cold than the Agen, Sergent *Robe de*, or Imperial.

4. Orchards are generally well cultivated.

8. San Jose scale, oyster shell bark louse, red spider and twig borer, shot-hole fungus, scab and brown rot. All can be controlled by spraying.

11. Prunes, apples, cherries and pears are evaporated.

12. Prunes are hardy in the order following: Italian, Dosch, Splendor, Pearl, Sergent, Agen and Pearl. Cherries and apples were not hurt by the winter. Bartlett pears were much injured.

SOUTHWEST OREGON.

BY H. B. MILLER, EUGENE.

JACKSON AND JOSEPHINE COUNTIES, ROGUE RIVER VALLEY.

Soil—Red clay on hills, black clay in valley and sandy loam on river bottoms and granite hills. Elevation 9,000 to 2,000 feet.

Peaches, prunes and grapes do well upon the red hills where there is good depth of soil, grapes doing the best of the three upon the more shallow soils. These lands are worth about $10 per acre in brush, within five or ten miles of the railroad, and are well adapted to the growth of peaches and table and wine grapes.

Prunes—Silver, Italian and Agen prunes have been extensively planted, but only Agen seems well adapted to the climate, and Silver and Italian are gradually being abandoned as unprofitable. The Silver upon the river bottom is a strong and healthy tree, but does not bear enough to be profitable. The Italian does not thrive well in this section because the summers are too hot and dry. The Agen or *French* prune thrives better in this section than in any other part of Oregon and can be grown at a profit either on red hills, black valley clay, or sandy loam bottoms. All prunes are cured in evaporators. Prunes can be produced, dried and put aboard cars at a cost ranging from one to two cents per pound.

Peaches—Are grown on all kinds of soil, but do best on red hills or sandy loam bottoms. Early and Late Crawford and Salway have proven the most profitable. Largest orchards 100 acres. San Jose scale and brown rot are very injurious to the peaches. Lime, sulphur and blue vitriol are used for the scale and Bordeaux mixture for brown rot. Irrigation is resorted to in some places to advantage. No fertilizers have been used so far, but could be used with profit. Two cents per pound boxed in twenty pound boxes and loaded in cars is considered a profitable price.

Pears are grown in large quantities. Owing to the Bartletts reaching the east during the height of the fruit season there, they have not always been profitable, but most of the later varieties have been a continued source of profit.

Almonds are grown also and are considered a good commercial product.

Apples constitute the main product of this country. They grow well upon the heavy black loam bottoms and on the sandy loam bottoms. White Pear-

main, Ben Davis, Jonathan, Spitzenburg, Baldwin, Red Canada, Monmouth Pippin, Yellow Newtown and Winesap are the principal varieties. Largest orchards 160 acres. Corn, potatoes and melons are grown in young orchards. No irrigation, no fertilization and no cover crops grown. The ground is cultivated seven or eight times during the season. Apple crops seldom fail and the fruit is of such a quality as to command a good demand and a fair price. San Jose scale, codling moth, woolly and green aphis and apple canker are the principal injurious insects and diseases. Apples are all marketed in bushel boxes 9x11x22 inches, all weighing 50 pounds. Fifty cents per box should be realized f. o. b. cars to bring the grower good returns. The average price last season to grower was sixty-five cents. This is an excellent winter apple country and the industry is increasing fast. 200 carloads were shipped last season.

The value of choice fruit lands is from $50 to $75 per acre. Bearing trees $100 to $200 per acre. A good crop of apples will bring from $50 to $100 per acre net. Trees have never been injured by freeze in this Valley. Average rainfall is 23 inches.

UMPQUA AND COW CREEK VALLEYS, DOUGLAS COUNTY.

Principal fruits are Italian and French prunes; apples also do well.

Sandy loam bottom lands are the best for fruit of all kinds, but prunes do well on either red or black land where soil is six feet or more deep and well drained.

The value of choice fruit land is $30 to $50 per acre; bearing orchards from $100 to $200 per acre.

Neither fertilizers nor irrigation are needed. Largest orchards 160 acres in prunes, cheapest cost of prunes f. o. b. one and one-half cents per pound, which covers the expense of pruning, cultivating, drying and boxing.

Peaches, pears, cherries and grapes are grown but not extensively and very little for commercial purposes. The Italian Prune has proven to be the most profitable fruit for this section and the climate and soil conditions are especially well adapted for it.

No injury whatever was done by the cold of last winter and there is no better country in the world for the growth of the Italian Prune than the Umpqua Valley.

NORTHWESTERN OREGON.

BY HENRY E. DOSCH, HILLSDALE.

2. Soil—Loam, decomposed granite and clay soils. Elevation from 300 to 1,000 feet, the higher the better, especially for apples and pears.

3. Varieties: Apples—Gravenstein, Wealthy, Oldenburg, Northern Spy, Spitzenburg, Wolf River, Tompkins King and Ben Davis. Pears—Bartlett, Fall Butter, Clairgeau, Anjou. Prunes—Agen, Italian, Clairac Mammoth, Imperial and Dosch. Cherries—Napoleon, Oregon, Bing, Hoskins, Lambert, Kentish and Late Duke. French Walnuts—Mayette, Parisienne, Franquette, Praeparturiens and Columbus. Chestnuts—Grosse Precoce, Paragon, Nouzillard and Combale. Almonds—Grosse Tendre or Languedoc. All varieties of berries and grapes.

All of the foregoing varieties are of commercial value.

4. Cultivation—Orchards are generally well cultivated; when the orchard is young, beans and other hoed crops are grown, but when in bearing clean cultivation is practiced.

5. Cover Crops—Crimson clover and vetches have given beneficial results wherever tried.

6. Fertilizers—Some commercial fertilizers have been used but not generally. For drupaceous orchards, muriate of potash is most beneficial.

7. New Varieties: Cherries—Bing, Hoskins and Occident. Prunes—Dosch. This prune was named after the originator by Prof. VanDeman, when Pomologist at Washington; it is a seedling of Washington and is a most promising prune. Tree a very hardy, strong grower; fruit more oval than ablong, very large, dark maroon in color, with a light blue plush; flesh golden green, very firm and aromatic, not as sweet as the French nor as tart as the Italian. Ripens two weeks earlier than either. Will ship to England in good order. Will evaporate to 17 to 30 to a pound.

8. Insects and Diseases—Woolly and green aphis, codling moth, apple canker, crater blight of the pear. We use kerosene emulsion and tobacco washes for the aphis, Paris green or arsenite of soda for the codling moth and Bordeaux mixture for the fungous diseases with splendid results.

9. Irrigation—Irrigation is not used in this section.

10. Statistics—Orchards are planted all over Oregon. The larger plantations in Eastern and Southern Oregon are of apples and pears with prunes as a close second, while in the Willamette Valley prunes predominate. We can produce prunes at three cents per pound with a profit.

11. Evaporated Fruits—Prunes, pears, apples and cherries all evaporate well, the average profit on prunes was $40 per acre last year but generally is much larger. Apples and pears gave from $50 to $100.

12. Hardiness—Only Bartlett pear buds have been injured by the winter. All fruits are hardy here except Bartlett pears and Napoleon cherries.

PENNSYLVANIA.

BY PROF. G. C. BUTZ, STATE COLLEGE, CHAIRMAN.

1. Pennsylvania has not yet fully developed her fruit interests, although it has been clearly demonstrated that a fine quality of fruit can be grown, if the proper soil, elevation and varieties be chosen. The most noted fruit sections in the State are the Juniata and the South Mountain peach belts, each embracing about three thousand acres in peaches, lying mainly upon the mountain slopes of those regions. Profitable peach culture is carried on extensively in most of the counties in the southern half of the State. There are no marked sections devoted to the apple, but great activity in planting young orchards is displayed in Adams, Franklin, Berks and other southeastern counties and also in the western central counties. In the northern tier of counties, which have but recently been cleared of their forests, apples of excellent quality are grown, and farmers are realizing a good profit from orchards. Potter county alone shipped last fall 100,000 bushels of apples. Erie county is noted for its acreage in grapes, it being a part of the great Chautauqua grape belt, lying mainly in the State of New York, along Lake Erie. There are but few commercial vineyards elsewhere in the State.

2. The soils of Pennsylvania embrace a great variety which are adapted to fruit culture and lie at elevations all the way from sea level to 2,000 feet above. The shales and sandstone soils are preferred for peaches. In the Juniata peach belt the red shales, out-cropping on the hillsides, are the

principal peach soils. In the South Mountain region, what are known as "ironstone" soils predominate in the orchards. These are generally of a sandy porous nature containing soft sandstones, flint or gravel. Chemical analysis shows the predominance of much potash and carbonate of iron. The original growth on these soils was largely chestnuts, so that peach growers plant without much question where chestnuts have grown. Apples succeed upon a greater variety of soils than do the peaches, but preference is given to the limestone soils.

3. There is considerable range in the varieties of fruits grown in Pennsylvania. The following are for commercial planting: Apples—Baldwin**, Northern Spy**, York Imperial**, York Stripe*, Smokehouse**, Ben Davis*, Lehigh Greening†, Stark*, Maiden Blush*, Red Astrachan*. Pears—Bartlett**, Clapp *Favorite***, Seckel**, Howell*, Angouleme**, Clairgeau*, Lawrence*, Kieffer**, Winter Nelis*, Flemish *Beauty**. Peaches—Elberta**, Mt. Rose**, Crawford Late**, Wonderful*, Albright*, Globe*, Stump*, Oldmixon*, Salway*, Smock*. Plums—Bavay *Green Gage***, Bradshaw*, German *Prune***, Lombard**, Peach**. Cherries—Downer**, Tartarian**, Montmorency**, English Morello**, Richmond*. Grapes—Concord**, Niagara**, Worden*, Brighton*, Pocklington*. Strawberries—Haverland**, Bubach**, Crescent**, Greenville*, Brandywine**, Warfield**, Sharpless*, Woolverton*, Glen Mary*, Parker Earle**. Raspberries—Columbian*, Shaffer*, Gregg**, Ohio**, Cuthbert**, Loudon**. Blackberries—Erie**, Kittatinny**, Snyder**, Eldorado*, Wilson Jr.*.

4. Most orchards are cultivated in crops until they are three or four years old. The "crop" may be corn, potatoes, strawberries, or peas. The successful peach growers and vineyardists continue the cultivation among their fruits, but apple and pear orchards are run into grass, or subjected to the ordinary rotation of farm crops as with other fields.

5. A few progressive fruit growers are cultivating, fertilizing and growing crimson clover or rye to be plowed under, but it cannot be said to be general enough to be considered a fixed practice in this State.

6. Barnyard manure is occasionally applied to orchards, but most fruit growers realize that the plant food they most need is potash, and are using Canada wood ashes, muriate of potash or kainit. Phosphoric acid in S. C. rock is also applied, usually in connection with potash.

8. Insects and fungous diseases are attracting the attention of horticulturists, and each year some new cases of destruction occur within the State. The canker worm had not been known in Pennsylvania previous to 1898. This season it is reported from several counties. It is best treated with Paris green. Peach curl has caused considerable alarm the past two years because of its prevalence, but this season there is little evidence of it. The successful remedy for this disease is the early use of Bordeaux mixture. The rose chafer is very destructive in the western part of Erie county upon grapes. It is difficult to find a satisfactory remedy for this beetle. The frequent jarring of vines and catching the beetles by hand is practiced by the vineyardists. We suffer from the common enemies of fruits just as our neighboring states do; that is, from the codling moth, peach and apple borers, curculio, peach root aphis, apple scab, pear blight and stone fruit rot (*Monilia fructigena*). Farmers are slow to adopt the practice of spraying with insecticides and fungicides, but the more successful fruit growers are spraying with more or less faith and regularity.

9. Irrigation is not practiced in this State.

10. I cannot obtain very accurate statistics of fruits in Pennsylvania, but a conservative estimate would place the acreage in apples at 15,000 acres, peaches 2,000 acres, and grapes at 10,000 acres.

EASTERN PENNSYLVANIA.

BY W. B. K. JOHNSON, ALLENTOWN.

1. The eastern portion of Pennsylvania is very variable in soil, and varieties of fruit should be selected for each particular locality. Pennsylvania is particularly adapted for fruit growing and nowhere can fruit be found superior, to that grown on the blue or Trenton limestone formation, in quality and flavor, thriftiness of trees and healthiness and longevity of trees. California alone beats us in appearance. Varieties introduced from north of us are not good keepers, and winter fruits should be from the south. Only on northern slopes can the Northern Spy and others of the same order be grown as winter apples. Apples, peaches, cherries and pears are grown successfully wherever chestnut timber is growing, also in deep clay bottom. Quinces need a deep moist soil, not wet. On the conglomerate formation, reports are not as favorable, probably owing to the lack of attention, as the valleys are favorable.

Fruit lands can be bought at all prices, as located, from $50 to $150 and even $200 per acre.

No fruit brings better prices than good winter apples, such as Lehigh Greening**, York Imperial**, Baldwin*, Ben Davis*, Newtown Pippin*, Pewaukee**, Walbridge*, American Beauty**, Grimes Golden**, Red Paradise**.

Cultivation—The care given is generally poor, yet the orchards produce such fruit that visitors are astonished to see it at our county fairs.

Fertilizers—Stable manure is generally poorly balanced for orchard purposes. Where formerly I used from forty to fifty tons of stable manure to the acre I now use crimson clover, muriate of potash, bone and South Carolina rock. The soil should have a goodly proportion of humus.

8. Insects—We have plenty of codling moths, grape fruit worms, tent caterpillars a few, while the canker worm is not troublesome; plum curculio does some harm, as do the peach tree borer and flat head borer. For all eating and chewing insects I find nothing better than Paris green; for borers use a sharp knife.

9. Irrigation is scarcely used.

10. We had an orchard of ninety acres of peaches, but few are over ten acres; of apples I know of but two bearing orchards of over five hundred trees; for pear, plum and quince orchards none contain more than 450 pears, 500 quinces and 300 plums.

11. I know of no establishment where fruit is evaporated as a business. Old style drying is done in every farmer's family, but I doubt if it is profitable.

12. Peach buds, red and black raspberries and apricots were injured, but all others withstood the cold exceedingly well.

SOUTHERN PENNSYLVANIA.

BY GABRIEL HIESTER, HARRISBURG.

1. The foot hills of all our mountain ranges appear to be well adapted to the production of all our common fruits, especially the apple, pear, peach and grape.

2. Peach growers appear to favor the ironstone land, sufficiently elevated to escape the fogs that hang over the valleys, and which frequently cause loss of fruit from late frost, except in the immediate vicinity of large bodies of water, as lakes and broad rivers.

Apples and pears require a richer soil than peaches, and less elevation as they do not run the same risk from frosts. Good orchard land can be bought along the foot hills in Perry, Snyder, Juniata, Mifflin and York counties at prices ranging from $8 to $15 per acre. I have no knowledge of a bearing orchard having been sold.

3. Apples—Oldenburg**, Early Harvest*, Yellow Transparent*, Summer Rambo**, Maiden Blush*, Smokehouse**, Baldwin**, Northern Spy*, York Imperial**, York Stripe*. Pears—Bartlett**, Angouleme**, Seckel*, Howell*, Lawrence*, Clairgeau*. Peaches—Elberta**, Mt. Rose**, Crawford Late**, Wonderful*, Albright*, Globe*, Stump*, Oldmixon*.

4. Most orchards are cultivated in crops until they are three years old. Potatoes, strawberries, peas and sometimes corn are grown in the young orchards.

5. Fruit growers are only beginning to use cover crops.

6. Fertilizers rich in potash appear to give the best results, and are principally used. Those brands which contain two parts of potash to one of phosphoric acid seem to be most in demand.

7. I have no experience with new varieties.

8. The codling moth, curculio, peach and apple borers, and peach root aphis seem to have done most damage in this section. As usual, pear blight, apple scab, mildew and rot in grapes, curl leaf and rot in peaches have been most prevalent.

9. Not practiced at all in this neighborhood.

11. No fruits are evaporated that I know of.

12. I can see no difference in peaches this year, all varieties appear to have suffered alike. The number of fruit buds that escaped appeared to depend more upon the air currents than upon varieties.

NORTHWEST PENNSYLVANIA.

BY A. I. LOOP, NORTH EAST.

1. The northwestern counties seem to be well adapted to most kinds of fruit growing. Erie county, however, is most favored in this respect. Its location in regard to Lake Erie makes it adapted to a much greater variety than the less favorably situated counties. This is especially true in the matter of grapes; a failure in the grape belt (a strip 3 to 5 miles wide bordering Lake Erie) has never been known. Strawberries, raspberries, etc., are also grown to greater perfection in the "belt" than any other point in the northwestern counties. Apples do well in all the northwest section, as

also do pears, plums and cherries. Peaches are uncertain, as a crop can only occasionally be secured.

2. Soil—In the "grape belt" tree fruits are grown equally well in any location and on any kind of soil, but further south they seem to do best on elevated land. Grapes (of which there are four thousand acres in North East township alone) succeed in any soil except muck, there they are a failure, but from the heaviest clay to the lightest sand they do equally well. Good clean farm land is worth in the "belt" from $50 to $100 per acre, including buildings. South it is valued at from $10 to $30 with improvements.

4.. Very few orchards are cultivated; some farmers attempt to grow hay, oats and wheat in them.

5. A few use crimson clover, some rye—mostly in vineyards; considerable improvement can be noticed where used.

6. But little attention has been paid to fertilizers, except on grapes; there muriate of potash has been used with marked improvement; barnyard manure is also used, but too much of it is worse than none.

8. The rose bug is very destructive in the western part of Erie county and closer to the lake in the eastern part, nothing can be done with them, except jarring and catching by hand. They do not seem to increase.

9. I think nothing of the kind has been attempted.

10. In "the belt" a total of about 30 per cent of all the land is in fruits, mostly grapes. South and in the other counties I should put it at from 1 to 1½ per cent of total acreage in orchards.

11. Nothing to amount to anything is done in this line.

12. Anything in the fruit line that succeeds well in the northern states does well here. By far the largest fruit industry in this section is the grape business; the variety is Concord, to the extent of 95 per cent of the whole. The crop was never known to fail since the introduction of Concord.

About 800 carloads are shipped from North East township alone each year. The belt extends from Harbor Creek, Pa., to Silvercreek, N. Y., and is estimated to contain 25,000 acres of bearing vineyards.

QUEBEC.

BY R. BRODIE, VICTORIA AVE., WESTMOUNT, CHAIRMAN.

1. The portions of the Province of Quebec adapted for fruit culture are the Island of Montreal, Huntingdon, which is one of the largest apple growing counties in the Province, the Ottawa Valley, and the plum growing regions of the Island of Orleans, L'Islet and Kamouraska counties, 75 miles below Quebec, famed for the Quebec damsons.

2. The soils are mostly of a limestone nature, although there are fairly good orchards on clay loam.

3. Varieties: Apples—Yellow Transparent, Red Astrachan**, Oldenburg for summer; Alexander*, St. Lawrence** and Louise† for autumn; Fameuse*, McIntosh**, Wealthy*, Ben Davis*, Golden Russet**, for winter. Pears—Flemish Beauty**, Anjou*. Bessemianka†. Of the latter variety the tree I procured from the late Charles Gibb is totally different and superior to the Bessemianka procured from Prof. J. L. Budd. In plums the European varieties do very well on the Island of Montreal and below Quebec city in L'Islet county. The American sorts give better crops and are hardier where they are grown. Of Japan plums, Burbank has come to stay; it has

stood three severe winters and at this date is covered with bloom, while Lombard trees alongside are barely living, on account of the severe winter. Cherries—Amarelle Hative†, *Early* Richmond**, Montmorency**, Ostheim**, Brusseler Braune†. The first of them ripened June 24, and the last August 9.

6. Fertilizers—Barnyard manure and wood ashes.

8. Insects and Diseases—Tent caterpillar, codling moth, borer, oyster-shell bark louse, pear blight and black knot. Remedy—Bordeaux mixture with Paris green and kerosene emulsion.

Some of the largest orchards run from thirty to fifty acres.

We generally have plenty of rain and do not need to irrigate. The estimated profits for apple orchards are about $100 per acre. All kinds of small fruits are grown extensively. Our French Canadian farmers are born gardeners and their large families enable them to cultivate and grow all kinds of produce.

RHODE ISLAND.

BY PROF. L. F. KINNEY, KINGSTON, CHAIRMAN.

As has been stated in previous reports there are certain prevailing conditions in Rhode Island that have interfered with the development of the pomological interests.

The climate is not severe, there is sufficient available land and thousands of cords of sea weed— one of the best fertilizers for fruit—are cast up annually upon the shores; still commercial plantations of fruit are made very rarely and only on a small scale. The products of these plantations as they are managed at the present time amount to only a small proportion of the fruit that is consumed here. More fruit is grown in the northern than in the southern part of the State. Plums, cherries and grapes are often injured near the shore by the midsummer sea fogs, but peaches—like the summer visitors to Rhode Island—find in the fogs those elements which produce the fairest complexion. The trees when properly cared for, flourish in the moist atmosphere, producing fruit of the largest size, that is both rich in flavor and beautiful in appearance.

Loamy land is generally preferred for the growth of small fruit and the higher elevations for orchards. The average valuation of orchard land according to the State census of 1895 is $74 per acre. In Bristol county the average valuation is $107 per acre, in Providence county, $81.75 per acre, and in Washington county it is $48 per acre. In Washington county the products from the orchard land in 1895 amounted to approximately fifty per cent of the value of the land, in Providence county twenty-four and three-fourths per cent of the value of the land and in Bristol county fourteen and one-half per cent of the value of the land.

The principal varieties grown for market are: Apples—Baldwin, Rhode Island *Greening*, Roxbury *Russet*, Williams, Red Astrachan. Pears—Clapp *Favorite*, Bartlett, Bosc, Sheldon, Lawrence. Peaches—Late Crawford, Mt. Rose, Oldmixon *Free*, Stump, Crosby. Plums—Lombard**, Burbank†, Red June†, Abundance†. Cherry—(not grown for market). Quince—Champion. Orange. Apricot—(not grown for market.) Grapes—Concord, Moore *Early*, Worden, Niagara, Winchell†, Campbell†. Currant—Fay, Versaillaise, Cherry. Raspberries—Cuthbert, Turner, Shaffer, Gregg, Wineberry†. Blackberry—Snyder, Wachusett, Kittatinny, Lawton. Strawberry—Bubach, Shuster, Parker Earle, Gandy, Downing.

The custom of cultivating bearing orchards is gaining favor but cover crops are seldom grown. Stable manure and sea weed are the principal fertilizers used and these are suplemented with ground bone, ashes, German potash salts, acid phosphate, etc.

Peach yellows, black knot, apple and pear scab, black rot of the grape and brown rot of the cherry and plum are among the most troublesome diseases. The codling moth, the apple and pear curculio, the plum curculio and the apple maggot are the most troublesome insects. Fire blight of the pear does considerable damage, but there is less apprehension now than a few years ago concerning this malady.

Only the small fruits are irrigated and this is rather the exception than the rule. No water systems are constructed for this purpose.

The largest orchards in the State are apple orchards, with a large proportion of the trees Baldwins—much of the fruit is however made into cider. In 1895 fifty-two per cent of the apples in nineteen towns in the State, each town producing over 5,000 bushels, were made into cider. The average price of these apples was twenty-seven cents per bushel. The remaining forty-eight per cent that were used for other purposes than the production of cider averaged sixty-one and one-quarter cents per bushel.

The average price of pears grown in six towns, each town producing over 1,000 bushels of the fruit, was ninety-eight and one-half cents per bushel.

The average price of peaches in two counties producing over 1,000 bushels each, was $1.76 per bushel. The yield of strawberries in the State in 1895 was 257,127 quarts and the average price was nine and one-half cents per quart. The average price of raspberries in four counties, each county producing over 5,000 quarts, was fifteen cents per quart.

Apples are evaporated on a small scale. Few fruits except those belonging to the *Rubus* family were severely injured last winter. Peach trees blossomed freely, but are bearing a light crop. Apples and pears are very good but the yield is below the average.

REPORT FOR SOUTH DAKOTA.

BY PROF. N. E. HANSEN, BROOKINGS, CHAIRMAN.

In studying the list of apples grown in the various parts of the State we find that South Dakota has a list that is both Minnesota and Southern Iowa in characteristics. At the State Fair at Yankton, September 26-30, 1898, the list of apples was very creditable for a new State. The following partial list of the varieties on exhibition shows that the southern tier of counties along the Missouri river can raise varieties which are not at all hardy northward in the State: Ben Davis, Oldenburg, Wealthy, Iowa Blush, Ralls *Genet*, Perry Russet, Walbridge, Haas, Tolman *Sweet*, Sheriff, Bailey *Sweet*, Grimes Golden, Jonathan, Maiden Blush, Bailey Crimson, Fameuse, Longfield, Hibernal, MacMahon, Plumb Cider, English Russet, Willow *Twig* Wolf River, Black Annette, Winesap, Price Sweet. Of crabs—Yellow Siberian, Whitney, Virginia, Richland Sweet, Spitzenburg, Gen. Grant, Hyslop, Transcendent, Forbes, Shields and Soulard.

It is interesting to trace the orcharding belt along the great river, from far down in Missouri northward between Iowa and Nebraska and along the

termined. In this narrow belt can be grown apples not hardy upon the open prairie a very few miles from the river. This fact has been recognized by the State Horticultural Society in making up the list of fruit districts, this favored region, termed District No. 7, consists of a strip of country about fifteen miles wide along the Missouri river, in the four counties in the southeast corner of the State. In making up a list for planting throughout the State, especially at the north, it will be wise to bear in mind the fact that no variety less hardy than Oldenburg should be planted, especially if the planter desires a long-lived, fruitful orchard, and cannot afford to experiment. The experience of the past severe winter has emphasized the need of hardy varieties, even in District No. 7, and the list given above would be recognized as being too long. The Minnesota State Horticultural Society list contains only three varieties recommended for general cultivation as being of the first degree of hardiness, viz.: Oldenburg, Hibernal and Charlamoff, but this short list is an eminently safe one where hardiness is the first essential, as it is in the larger part of the State:

In district No. 7 the following list of apples do well: *Duchess* [Oldenburg,] Charlamoff, Wealthy, Haas, Patten *Greening*, Longfield. Winter apples—Walbridge, Ben Davis, Iowa Blush, Tolman *Sweet*. For trial—Plumb *Cider*, Willow *Twig*, Sheriff, Northwestern *Greening*, Price Sweet.

The greatest trouble with apple culture in the Northwest at the present time is the root killing of the common apple seedlings which are used for stocks. This subject has been considered by the writer in a paper, "The Russian remedy for root killing," prepared for the present meeting of the Society.

Trouble is experienced with root killing of grapes and many other plants. The dry weather often prevalent in autumn, followed by low temperature in winter, often with no snow on the ground, probably fully explains the trouble with root killing.

REPORT FROM THE BLACK HILLS.

BY C. THOMPSON OF RAPID CITY.

The climatic and soil conditions are such as to make possible the growing of many varieties not hardy upon the open prairie.

1. Fruit Sections—All around the Black Hills for at least fifty miles is good for fruit.

2. Soil—Sandy loam mixed somewhat with clay or gumbo for apples and pears. Sandy loam for plums and very sandy for grapes. We are at an elevation of from 2,000 to 4,000 feet. Value of land for orchard, without irrigation, two to six dollars per acre; with irrigation from twenty dollars to one hundred.

3. Varieties: Apples—Oldenburg, Wealthy, Longfield, Ralls *Genet*, Whitney, Pewaukee, Alexander, Northwestern *Greening*, Tetofski, Price Sweet; these are all good. Pears—Bartlett and Flemish Beauty are the best Cherries—Early Richmond and English Morello. Plums—DeSoto. Prunes—The Golden Prune from Idaho. Peaches must have winter protection. Grapes—Concord**, Moore *Early**, Worden*. A good variety of small fruits do well.

4. Cultivation—The best is cultivation at least once a week through the growing season. I plant nothing in orchard after the first two years.

5. We cover nothing but peaches, grapes and strawberries.

6. We have used fertilizers very little as yet, but find barnyard manure good.

8. I use London purple and Paris green for insects; of diseases we have none.

9. Irrigation is good for all trees and plants in dry seasons, but good cultivation answers nearly as well. For orchards irrigation is by ditches from creeks and rivers.

10. Probably about one thousand acres in orchard, very little in bearing. The value of the crop is as a rule the eastern price, with the freight (1.65 per barrel) added, from Omaha, Nebraska.

11. No fruits evaporated as we sell them fresh for better prices.

12. Hardiness—The varieties I have named are perfectly hardy; even last winter did not affect them as the loss did not reach one per cent.

TENNESSEE.

BY PROF. R. L. WATTS, KNOXVILLE, CHAIRMAN.

1. East Tennessee is particularly well adapted to all branches of fruit culture. Certain sections of Middle Tennessee are well adapted to the cultivation of fruits, and orchard fruits may be grown successfully in all parts of West Tennessee, except in the valley of the Mississippi River. We regard East Tennessee as best adapted to the culture of apples, grapes, and peaches, although all of these fruits are grown in the other two sections of the State.

Such fruits as pears, plums, Morello cherries, strawberries, raspberries, and blackberries thrive well on the lower lands of Middle Tennessee, including the creek and river bottoms. The highland rim of Middle Tennessee, which includes the valley of Middle Tennessee, is probably the best adapted to fruit culture of the lands in Middle Tennessee.

Strawberries are grown extensively for shipping purposes in Hamblen county, about Chattanooga, and in the counties of Haywood, Crockett, and Gibson of West Tennessee. Early apples are also grown to a considerable extent for shipping to northern markets, in the four counties named. Winter apples for commercial purposes are grown to a limited extent in a few counties of East Tennessee, and all of the fruits commonly grown in this latitude are produced for home consumption over the entire State.

2. The fruits of the State are grown most extensively on the following kinds of soils:

In West Tennessee sandy loams are most extensively used in fruit culture. They are highly productive and durable when properly managed. The soils are easily worked; washing ruinously when neglected.

The Cumberland Plateau of East Tennessee embraces a large area of light, sandy loams which are shallow, overlying a fine yellow or red clayey silt subsoil, usually poor and of small agricultural value. Areas of good fruit lands and adapted to potatoes and garden truck.

In Middle Tennessee there is quite a large area of red and yellow clay loams which are fertile and well adapted to fruit lands.

The soil in East Tennessee varies greatly. Soils of this section which are best adapted to the culture of fine fruit lie near the base of the mountains. They are quite fertile, sandy loams, affording most excellent conditions, es-

pecially for the culture of apples and peaches. The loamy soils of the State give the best results in fruit culture.

Apples, peaches, pears and cherries thrive best at an elevation of from 1,100 to 2,000 feet. We do not believe, however, that the elevation is as important an element as the character of the soil and humidity of the atmosphere, except in the production of winter apples. Winter apples of an exceptionally fine quality are grown on the mountains of East Tennessee.

Good orchard land varies greatly in price. First class, unimproved fruit land can be bought in some sections for $1.00 per acre. Of course these locations are at a considerable distance from the railroad. The best improved orchard lands with good shipping facilities cost from $20.00 to $50.00 per acre. I am unable to give the price of land in bearing trees, but the best orchards of the State would doubtless command a high price.

3. Apples—Early Harvest, Red June, Winesap, Ben Davis, Paragon, Fanny, Buckingham, Kinnard, Royal Limber Twig, Gilbert and York Imperial. Pears—Kieffer, Bartlett, Clapp, Angouleme, *Duchess*, Flemish Beauty, Howell and Seckel. Peaches—Elberta, Thurber, Stump, Oldmixon, Chinese Cling, Sneed, Triumph and Greensboro. Cherries—All varieties of the Morello class. Plums—Wild Goose, Ogon, Abundance, Burbank, Lombard, and all of the finer varieties in East Tennessee, if insects are persistently combatted. Grapes—Concord, Moore *Early*, Worden, Diamond, Niagara, Delaware, Woodruff, Brighton, Lutie, Norton and Brilliant which is gaining in popularity. Blackberries—Agawam, Early Harvest, Wilson, Taylor and Kittatinny. Crab apples—Transcendent, Early Siberian and Hyslop. Dewberries—Lucretia. Currants—Not generally a success, except on northern exposures well protected from the sun. Gooseberries—Downing. Raspberries—Gregg, Cuthbert, Turner, Ohio and Shaffer. Strawberries—Crescent, Louise, Michel, Bubach, Haverland, Thompson, Gandy, Brandywine and Enormous.

4. The most successful fruit growers of the State cultivate their orchards thoroughly and systematically. Strawberries, tomatoes, cow peas, and corn, to some extent, are grown in our commercial orchards.

5. The following cover crops have been found to be useful, rye and crimson clover. These crops improve the physical condition of the soil, prevent washing and protect the roots of the trees.

6. Fertilizers when used intelligently are considered profitable by our fruit growers. Muriate of potash, wood ashes, and Tennessee rock phosphate are most largely employed. The supply of nitrogen is secured by the growth of cow peas.

7. We are unable to give you accurate descriptions of new varieties originated in this State, aside from those published in your catalogue of fruits for 1897.

8. The most troublesome insects in the State injurious to fruit are the codling moth, tent caterpillar, curculio, flea-beetle, aphis, the squash bug, and borers of various kinds.

Diseases—Scab and dry rot of the apple, rot of the cherry, mildew of the currant and gooseberry, black rot of the grape, rot of the peach, fire blight of the pear, anthracnose and rust of the blackberry and raspberry, and leaf blight of the strawberry.

Of the insects, the codling moth, curculio, tent caterpillar, and borers seem to be on the increase.

Fire blight of the pear is much more destructive than it was a few years ago, now attacking many apple trees.

Kerosene emulsion, the arsenites, Bordeaux mixture, and an ammoniacal solution of copper are the remedies commonly employed with success for the insects and diseases named, except fire blight of the pear.

9. We do not know of any fruit grower of the State who irrigates.

10. I cannot give you anything like an accurate estimate of the area in this State devoted to fruit culture. The largest orchards are of apples and peaches. The value of these crops, however, in Tennessee is not very large. Many young orchards are being planted every year, and we believe the time is not far distant when our annual yield of first class fruit will be many times larger than at present.

I am unable to give you satisfactory figures concerning the price which must be received in order to make fruit culture profitable in Tennessee. One member of the fruit committee in this State reports that apples must bring $2.00 per barrel, f. o. b. to be profitable.

11. Fruits are not evaporated to any considerable extent in Tennessee. We believe that this industry is confined entirely to fruits for home consumption.

12. Apples were little damaged by the freeze of last winter. Most of the buds of the early grapes in Middle Tennessee were killed. Buds of the LeConte and Kieffer pears were killed in Tennessee, while buds of all other varieties of pears were not injured to any serious extent in East Tennessee. Buds of Angouleme and Anjou in middle and West Tennessee were partially killed, while very little damage was done to the buds of other varieties. Pear trees were very little damaged by the freeze in any section of the State.

Practically all the buds of peaches were destroyed last winter and in a good many instances the trees were killed to the ground. Trees of Mountain Rose, Crawford Early, and other tender varieties of peaches suffered severely throughout the State. The hardiest varieties are the Chinese Cling and its seedlings. Trees of Elberta, Thurber and several other varieties were not damaged.

I have never known grapes to be injured in this climate by winter freezing.

TEXAS.

BY PROF. R. H. PRICE, COLLEGE STATION, CHAIRMAN.

1. Fruit Sections—Northern, eastern and southern portions of the State.

2. Soil—The best soil is a sandy loam, well drained. Perhaps the best fruit soil is in the northeastern portion of the State. Peaches especially of superior flavor and color are grown there. The higher elevations seem the best, but nearly all of Texas is of rather low elevation. Average price of good fruit land is from $10.00 to $15.00 per acre. Bearing orchards are very valuable.

3. Varieties: Apples—Astrachan*, Cooper Early*, Early Harvest*, Jonathan*, Winesap*. Crab Apples—Transcendent**, Yates*. Apricots—Moorpark*, Early Golden*, Royal*. Pears—Garber, Kieffer, LeConte. Plums—Abundance*, Chabot*, Burbank*, Munson**, Red June*, Transparent**, Wayland**. Peaches—Alexander*, Family Favorite**, Elberta**. Grapes—Catawba**, Champion*, Delaware**, Herbemont**, Niagara**. Figs—Adriatic*, Black California*, Celestial**. Japan Persimmons—Hachiya**, Yemon**. Blackberries—Early Harvest*, Wilson, Jr*.

4. Orchards are cultivated as a rule. Cow peas are sometimes grown in young orchards.

5. No cover crops are grown that I know of, the winters are so short it hardly seems desirable. If cow peas be grown late in the season they stay green until late in the fall and the roots hold the soil until spring cultivation begins.

6. Scarcely any fertilizers are used but occasionally dressings of cotton seed meal are given.

7. New Varieties: Among the most promising are: Apples—Hamilton*, color, red; quality 9; Season, September; use dessert, market, kitchen; origin Texas. Lincoln*, form, oblate; color, green; quality,9; season, medium; dessert and market; origin, Kentucky. Mrs. Bryan*, color, greenish red; quality, 8; season, August; use dessert and market; origin, Georgia. Stevens *, form, oblate; color, striped yellow; quality, 5; season, medium; origin, Texas. Yellow Sweet*, form, oblate; color, yellow; qualilty, 8; season, medium; origin, Texas. Pears—Alamo*, color, yellowish red; season, July and August; use dessert, kitchen and market; origin, Texas. Plums—Gonzales**, origin. Texas. Peaches—Carman**, form, oblong; color, yellow and red; quality, 8; season, June; use, dessert, kitchen and market; origin. Texas. Mamie Ross**, form, oblong; color, white and red; quality, 8; season, June; use, dessert, kitchen and market; origin, Texas. Grapes—America**, form, round; color, black; quality, 8; season, July; use, market; origin. Texas. Bailey**, color, black; quality, 8; season, July; use. market; origin, Texas. Brilliant**. form round; color, red; quality, 10; season, July; use. market; origin, Texas. Campbell Early*, form, round: color. black; quality, 8; season. June; use, market; origin, Ohio. Gold Coin**, form, round; color, purple; quality, 9; season, July; use, dessert and market; origin, Texas. Laussel*, form, round; color, purple; quality, 9; season, July; use. dessert and market; origin, Texas. Blackberries—Dallas**. form, round; color, black; season, June; quality, 9; use, dessert, market and kitchen; origin. Texas. Dewberries—*Austin*—Mayes**, form, round; color, black; quality, 7; season, June; use, dessert, market and kitchen; origin, Texas.

8. Insects and Diseases—Curculio is quite a serious pest to stone fruits in some portions. The "leaf footed bug" (*Leptoglossus phyllopus*), seriously injured peaches and plums in some portions. The "spring canker worm" has sometimes proved injurious in the northern part of the State. The peach borer occurs in many places. Rabbits do considerable damage to young trees in some places. Brown rot and fruit spot are occasionally troublesome.

9. Irrigation—Irrigation is practiced only to a limited extent. In western Texas it is coming more into use. Rivers are being dammed for the purpose, and windmills are used to pump water from wells for small orchards.

10. It is impossible to give any accurate idea as to the acreage planted to each fruit. The following may be considered only as indicative of the acreage planted; apples, 10,700 acres; grapes, 2,800 acres; peaches, 40,300 acres; pears, 7,300 acres; plums, 2,000 acres.

11. Very few fruits are evaporated.

12. In peaches, the seedlings of "North China" race seem to be the most hardy in bud for Texas. They rarely fail to produce a crop, especially in the northern portion of the State. For southern Texas seedlings of the "South China" and "Spanish" races fruit better.

The native Chickasaw plums and the *aestivalis* and *Bourquiniana* types of grapes rarely fail.

UTAH.

BY PROF. U. P. HEDRICK, LOGAN (NOW AGRICULTURAL COLLEGE, MICH.).

Fruit growing in Utah is peculiar in that, while there is a great deal of fruit grown in the State, yet until recently there have been but few large orchards. This condition existed because nearly all the farmers lived in villages, and in the past have planted only about their homes and for domestic use. The total amount grown for home consumption is large, however, as the home lots in the Utah farm-villages cover over an acre and are generally pretty well given up to fruit growing and to the garden. Within recent years the superior advantages of the State for fruit growing having been discovered, a large number of fine commercial orchards have been planted.

1. The horticultural interests of Utah have been developed in the northeastern portion of the State. The eastern side of the valley of Great Salt Lake, bordering spurs of the Wasatch Mountains and extending towards the lake for from one to ten miles, is the chief region. All the fruits of the temperate zone, including almonds and the European grapes are grown here. Cache Valley, forty-five miles long by ten wide, directly north of the above strip, is well adapted for growing apples, pears and all hardy fruits. In the extreme southwestern portion of the State, a region nearly as large as Cache Valley, known as Dixies, is wonderfully well adapted for growing all fruits of a temperate climate, and some, like the fig, that thrive in the subtropics. This region is as yet of but little commercial importance because of having no railroad. The soil and climate, however, are such that it is destined to become one of the richest fruit sections of the country. Other fruit sections that are worthy of mention, although their fruit interests are not yet greatly developed are those about the towns of Moab and Goshen in the eastern and central part.

2. The fruit growing lands in the sections above mentioned are mostly along the shores and on the bottoms of extinct lakes, and bordering the foot-hills of the mountains. The soils are mostly of a moderately heavy clay loam, that on the hillsides having been influenced by the wash from the mountains, containing most clay, while towards the middle of the valleys there is more sand and loam. All of the soils of the regions named are generally well supplied with plant foot, the element most commonly lacking being phosphoric acid. The altitudes range from 3,500 to 5,000 feet. Good orchard land, with water rights, is worth on an average $50.00 per acre, and double that when planted with young trees.

3. Comparatively few varieties of any one fruit are grown, the orchardists confining themselves to such standard varieties as have proved best adapted for their sections. The favorites of the various fruits are: Apples—Winesap, White Pearmain, Ben Davis, Jonathan; Summer and fall apples are not largely grown.

Apricots—Moorpark, Peach and Breda. Cherries—Napoleon, Republican and Knight *Early* as sweet, and Richmond, Large Montmorency, English Morello, Hortense, Choisy and Late Duke for sour varieties. Grapes—Of American varieties, Early Victor, Worden, Concord, Delaware, Niagara, Prentiss and Empire State are grown; the European sorts are *Muscat of* Alexandria, Black Prince, Flame Tokay, Mission and White Sweetwater. Peaches—Alexander, Crosby, Early Crawford, Elberta, Late Crawford, Heath and Orange Cling. Pears—Clapp, Bartlett, Anjou, Flemish, Lawrence, Louise

(*Bonne de Jersey*) Seckel, Tyson and Winter Nelis. Plums—Agen, Bradshaw, Columbia, German *Prune*, Golden Drop, Green Gage, Italian, Lombard and Yellow Egg. Strawberries—Bederwood, Crescent, Cumberland, Haverland, Parker Earle, Sharpless and Wilson.

4. Commercial orchards are, as a rule, well cultivated. Small fruits, vegetables and hoed crops are grown in young orchards. The cultivation is much better on the average than in the Eastern States.

5. Winter cover crops are not much used, but are being strongly advocated by the best orchardists.

6. Fertilizers are not as yet generally needed. Barnyard manure and a guano found on one of the islands in Great Salt Lake are the only fertilizers used.

7. Horticulture is in its infancy, especially as to years, in Utah, and few varieties worthy of note have been originated there. One or two have been described in the reports of this society.

8. The codling moth is everywhere present and does as much or more damage than in other States. Spraying with arsenites is resorted to with success. There are no other seriously troublesome insect pests. Though found in all the neighboring States, the San Jose scale has not been reported in Utah.

Because of the high altitude and the dry climate there is practical immunity from plant diseases, the only one for which spraying is used being mildew of the grape. Root or crown gall is found in all nurseries and in nearly all orchards and does an immense amount of damage. Destruction of affected trees is the sole treatment as yet. The so called "crater blight" of the pear is present and does considerable damage. The treatment used is that of scraping or cutting out the diseased portions. True blight of the pear is seldom, possibly never, found in the State. Utah is very fortunate in the matter of both insects and diseases of fruits.

9. Irrigation is practiced in all parts of the State and for all fruits. Where water is plentiful fruit growers look upon irrigation as an advantage over their fellow craftsmen of the East who do not irrigate.

10. The diversified nature of the products, the scattered fruit regions and orchards and the variety of markets would make it difficult to give reliable statistics in regard to average prices and profits.

11. Evaporation of fruit in a commercial way is as yet but little practiced, though the advantages of this phase of horticulture are becoming more apparent from year to year. Some prunes are evaporated for interstate markets; the German prune now has the lead, but Agen (*French* or *Petite*), first, and Italian next are taking its place as superior in every way.

12. As in other regions, Utah suffered from the severe cold of the past winter though not to the extent of most other regions. Late frosts did more damage. The factors of altitude, mountains, influence of lakes and rivers, make it difficult to draw any accurate inferences as to hardiness of species and varieties. The reports as to injury done last winter are so contradictory as regards varieties, that it might almost be said that no facts covering a widespread territory had been established.

VERMONT.

BY D. C. HICKS, NORTH CLARENDON, CHAIRMAN.

Vermont is divided by natural barriers (Green Mountain range) into three fruit sections, namely the Champlain Valley, Connecticut Valley and Memphramagog Valley, which rank in importance in the order named. In the two first sections nearly all of the standard tree and cane fruits of New England and New York can be grown, while in the more northerly section (Memphramagog) only the hardiest varieties of the same succeed.

The orchard fruit industry is the most extensive in the lower Champlain Valley, including Grand Island county and the towns of Addison, Chittenden and Franklin counties, adjacent to the lake; here are found the largest orchards of the State, from one to three thousand trees. There are also a few large orchards in the other sections, notably those of Dr. Hoskins at Newport and A. A. Halladay at Bellows Falls. The area devoted to small fruits in the State is not large and is mostly confined to the immediate vicinity of cities and larger villages, the largest being in the Connecticut River valley.

The soil of this section is a sandy loam and well adapted to the growing of these fruits.

The soil of the State varies somewhat, but in all sections may be found areas of strong lime loam soil, which, in a well drained condition, is one of the best for all kinds of fruits; in the Champlain valley many of the orchards are planted on clay loam and in the southeastern part of the State on black slate land.

Elevation—We find the orchards of the State growing at all elevations from 100 to 1,500 feet above the sea level. The large orchards of the Champlain section are on slight elevations above the lake level, generally one to three hundred feet, while in the Connecticut River section, the best soils for tree planting, will be found at a considerably higher elevation on the ridges between the tributary streams. The price of good orchard land varies according to the location, from $40.00 to $100.00 per acre, and that of the best bearing orchards from $150.00 to $250.00 per acre.

4. Irrigation—This is not practiced to any extent as yet; the few instances that have come under my notice have been the irrigation of small fruit plantations and the water has been secured through ditches or pipes from springs and streams at higher levels.

5. Cultivation—This is practiced in the large commercial orchards and crops used are clover, beans, peas, millet and buckwheat. Winter cover crops have not been much experimented with, although the plan seems a good one to retain moisture and secure a more even frost temperature in the root soil. In a few cases good results have been obtained from a mulch of coarse hay or leaves.

6. Fertilizers—Barnyard manure; potash, in hardwood ashes and muriate; and ground bone; with an occasional crop of clover or buckwheat plowed under are the sources used to furnish the needed fertility and their use is considered profitable.

Insects and Diseases—The most troublesome insects are the tent and forest tree caterpillars, codling moth and bud moth, borer and railroad worm. Of diseases, pear, plum and apple blight, black knot, canker and anthracnose. A remedy has been found for all insects, except the borer and railroad worm,

in the arsenites. Borers must be hunted out and killed. Little progress has been made in heading off the work of the railroad worm. Cutting off and burning the diseased portions is the only way to fight successfully the different blights and the same treatment is given for the black knot. The forest tree caterpillar has been very troublesome all over the State for the past three seasons. Pear blight and black knot seem to be less destructive than formerly.

8. Hardiness of Species and Varieties—The past winter and spring has been very trying on all kinds of fruit and ornamental trees and shrubs. The injury by the winter's cold has been greatly aggravated by one of the severest spring droughts of recent years. Reports from different sections of the State show losses among all species and varieties of trees, plants, vines, shrubs, etc. A few varieties in each group seem to have come through in better shape than others. Apples—Oldenburg, Northern Spy, Sutton, Foundling, Fameuse, Shiawassee, Walter Pease, McIntosh, Arctic, Tolman, Pound and Jacobs Sweet. Pears—Anjou, Tyson, Vermont Beauty, Koonce, Easter, Bartlett, Seckel, Bessemianka, Grand Island and *President* Drouard. Cherries—*Early* Richmond, Dyehouse, Montmorency, Olivet, Ostheim and Bessarabian. Plums—*Moore* Arctic, Giant *Prune*, Spaulding, Tennant *Prune*, Pacific *Prune*, Macomber, Gueii, Wickson, Satsuma and Ogon. Blackberries—Eldorado and Taylor. Raspberries (red)—Loudon, Turner and Miller; (black), Palmer, Ohio and Cumberland. In the purple caps Shaffer and Columbian seem of about equal hardiness, each being killed back about one-third of the previous year's growth. Currant—Red Dutch, Cherry, Fay and Red Cross. Gooseberry—Red Jacket and Smith. Strawberry Plants came through the winter in good condition, as they were covered with snow until early April, but the severe drought has shortened this crop, so that the best fields are now yielding one-half of a full crop; prices for this fruit were forty per cent higher than last season. The stand in new beds is a poor one and under the best conditions for the remainder of the season will not give over three-quarters of a fruiting area for next season.

The prices at which the various fruits must be sold, f. o. b., to repay the expense of growing, picking and packing are estimated as follows: Apples per barrel, $1.00; pears, per barrel, $1.50; plums, per bushel crate, $1.00; cherries, per bushel crate, $1.50; blackberries, per bushel crate, $1.00; raspberries, per bushel crate, $1.50; currants, per bushel crate, $1.60; strawberries, per bushel crate, $2.00.

We have home markets for all the small fruits raised in the State, and there is room to increase this industry greatly and still sell the product at home. The only fruit grown that in any year gives a surplus for outside markets is the apple, and this surplus mostly comes from the lower Champlain valley, where as fine specimens of this fruit in color, texture and table keeping qualities can be grown as in any other portion of the apple belt of the United States. The highest market price is always obtained for this fruit in New York City, and low freight rates are secured over the Hudson-Champlain waterway. In lots of two thousand barrels the rate will run from thirteen to sixteen cents per barrel, while the rate by rail to Boston and New York will average in carload lots twenty-five cents per barrel, with a proportional increase on smaller shipments.

The apple orchards of our State can be largely augmented with a sure market prospect in store for the products if good judgment is used in selecting varieties, soil and location and in the after care of the trees, which must

consist of proper cultivation, pruning and the control of insect and fungous foes.

While the fruit industry of Vermont, taken as a whole, does not show any marked increase in late years, we find that there are agencies at work that are raising the standard of horticultural knowledge. Therefore, from the standpoint of one who has studied the situation carefully there seems to be good reasons for hopefulness for the future.

D. C. HICKS, Chairman.
T. L. KINNEY.
D. B. SPIERS.
A. A. HALLADAY.
L. M. MACOMBER.
DR. T. H. HOSKINS.
Fruit Committee.

VIRGINIA.

BY PROF. W. B. ALWOOD, BLACKSBURG, CHAIRMAN.

1. The extensive coast plain and the region lying above it, known as Middle Virginia, make together fully one-half of the State and are not well adapted to the cultivation of apples other than summer and fall varieties. Winter apples in this section will seldom keep longer than through December and are not desirable as export fruit. This section of the State is, however, well adapted to the cultivation of bush fruits and strawberries, and also produces good grapes. The stone fruits generally thrive well in this section. Lying to the west of the section mentioned above we have the Piedmont section which merges into the Blue Ridge Mountains and is characterized by an elevation of five hundred to two thousand feet above sea level. This section is marked by strong red clay soils shading off into chocolate and dark loam soils up the mountain hollows. Also there are outcrops of light gray gravelly soils. These latter are very poor but the other soils mentioned are rich naturally and produce excellent fruit. The red lands are well adapted to the standard apples such as Winesap, York Imperial and others. The loamy soils up the mountain hollows produce our finest Pippins, which are the best export apples grown in America.

West of the Blue Ridge Mountains we have the great Valley and Appalachia, a region of the State having an elevation of from one thousand to forty-five hundred feet. It is chiefly a heavy limestone soil broken here and there with shale and sandstone formations, and produces all the standard fruits in great excellence.

Peaches, pears, plums and all the small fruits thrive well throughout all this upper section of the State. However, in exposed situations, peaches and plums suffer from late spring frosts.

2. Winter fruits can be grown well in this State at an elevation of five hundred feet but below this do not do well. There is such a great variety of soils that a special treatment of this subject would be necessary for clear understanding. Good orchard land can be purchased in a wild state at from one to ten dollars per acre. However, there are instances where people ask fabulous prices for specially good pippin land. Orchard land in bearing, with trees well grown and healthy, is worth from five hundred to one thousand dollars per acre.

4. The common practice in this State is to crop the orchards to corn and potatoes and, I regret to say, often with small grains. A few of our more scientific growers are gradually coming to the practice of cultivating the orchard for itself and growing cover crops to improve the land.

5. The best cover crops here are crimson clover for the winter and if this fails to set, sow rye later. Then for summer, sow cow peas. This latter crop should not be sown until after thorough spring cultivation has been given the orchard. It does not appear best here to cultivate our orchards late in the season.

6. Very few people have ever resorted to using chemical fertilizers in the orchards in this State. The practice on the part of some growers is to mulch the young trees during the first or second year with coarse manure. However, even this is a rare practice. I do not know of a single instance where fertilizers have been systematically used in such a manner as to note the profits.

7. I cannot undertake a discussion of this subject at this time.

8. The most troublesome insects on apple trees are the root louse, *Schizoneura lanigera*; the flat head and round head borers, principally the former; the tent caterpillars and in occasional years, the web worm, *Hyphantria cunea*, which is here two brooded, making it a very serious pest. San Jose scale has incidentally been a serious pest but we hope that we have it about suppressed. Of these insects, root louse and borers are now threatening our orchards seriously. This is from lack of skill and attention.

9. I have never known irrigation to be practiced in this State.

10. We have orchards in the State as large as fifty-four thousand trees in a body. The industry is spreading rapidly and within the last four years tree planting has increased at least one hundred per cent. Apple growing at twenty-five cents a bushel in the orchard is profitable. However, we often realize two to four dollars a barrel for them. I know of instances where eleven hundred apple trees have brought fifteen thousand dollars in a single year.

11. Evaporated fruits are hardly made in this State. Sun dried fruits have been quite common. In fact enormous quantities have been produced and the fruit yields in this way about six and eight cents per bushel, gross price; hence you will see it is wholly unprofitable. It is not unusual for two hundred tons of this stuff to be shipped from a small country depot. Only the poorer classes of fruit are used for this work, such as cannot bear expert.

12. Fruits were injured here the past winter to some extent and especially in some portions of the Valley peaches were killed to the ground. It is the first instance of the kind I have known. I have not known apple trees to be injured; but of course the fruit is often injured.

WASHINGTON.

BY E. F. BABCOCK, WAITSBURG, CHAIRMAN.

Apples are the principal fruit cultivated, and are grown quite successfully, the soil and climate being peculiarly adapted to their production.

Among the new fruits are a seedling pear and quince originated by Samuel Erwin, of Prescott, and named for him. The Erwin pear is of medium size; conical oblate; yellow, with a red cheek; quality, good; season late; dessert

or market. A hardy and productive variety. The Erwin quince is a seedling of Orange. It is medium to large; oblate round; yellow; quality very good.

The rules of nomenclature and the exhibition rules of the society have been adopted by the management of the Spokane and the Seattle Expositions, and if rigidly enforced will wipe out the craze for alleged new varieties.

We have sudden and severe cold waves, that destroy not only our fruit crop for the present year, but work havoc in our trees, particularly if in an irrigation district, and the water is turned on or kept on after the first of September, or if we have copious rains in the fall, followed by sudden and severe changes. These changes, however, are not as frequent as in the East and North.

These difficulties can be reduced to the minimum by underdraining and by shutting off the irrigating water not later than the first of September. If the trees have been injured their recovery can be aided by severe pruning. The heads of the trees should be formed two and one-half feet from the ground to aid them in resisting the Chinook and trade winds. Thin out the centers so as to form low, spreading tops and remove all cross limbs. Begin cultivation early in the spring and continue it until the first of September. Treated in this way the trees will make a strong, vigorous growth and set fruit buds for a full crop.

WEST VIRGINIA.

BY PROF. L. C. CORBETT, MORGANTOWN, CHAIRMAN.

The peculiar outline of the State of West Virginia, taken in connection with its numerous waterways and mountain chains, gives it a diversity of soils and climates, which suit it to the production of a great variety of the fruits of the north temperate zone.

Along the river bottoms of the southern division of the State, the horticulture is southern in character; while along the mountain breasts further north, the fruits become distinctly northern. The fruits of the so called Northern Pan Handle, or tongue of the State, are such as might be found in New England. It is one of the greatest apple districts of the eastern United States, the crop of the single county of Hancock being about 100,000 barrels, when the trees bear full. This year the orchards are carrying about 45 per cent of a crop. This section borders the Ohio river, and, although somewhat changed in character of fruit grown, the orchard belt extends southward along the Ohio to the Great Kanawha, where it branches to the eastward and takes in a portion of the territory drained by that stream. In general this region is spoken of as the Northern Ohio, or Northern Pan Handle region and the Southern Ohio Valley region of West Virginia. The Eastern Pan Handle is second to this region only in apple production. It embraces that neck of land bordered on the north by the Potomac river, and on the south by old Virginia, being really a portion of the famous Maryland peach orchard and the world famed Albemarle Pippin section of Virginia. Here in this line of counties which lie between Maryland and Virginia, two of the great fruit belts of America are joined, and West Virginia is a gainer, for it is in this region that the famous York Imperial Orchard of Mr. John Miller is situated, as well as the peach orchards of his brothers. These peach orchards are now the largest owned by any one company in the United States,

aggregating nearly 275,000 trees. This plantation at present constitutes the greater part of the commercial peach interest of the State. A third fruit section, or really a fourth considering its distinctive character, lies in the southern tier of counties bordering old Virginia, along the extreme southern portion of the State, and including lands tributary to the Blue Stone, Greenbrier and New rivers. Commercial orcharding will for some time be at disadvantage in this last named region, because of a lack of railroad facilities, except along the line of the Chesapeake and Ohio which passes across it.

Soil—The lands upon which the orchards of the Ohio Valley are growing, are chiefly of two sorts. First, a sedimentary clay upon the hill tops and hillsides, and second, alluvial sandy deposits on the bottom lands. The earlier orchard planting was confined to the hillsides, but during later years the planting has extended to the bottom lands, where it is now most extensive, notwithstanding that bottom land orchards require more attention in regard to fertilizers and show evidence of being shorter lived than those on the hillsides.

Through the Eastern Pan Handle the apple and peach soils are composed chiefly of gravel, the result of the breaking down of shale, mixed with clay, from a decomposition of the same shale with a small per cent of sand. As regards the price of land suitable for orchard purposes, it varies with the character of the land. Brush land, which when cleaned will produce good orchards, can be had at from eight to fifteen dollars per acre, it costing twelve to fifteen dollars per acre to clear such land. Cleared land ranges in price from fifteen to sixty dollars per acre; while lands upon which orchards are growing is hard to buy and is held at from seventy-five to two hundred and fifty dollars per acre.

Varieties—Sorts vary with the character of the country; in fact, some are exceedingly local, while others are general in their distribution. The Willow *Twig* furnishes 90 per cent of all commercial fruit grown in the Northern Pan Handle section, while ten miles out of that belt it is a failure. The Ben Davis is second, while the Rome Beauty and Bentley *Sweet* are both important commercial sorts. In the eastern Pan Handle the York Imperial outshines all others, the Rome Beauty and Willow *Twig* being little known and very sparingly grown in the region. While the Ben Davis is here a second to the York Imperial, Yellow Newton, (*Albemarle Pippin*) and such new sorts as Northwestern *Greening* and Shackleford rank well.

List of varieties (Northern Pan Handle).—Willow *Twig***, Ben Davis**, Bentley *Sweet**, Rome Beauty*. Southern Ohio River Region—Rome Beauty**, Ben Davis**. Eastern Pan Handle—York Imperial**, Ben Davis**, Shackleford*, Northwestern *Greening**, Yellow Newtown**.

Cultivation—The cultivation of orchards is largely governed by the character of the land upon which they are located. In the Northern Pan Handle section nearly all hill orchards are kept in grass. Sometimes this is cut for hay, but oftener is pastured by hogs or sheep; while the lowland orchards may be cultivated in the ordinary farm crops, such as corn, oats, potatoes or melons. In the eastern section, clean culture, with buckwheat or rye as a cover crop, is the rule. All the peach orchards are given clean culture, followed by early sown rye where the crop can be harvested in time, and late sown rye upon the later sorts.

Commercial fertilizers are very generally used upon the peach orchards, while little attention has been paid to the use of fertilizers in the apple regions.

Insects and Diseases—Neither apples or peaches suffer to any considerable extent from insect enemies in this State. The common enemies of the tree and fruit are the only ones worthy of note. The apple suffers from borers at the root and in the trunk. Trunk borers, being both the common round headed and flat headed, together with *Scolytus rugulosus*. The woolly aphis is one of the worst pests on young stock. The foliage suffers greatest damage from the green aphis, particularly upon young trees, while the tent caterpillar is most annoying upon older trees.

Insects troubling the fruit of the apple are few outside the codling moth. Here the curculio is less injurious than in New York. The diseases are the blight of the twigs; the rust on both fruit, branches and leaves; the scab on leaves and fruit. The leaves also suffer largely from brown spot(*Phyllosticta pirina*), in the southern apple growing regions.

From nearly all quarters complaint comes to us of trees dying at the root. This is not confined to young stock, but seems to be common to both young and old. The disease is of fungous origin, but, so far, no one has worked out its character or life history. In the advanced stages a whitened growth is found under the bark and adhering to the wood. When the tree dies, or before, the bark cleaves loose and frequently falls off in an irregular line around the body, leaving the dead and hardened sap wood exposed. In some cases this condition is undoubtedly induced by root aphis, but in others there is no trace of early insect injury and the disease seems to start without previous cause. We are giving this trouble special attention with a view to finding some successful remedy.

Peaches are, up to the present, free from yellows; a small percentage of fruit being lost from the *monilia* where careful attention is not given to thinning. The trees during early years are subject to the ravages of the peach tree borer. Up to the present, however, the *Scolytus* has been found only in the extreme northern part of the State, and few trees have been killed by it.

Grapes have few insect pests, but suffer severely in most sections from mildew and black rot. At present the grape industry is limited to small plantations near the larger cities and towns, for the purpose of supplying a local demand. and to a few large vineyards planted exclusively for wine purposes. There are no evaporators making a business of drying fruit in our State to my knowledge. This is a promising field for such enterprises.

There are several canneries and preserving factories doing a large business in fruit and vegetables.

The State is also well provided with cold storage facilities, both at the orchards and in the cities.

In regard to hardiness or the influence of climate upon fruits, the sweet cherries and Japan plums are the two classes which give most trouble. The cherry grows to perfection only on the higher plateaus of the mountains; while the Japan plum has a much wider range, yet it suffers from too early blooming in many localities. Varietal differences and a better knowledge of the demands of this fruit will undoubtedly overcome this drawback for most fruit growing regions.

WEST VIRGINIA.

BY C. S. SCOTT, SINKS GROVE.

1. Fruit Sections—Fruits do well in all parts of the State, but particularly in the northern, northeastern, eastern and southeastern sections and there the business is most extensively carried on.

2. Soil—The soils best adapted to the raising of the apple, pear and plum are those having a strong, productive, red clay subsoil; this is of first importance as trees planted on any other kind of soil are sure to disappoint at least in a majority of cases. If the above kinds are planted on land having a sandy, peaty, white clay or gravel hard-pan, or if the subsoil is filled with water, one has no assurance of success with either tree or fruit. The trees are small in growth, unproductive and short lived, and the fruit is lacking in size, color and flavor. The same is true with grapes, currants and gooseberries. Do not plant on land where the natural growth was pine of any kind, sycamore, black jack, honey locust, sourwood or chestnut oak. Peaches, cherries, Japan plums, and grapes do best on light loamy soils of a gravelly nature, or sand with clay subsoil.

Most fruits reach the highest perfection at 2,500 to 3,000 feet above Chesapeake Bay.

3. Varieties: Apples—Yellow Transparent, Williams *Favorite*, Benoni, Sweet Bough, Wealthy, Summer Rambo, Golden Sweet, Nyack *Pippin*, Jefferis, Grimes Golden, Wolf River, Bonum, Golden Russet, Salome, Ben Davis, Gano, York Imperial, Stayman Winesap, Fallawater, Oldenburg, Rhode Island. Pears—Wilder, Angouleme, Elizabeth, Bessemianka, Clapp *Favorite*, Bartlett, Seckel, Vermont Beauty, Idaho and Kieffer, the latter blooms early and is injured quite often by frost. Plums—Red June, Niagara, Lombard, Shropshire and Sweet Damson. Quinces—Orange. Peaches—Amsden, Mountain Rose, Stump, Lovett White, Elberta, Wager and Champion. Grapes—Worden, Winchell, Martha, Concord, and Hosford. Currants—Red Dutch, Red Cross, Victoria, Crystal White, Black Champion, and Lee. Gooseberries—Downing, and Houghton. Blackberries—Erie. Raspberries—Ohio, Cuthbert and Loudon. Strawberries—Bederwood, Parker Earle, Greenville, Brandywine and Gandy.

4. Cultivation is generally practiced at least for several years after the trees are set. No particular crops are grown.

5. Winter cover crops are not sown.

6. All kinds of fertilizers are used, including stable manure.

8. Insects and Diseases—The apple and peach borers are very troublesome in some sections, while the curculio is by far the worst insect pest we have. The grape and plum are ttacked by rot and the apple by the scab fungus. Jarring is used for curculio and spraying for apple scab.

9. Irrigation is not practiced.

11. Evaporated Fruit—Apples, peaches and cherries are the kinds of fruit most used in this section, the best apples for this purpose are Wealthy, Maiden Blush, Jefferis, Gideon, Wolf River, Grimes Golden, Summer Rambo, Fall Pippin, Rhode Island *Greening* and any of the free peaches may be used.

12. Hardiness—Last winter gave a good opportunity for studying the relative hardiness of fruits. The following apples were not injured: Yellow Transparent, Wealthy, Bonum, Wolf River, Chenango, Hurlbut, Gideon, Longfield, Grimes Golden, Golden Russet, Ben Davis, Salome, Red Canada, Stay-

man Winesap, Nonpareil, Honey Sweet, Gem *Sweet*, Fallawater, Whitney, Shackleford, Oldenburg, Rome Beauty, Baldwin, Alexander, Summer Pearmain, Stark, Winter Rambo, Early Harvest, Twenty Ounce, Jefferis, York Imperial.

Hardy Pears—Bartlett, Clapp *Favorite*, Elizabeth, Idaho, Bessemianka, Anjou, Buffum.

Of plums, Lombard is as hardy as any. All of the Japan sorts were killed except Red June and Willard, and trees of the latter variety were so badly injured that the fruit dropped after the bloom fell, Red June being the only one that bore fruit. This is the only Japan plum I would recommend for this section. I have faithfully tried Burbank and Abundance, but they will not do here.

Peaches were all killed. Fay is the only currant that is not hardy here. It blooms so early that it is often killed; fruit fine; North Star, fruit too small, also quite acid; Victoria grand and in every way one of the best.

The following varieties of apples should be top-worked a good distance above the ground: Tompkins King, Stump, Whinnery, Wealthy, Winter Rambo, Jacobs Sweet and Hubbardston *Nonesuch*.

Mulching is just as good as cultivation and in some cases better, if faithfully and rightly done. I have tried it for a number of years and just as fine fruit can be raised as in any other way.

Statistics—Plums and damsons bring the growers twenty to twenty-five cents per gallon net delivered at the railway station. Apples sell at from a dollar and twenty cents to a dollar and a half per barrel. Grower picks apples and hauls to depot and the buyer furnishes barrels and packs the fruit. Early apples bring more in the local markets. Peaches sell at one dollar net; pears at a dollar and a half to two dollars per bushel. Evaporated apples sell at from ten to twelve cents per pound; cherries and raspberries vary at from fifteen to twenty-five cents per pound.

Good fruit land can be had for $25.00 per acre and rough mountain land much cheaper.

I have tested about seventy-five of the best known and most popular apples grown in all sections of the country. I find the following seven the most profitable per tree in a money point of view: Jefferis, Yellow Transparent, Wealthy, Ben Davis, York Imperial, Oldenburg and Wolf River. The following seven have been the least profitable in the order named: Alexander, Monmouth *Pippin*, Mann, Bietigheimer, Primate, Gravenstein and Lawver.

WISCONSIN.

BY PROF. E. S. GOFF, MADISON, CHAIRMAN.

1. Eastern and southern Wisconsin are fairly well adapted to the culture of apples, plums and cherries, also portions of Waupaca and Richland counties. In these sections the business is most extensively carried on at present. Northeastern Wisconsin, especially the peninsula between Green Bay and Lake Michigan, is regarded by many as being especially adapted to the tree fruits. Nearly all of the State is adapted to small fruit culture. The plants of the raspberry and blackberry admit of easy winter protection and the currant and gooseberry are hardy without protection.

2. Clay soils are best adapted to apples; lighter soils suit the stone fruits and possibly the small fruits better. Apples and the stone fruits thrive best

on elevated locations where air and soil drainage are best. Good orchard land can be purchased all the way from $10.00 to $75.00 per acre, the former figure of course applying only to wild land. Good bearing orchards are worth $50.00 to $100.00 per acre.

3. Apples—Oldenburg** (*Duchess*), Wealthy**, McMahon** (for S. W. part of State), Tolman *Sweet***, Longfield*, Wolf River*, Tetofski*, Haas*, Northwestern *Greening**, Pewaukee (in east)*, Yellow Transparent**, Willow *Twig***, Hibernal*, Flushing *Spitzenburg**, Newell*, Malinda*, Minkler (for southern Wis.)*, Ratsburg†, Berlin†, Hoadley†, Windsor Chief†.

Cherries—Early Richmond**, Kentish**, English Morello**, Late Morello†, Large Morello†, Shadow Amarelle† King Amarelle†.

Plums—Wyant**, Ocheeda**, Forest Garden**, Rollingstone**, Mankato**, De Soto**, Quaker*, Wolf*, Pottawattamie*, Lombard*, Rockford*, Weaver*, Robinson*, Pipers†, Aitkin†, Frotheringham†, Le Duc†, Surprise†, Springer†, Orleans†, Aubert†, Smith *Red*†.

Grapes—Worden**, Delaware**, Moore *Early***, Brighton*, Niagara*, Concord*, Wilder*, Winchell, Ebony†, Bentzella†, Brilliant†, Fromania†.

Currants—Holland**, Victoria**, White Grape**, Red Dutch*, Fay*, Cherry*, Raby Castle†, President Wilder†, Red Cross†, London Market†.

Gooseberry—Downing**, Champion*, Red Jacket*.

Raspberry—Loudon**, Marlboro**, Nemaha**, Souhegan**, Cuthbert**, Gregg**, Older**, Palmer*, Shaffer*, Kansas†, Harris†, Columbian†, Conrath†.

Blackberries—Ancient Briton**, Stone*, Snyder*, El Dorado†, Bangor†.

Strawberries—Warfield**, Bederwood**, Haverland*, Lovett*, Gandy*, Dayton*, Eureka*, Enhance*, Greenville*, Dew†, Marshall†, Epping†, Glen Mary†, Belt†, Clyde†.

4 and 5. Young orchards are commonly, though not always, cultivated with corn and potatoes. Sometimes they are sown with small grain. The most progressive fruit growers are adopting the plan of cultivating orchards during the first half of the summer without planting a crop, and during the latter part of the season either grass is allowed to grow on the land or else some cover crop is sown. Very few as yet are practicing this method. Summer grass and barnyard grass grow very luxuriantly in some parts of our State during the latter part of the summer, and these make the cheapest cover crop that can be grown. While this may suggest shiftlessness, it cannot be denied that some of our most successful orchards are managed in this manner.

6. Very few practice any system of fertilizing orchards. Barnyard manure with an occasional dressing of wood ashes togother with growing clover or peas, are the only fertilizing methods in use.

7. The following new varieties of apples have been favorably spoken of by Mr. A. J. Philips, Secretary of the Wisconsin State Horticultural Society, and by Mr. A. D. Barnes of Waupaca county; Windorf, said to be excellent in quality and to keep until April; Granite Sweet, a winter apple, and Lindfield, an autumn apple, also an unnamed seedling from Monroe county. While these are all promising, time will be needed to determine their real value.

8. The codling moth, leaf-roller, bark lice, and the apple curculio are most troublesome in apple orchards. The apple scab and apple blight are the most destructive diseases. Spraying with Bordeaux mixture and Paris green is the remedy most used against apple scab, codling moth and leaf-roller; but this is not always successful. In plums, the curculio is most troublesome.

A few of the more progressive plum growers jar their trees over sheets to destroy this insect, but as a rule no attempt is made to prevent its damage. The apple curculio seems to be becoming more troublesome and must be regarded as one of our most serious apple pests. No remedy has been found for it, though spraying is thought by some to be helpful. The insects troubling small fruits are those which are most commonly troublesome in other States.

9. Irrigation is not practiced in our State except in a few cases where small fruits have been irrigated. In many seasons irrigation is not required. In dry seasons the yield of small fruits could doubtless be much increased by thorough irrigation.

10. One orchard of about four thousand trees is located near Eureka in Winnebago county, and one of about sixty acres is located near Ripon in Fond du Lac county. One of about twenty-five acres is located near Ithaca in Richland county. These are among the largest orchards in the State.

11. The evaporation of fruits has scarcely been attempted in Wisconsin.

12. In southern Wisconsin, young fruit trees have suffered seriously the past winter, mainly from destruction of the roots. Bearing trees have suffered little damage. The European and Japan plums suffered nearly a total loss of their flower buds, also some varieties of the cherry. Among the hardiest apples may be mentioned Oldenburg, Hilbernal and Wealthy. The *Americana* plums escaped injury better than most other fruits, and are bearing a full crop this season. Grapes suffered very seriously, and blackberries were nearly a total loss through southern Wisconsin. In portions of the State that were protected by snow during the severe February weather, which includes the northern two-thirds of the State, the damage from winter-killing was very slight, notwithstanding that the temperature during the early part of February descended to from 33 to 35 below zero throughout this whole section.

E. S. GOFF.
HENRY TARRANT.
A. D. BARNES.
State Fruit Committee.

WYOMING.

BY PROF. B. C. BUFFUM, LARAMIE, CHAIRMAN.

Horticulture is very new in this state. There are hardly a half dozen growers in the state who raise enough fruit to supply any product to local markets and of these names it has been possible to get but one answer to my request for information at this time. There are probably not to exceed one hundred acres planted to fruits of any kind in the state and it is doubtful if there is one-fourth this area from which fruits are furnished local markets. There are three sections of the state where apples are raised successfully. In Sheridan county there is a strip or belt extending north and south along the eastern border of the Big Horn Range of mountains where apples are succeeding well. They are raising Tetofski, Fameuse, Ben Davis, Oldenburg, Antonovka, Hibernal, Wealthy and Red Astrachan. The past winter was a hard one and the larger part of the Ben Davis, and young plantings of Wealthy trees were killed in that section. The crop of other varieties will be light.

In the valleys extending north from the Wind River Mountains, in the west central portion of the state, apples are very successfully produced. Here the Wealthy and Oldenburg have been the most successful varieties and, of course, hardy crabs succeed. The last winter was very destructive there also. In these protected valleys, at not more than 5,500 feet altitude, small fruits of all kinds which are generally grown at this latitude, succeed, and several varieties of grapes, principally Concord, Diamond and Wyoming have ripened for several years.

Along the eastern border of the state near the Laramie Range of mountains, is a belt in which apples and other fruits are succeeding well. The hardy varieties of standard apples and crabs are in bearing and little trouble has been experienced with winter killing.

The Wealthy has been proven the hardiest apple over the larger part of the state. Trees of Wealthy apples have been in bearing for several years on the Laramie plains at altitudes of from 7,000 to 7,500 feet.

Wyoming will never be a fruit producing state in which horticultural products will be of commercial value. We are trying to show our inhabitants that it is possible for them to grow sufficient fruit for home consumption, but to do this special care must be given the fruit garden.

REPORT OF COMMITTEE ON TROPICAL AND SUB-TROPICAL FRUITS.

Your Committee as originally constructed consisted of the following named gentlemen:

E. H. Hart, Federal Point, Fla.; Lyman Phelps, Sanford, Fla.; H. C. Matthams, West Palm Beach, Fla.; Mrs. W. F. Meres, Tarpon Springs, Fla.; R. Maitre, New Orleans, La.; W. H. Winters, Phoenix, Ariz.; Frank A. Kimball, National City, Cal.; J. E. Cutter, Riverside, Cal.; J. S. Calkins, Pomona, Cal., Leslie F. Gay, Piru City, Cal., Geo. C. Roeding, Fresno, Cal.

The serious and continued illness of Mr. Hart compelled his resignation as Chairman, and Frank A. Kimball was appointed to succeed him. The death of Mr. Hart created a vacancy on the Committee, which was filled by the appointment of F. G. Sampson, of Boardman, Fla.

Mr. Sampson reports as follows: "Since the last report from Florida Committee on Tropical and Sub-Tropical Fruits was made to this Society Florida's chief fruit crop, the Orange, has suffered a terrible set back, from cold, the great majority of the trees being cut to the ground, thereby reducing the crop from probably nearly 6 000,000 boxes in 1894, to 40,000 boxes in 1895, 150,000 in 1896, 250,000 in 1897, and probably about the same quantity in season of 1898-9. The loss was so severe that many growers were completely discouraged and abandoned their groves, and many others are only able to half take care of their groves so that 50 per cent is likely to cover acreage in the State now fully taken care of as compared with 1894.

"The cold this past winter again damaged the youngest buds, but nothing like as bad as in 1894-5. Trees now taken care of are making a wonderful growth so that there will be a marked increase in the crop of 1899.

"In re-budding the groves in the northern section of the State, since the freeze, the growers have budded more generally to the early varieties *Parson* Brown, Boone, Satsuma, etc., etc.

"In South Florida the re-budding has been to late varieties, i. e. Bahia *Washington Navel* and Valencia *Late*—so when groves do get to full bearing the Florida season will be longer and we hope better prices will be maintained than for the years before the freeze.

"We have no fears as to getting big profits so far as prices go, for the markets are ready for high grade Florida oranges; our only dread is, that the cold may damage our buds while they are young and growing so rapidly, They cannot now stand the degree of cold that they would endure if they were in bearing.

"We have, in past years, gathered 650 boxes of oranges at one crop from an acre of trees, which, if they had sold at the price obtained for our last season's crop, i. e., $3.10 per box, f. o. b., would have given profit enough—*'if'*."

In a later report, Mr. Sampson says, "I was in hope that some member of the Committee from South Florida would report on the fruits raised more extensively in that section and will add: The pomelo or "grape fruit" is somewhat more tender than the orange, so that there are no very extensive plantings being made in the northern orange belt, but as one goes further south a constantly increasing proportion of trees are being budded to that fruit; as they come into bearing quicker than the orange, there will soon be a very large increase in crop.

"The Aurantium, Seedless, Triumph, Josselyn and Walters are general favorites; the fruit is becoming more highly prized year by year and those who are fortunate enough to have bearing trees *now* are reaping a very rich harvest.

"The Lemon is more tender than the pomelo or 'grape fruit' and is now confined to South Florida, except in some exceedingly well located places near large lakes, but even in South Florida the freeze has prevented many persons from re-budding to lemons.

"Before the freeze the owner of an acre or two of lemons was not as a rule, well paid for his labor, owing to budding to poor varieties, not keeping fruit free from rust and generally poor methods of culture. I think I am safe in saying it requires more attention to grow lemons profitably, than to grow oranges profitably. A second class orange will sometimes pay its cost, but a second class lemon will hardly ever do so. On the other hand, a well planned lemon grove is far more profitable, they come into bearing earlier grow much more rapidly and bear many boxes more per tree than will the orange, and sales will average at higher prices.

"There has always been very much more attention given to oranges than to lemons in this State and before the freeze many growers had begun to understand more about growth and marketing and were growing an annually increasing crop of lemons that would compare well with those grown anywhere—thin skined, seedless and full of juice, with flavor as well as acid.

"The main crop ripens here during the summer and early fall months, when, naturally, lemons are most in demand.

"There has been a very large increase in pineapple planting during the past few years, of the small varieties under field culture and also of the larger varieties grown in inclosures with slat protection on top to secure the plants from both sun and frost; and the profits realized have been very encouraging.

"Aside from the fruits coming within the purview of your Committee, North and Northwestern Florida every year ship large quantities of Kieffer

and Le Conte pears and quite a good many peaches, plums, grapes, Japan persimmons, figs, pecans, strawberries, guavas and mangoes, all of which crops are remunerative."

Mrs. W. F. Meres, of Tarpon Springs, Florida, makes no report, although she had planned a personal investigation of the subject over her entire district, but long continued sickness in her family has prevented the possibility of a report.

Rev. Lyman Phelps, of Sanford, Florida, has been physically unable to make a report covering his district, nor has he secured assistance for that purpose.

I have been entirely unable to secure answers to any of my correspondence with Mr. H. C. Matthams, of West Palm Beach, Florida, or to secure the co-operation of any other person.

The report of Prof. Burnette, Horticulturalist of the State Experiment Station, Baton Rouge, Louisiana, is exceedingly interesting and instructive. He says:

"South Louisiana has been slowly recovering from the freeze of February 1895. At that time almost everything in the line of sub-tropical fruits, save the kumquat and a few Satsuma and sweet oranges were destroyed.

"The value of certain stocks was then noticed and the plantings since have been modified accordingly. *Citrus trifoliata* and common sour stock are used now almost universally, and are thought to offer the best resistance to our sudden cool changes.

"Very little has been done outside of renewing the orchards during the last two or three years.

"There is a wide spread interest in this, as well as in improved methods of culture, controlling insects and the introduction of new varieties, which, in time, will bring the extreme southern portion of Louisiana to the front as a producer of fine oranges.

"The character of the delta lands is such that the planting and culture differ greatly from that given in higher and more sandy locations.

"The common varieties of kumquats, mandarins, tangerines and sweet oranges are grown and it is only occasionally that anything on a commercial scale is done as yet with the other members of the *Citrus* family.

"Immense quantities of figs are grown, but there seems to be one which is by far the most popular, i. e. the small Celestial. The other desirable varieties are Reine Blanche, Brunswick, Mission and Lemon.

"Altogether too little culture, as a rule, is given; orchards are now being set and care given in order to supply the demands of fig preserving establishments as well as the domestic market.

"The planting of Japanese persimmons is being extended in all directions. Some shipments have been made north with profit and numbers of trees are being planted each year. The desirable varieties are Hiyakume, Kurokume and Hachiya.

"Considerable quantities of the Purple and Acid pomegranates are grown commercially as well as for the home.

"The guava, olive and pineapple have received only occasional notice.

"The severe check of '95 did an immense amount of damage, and although for the time being it completely killed some orchards, it served the purpose of improving the culture of sub-tropical fruits, by forcing the use of better stocks, hardier varieties and better culture throughout."

After many months correspondence with Rev. W. H. Winters, of Phoenix, Arizona, and his subsequent resignation from the Committee, I found it impossible to secure a successor who would make a report for Arizona, although several recommendations were made by the retiring member, and appointments were made in accordance with them.

In the report of Mr. J. E. Cutter, of Riverside, Cal., he says:

"It is not practicable to make such a report as may be desired by and for the purposes of the Society, and I can give merely some review of the present status and trend of our industry.

"The acreage is but slowly increasing. During the present season new plantings of favorable lands have only amounted to a few hundred acres.

"The water supply which is so important a factor in the production of good fruit, has been adequate for all necessities.

"The crop of the closing season has been approximately one million four hundred thousand boxes (1,400,000) from the Riverside groves and the largest in our history.

"The crop of the coming season will be a light one, perhaps less than a half crop, nor will the output be made up by the coming in of new groves, for the large plantings of the past are already in fruiting.

"A large proportion of the old seedling groves have been recently budded to Navel [Bahia] and so are temporarily out of bearing.

"The Navel [Bahia] is more than ever in favor—all other varieties are out of the race, except Hart *Late* often called Valencia *Late* which is the necessary and best complement of the Navel, for with it the marketing season of the year is covered.

"Such specialties as the Tangerine orange and the pomelo (or grape-fruit) have obtained increased prominence. The pomelo last year *up* is now *down*, however. This may nevertheless be changed when the Seedless or some still better and now unknown variety shall reach the markets.

"In the past, the proportion of lemon trees, as compared with the orange in Riverside, was the merest fraction; there are now here several hundred acres of young groves already in bearing. These are of carefully chosen varieties and are yielding a product of the finest character. They are principally in the hands of large corporations, which have command of technical skill and sources of information which the handling of the lemon requires, and can do their own marketing.

"It is the writer's conviction that the lemon *industry* is destined to permanence and great magnitude. Corona, formerly known as South Riverside, has gone largely into the lemon business, and is pursuing it with much success—the same may be said of the production of the orange.

"In the newer districts of Moreno, Alessandro and Perris, and also in West Riverside the citrus industry has been established under favorable circumstances.

"In this county the fruit is yet generally free from the scale insects; the pest exists here rather as a threat, than as a generally prevailing nuisance, and is vigorously fought by the local Horticultural Board, supported by the citizens.

"I will not assume to report for districts beyond county limits."

The above report of Mr. J. E. Cutter was written before the close of 1898.

It is quite proper to add that the unprecedented drought which has prevailed through Southern California during the past two years has made so little change in the then prevailing conditions that no additional report seemed

necessary. The usual winter rains, when supplemented with reasonable irrigation have always produced results satisfactory to the fruit grower, but during the past two years such unusual conditions have obtained that the grower found himself somewhat unprepared to meet them—especially is this true of the present season.

At the close of last season (1898) Mr. Geo. C. Roeding, of Fresno, advised me that he would not be able to report on the "Tropical and Sub-Tropical Fruits" of his section. This declination to report the great raisin and fig industries of the State is exceedingly to be regretted; the more so as there is no person more familiar with the wonderful development of the raisin and fig conditions than is Mr. Roeding.

The continued ill health of Mr. J. S. Calkins, of Pomona, Cal., made it physically impossible for him to perform his duty as a member of the Committee and he asked to have his place filled by another appointment and after repeated trials no one could be induced to make a report.

Santa Barbara and Ventura counties and adjacent localities represented on the Committee by Leslie F. Gay, of Piru City, is as yet unreported, although great pleasure was expressed by Mr. Gay in being able to report the entire district.

I cannot adequately express my regret that no report has been made, as no section of the State has made a better record in lemon culture than portions of the territory under consideration; its range of products, considering the latitude, is somewhat remarkable, the section immediately under Mr. Gay's observation having never been known to have frost sufficient to injure citrus trees or even plants.

To enable me to make a report on the "Tropical and Sub-Tropical Fruits" of North California would require me to travel about two thousand (2,000) miles and to avoid it, I called to my assistance Judge John C. Gray, of Oroville, whose report on the fig industry is appended.

Mr. S. S. Boynton, of Oroville, reports the condition of the orange and lemon industry in the same section, which I also append hereto.

THE FIG IN BUTTE COUNTY.

REPORT BY JOHN C. GRAY, OROVILLE.

In 1889 I set out an orchard of fifty acres of White Adriatic fig. I selected foot-hill land, covered with a large growth of yellow pine and white oak trees, many of them two feet in diameter. There were also patches covered with quite a dense growth of chapparal. The soil was that usually found along the base of the Sierras, where the elevation is from five hundred to one thousand feet, and seemed to be a reddish loam, mixed with some gravel. Such land when cleared, and not cultivated, yields a small quantity of grass, fit for grazing purposes, about three months in the year. But cultivate the land at the proper season of the year, and it will yield a good crop of grain or hay every two years. I burned the oak stumps, but left the pine and in two years they had rotted so much that the plow took them all out.

Bedrock appeared at the surface in a number of places, but it seemed to be set edgewise, so that it was an easy matter to sink a crowbar into the land its full length, even close by the side of the bedrock. The trees were set thirty feet apart, as the tree grown on this kind of land does not attain

that growth found on the richer river bottom lands. There is the same difference between the fig tree grown on the red foot-hill land and that grown on the river bottom land that there is between oak trees grown in the two places. The foot-hills oak is clean, trim, has thin bark, while its neighbor on the river bottoms has thick, rough bark, is stocky, and has soft spongy wood that never makes a good hot fire like that which comes from the hilly land. As with the tree, so with its fruit. The foot-hill fig is by far the most delicious raised in the State. Perhaps a larger crop can be harvested from the bottom land trees, but it is so much poorer in quality as to attract the attention of a novice, while fig men will give them the go by at once in favor of the upland fruit. The largest dealer in figs in this State said to me a few days ago, "We have to bleach the lowland fig, but the upland finishes up bright enough for commercial purposes and at the same time retains the pure fig taste."

As I did not irrigate my trees they were driven to find moisture for themselves, and for two years I do not think they grew one foot in height, but they were not idle during that time. The roots were going down further and further into the red loamy land, until some of them are fully twenty feet beneath the surface and have a formation that resembles a corn broom, that collects all the moisture that the tree requires to bear its crop of figs. By not irrigating them, the fig grows almost round, very smooth, thin skinned, not easily hurt by intense heat, easily cured and has the pure fig flavor. But chiefest of all, should a heavy rain come on in September, before the crop is harvested, while many will fall and become covered with mud, yet this can easily be washed off, and the fig comes forth as bright and fresh as could be wished for. A very few will sour but not many, and the crop is but little, if at all, injured. Such at least has been the result on my place for the past three years.

My trees were two years old when I planted, or set them out. Last summer I cut away the extra wood, trimming them very severely, and cut away the lower branches so that I could plow around them, smooth the ground under the tree, and thus be able to harvest the crop without interference, and yet it is estimated that the crop will amount to fifty tons of dried fruit, while another year's crop ought to exceed one hundred tons. I plow the land in the winter once only; it is harrowed but once. With a drag, I smooth the ground under the trees, but this is done only after the spring rains are over. All persons know that hill land will not come up to weeds and grass and other vegetable growth as does the bottom land, and there is no need of going over and over the ground to kill weeds and grasses. One harrowing at the close of a rainy season, and no green things appear to mar the growth of the trees till the following winter's rain falls. It follows that the expense of taking care of a foot-hill orchard is much less than that on bottom land.

My orchard is planted on ground that has a gentle slope from the top of a hill to the creek in which there is water in summer only. The trees on the topmost part of the hill are the largest, finest looking, and most prolific bearers, and are the least affected by the severe frosts that once in awhile visit the place, and with this result before me, I shall plant further up the hill confident of getting my best results there. Were I to attempt to find water by sinking a well anywhere along the upper row of trees, I am confident I should not reach it till I had reached a depth of at least fifty feet, and perhaps not then; but that row of trees is the finest on the ranch.

The two largest fig orchards to be found in California, are in Butte county. There are a number of smaller ones, but whatever the size, there is no other crop that pays the grower as well. It is only within the past three years that the attention of fig men has been turned this way, and then only to find the best articles raised in the State. There is a large tract of this foot-hill land yet untilled that will raise just as good figs as those grown in my orchard, that will be soon set to trees of this kind, for the raising of figs is the most profitable business that we have in the fruit line. The trees are free from most of the pests that trouble other kinds of trees, and are prolific bearers, rarely missing a full crop, and the fruit always finds a ready market. It is a part of the history of this State, that many years ago acre after acre of fig trees were planted, and all grew with amazing rapidity. It is also true that when they came into bearing, more than half of the figs raised in any one year became sour and worthless save as food for stock, while a large part of the rest went to feed swine for want of a market, and as a result orchard after orchard was rooted up and the ground planted to other things. Within the past few years but very few fig trees have been planted. What is the result? Just as the good qualities of the fig came to be known and appreciated, and a good market opened for it, but few growers can be found. I am told that a sixty acre orchard is the largest in the State and that mine is the second in size, and this information comes from the largest dealer in figs. I am further told that there is no other state in the Union that can begin to compete with us in raising this fruit; that in no other is it raised as a source of profit, though in Arizona it grows well in very many places.

The lesson of where to plant the fig has been an expensive one, but like all others, it has been learned, and as a result, a number of men are on the lookout for lands on which to plant. They do not want to make any mistake this time, and they need not if they will closely observe the lands now raising this fruit, and select similar tracts for themselves. The foot-hills of Butte should be covered with this profitable tree, especially as new markets have been opened that will take tons of dried figs to supply. To such, let me say, that there are thousands of acres of land along the foot-hills of Butte that will raise just as good and as profitable fig crops, as that covered by the two largest orchards in the State.

THE ORANGE, LEMON AND OLIVE IN NORTH CALIFORNIA.

REPORT BY S. S. BOYNTON, OROVILLE.

The orange industry in the Sacramento Valley is attracting more attention every year because of the earliness of the fruit and because of the vast extent of territory in which the orange can be successfully cultivated.

The orange will thrive throughout the whole of this valley except in the lower and wetter portions. It does best however in the low foot-hills of the Sierra Nevadas and the Coast Range where the soil is a red clay mixed with gravel and where the drainage is almost perfect. Owing to the long dry summers of this region, it is necessary to irrigate this fruit freely and hence those sections where water is convenient for irrigation have taken the lead in orange growing. This is especially true in Butte, Placer, Yuba and Sacramento counties, all of which lie on the lower slope of the Western Sierras.

Oranges were planted in Butte county as early as 1855, but it was many years ere the fruit was considered anything more than a curiosity. In the latter part of 1885 and in the spring of 1886, efforts were made to plant orange trees upon a commercial scale. A company was formed in Oroville and twenty acres of oranges set out in the spring of 1888. From that time onward orange planting continued active, and today there are several thousand acres of orange trees in Butte county alone. Many of these trees are yet young, but the older trees now coming into bearing will yield this season fully 200 car loads of fruit.

The orange has done exceedingly well in the foot-hills of Placer and large shipments are being made from Auburn and other Placer towns.

In Yuba county the orange thrives well and one of the finest groves is in the open Sacramento Valley miles from the foot-hills.

In nearly all parts of this valley as in Glenn, Colusa, Yolo, Tehama, Sutter and Sacramento counties the orange and lemon do finely and in the future thousands of car loads of these fruits will be shipped from this part of the State. The orange gains its greatest perfection in the low foot-hills of the Sierras at an altitude of from 200 to 700 feet. Here the lemon grows luxuriantly although no large lemon orchards have been planted.

The orange is colored enough for successful shipment by the middle of November and by Thanksgiving large shipments are made. The steady and long continued heat of the summer and fall gives sweetness and earliness to this fruit and thus enables growers to obtain the cream of the market as to price.

The great northern markets are open to growers in this part of California while shipments are made east during the holidays in large quantities.

The orange requires much care, thorough tillage, plenty of manure and an abundance of water. If the tree is neglected, the fruit is valueless. Those who have grown oranges for several years are the most enthusiastic advocates of orange production and orange planting that can be found in this section. This indicates that to them the fruit has been profitable. No effort is being made by land owners to boom this industry, no advertising is being done to attract attention. The fruit is increasing each year and the shipments are multiplying. Within a few years at longest this part of California will force itself into prominent recognition as a great citrus region.

The olive in that part of California lying north of Stockton is destined to become a great industry. It is recognized by all that in the southern portion of the State this tree does exceedingly well, but it is not known that throughout the Sacramento Valley and its adjacent foot-hills up to an altitude of 1,500 feet that this tree grows rapidly and bears heavily. We have seen olive trees so loaded down with fruit that the branches drooped to the ground like a weeping willow. The tree is hardier than the orange, but the fruit is less so. An olive tree will bear several degrees more cold than the orange or lemon, but the ripening olive is injured more severely by the frost than either the orange or lemon fruit.

The olive grows in every county in Northern California with two or three exceptions. It does well in the low flat lands of the Sacramento and San Joaquin Valleys and thrives luxuriantly in the foot-hills of both the Sierras and the Coast Range.

Large quantities of the Mission olive are pickled but the Picholine is too small for profitable pickling and these two varieties constitute most of the olives heretofore planted.

The Picholine is pressed into oil and this oil like that of the Mission is being introduced into eastern markets.

Several olive mills have been established in Butte county alone and this holds true of other counties where the olive is extensively grown as in Placer and Yolo and some others.

The olive thrives so well under adverse circumstances, on dry lands, and with limited cultivation. that it is a favorite with many who are unable to give their trees the care they really need. With good cultivation this tree shows excellent results, giving larger fruit and heavier crops.

GENERAL VIEW OF CONDITIONS IN CALIFORNIA.

In the consideration of the subject—"Tropical and Sub-Tropical Fruits"—assigned to this committee, the largest share of attention has been addressed to the present condition and future prospects of those fruits more generally known and which, in their season, are found in almost every market of the United States, viz. the orange, lemon, grape-fruit, lime, olive, fig, raisin, almond, guava, persimmon and loquat.

There are many other fruits more nearly approaching the true tropical type (represented in the southern portion of the State especially) but in too limited quantities to suggest extended notice, but that many of them will ultimately figure in the commercial market will not for a moment be questioned.

The early American settlers in California found no orange trees except at Mission San Gabriel in the city of Los Angeles, and down to 1869 there were no groves of more than ten acres of bearing trees in the State, those being in the cities of Los Angeles and San Bernardino.

The first groves of citrus trees in San Diego county were planted early in 1869, but as there was no system of irrigation, people were timid in regard to planting fruits of which they had little or no knowledge, and it was not until 1887 when the great Sweetwater system of irrigation was finished that extensive plantings occurred: these were modest at first, but as the value of irrigation became better known, and the knowledge of when and how to use water was better understood, the planting of groves of oranges and lemons was rapidly extended till now a continuous grove of a thousand acres of lemon trees from three to five years old may be seen.

Orange trees amounting to thousands of acres are now growing where naught save brush and cacti grew, except where it was absolutely desert. In the early seventies and concurrent with the diversion of water from the Santa Ana river for domestic and irrigation purposes, a wonderful development of orange planting occurred at Riverside, at that time a portion of San Bernardino county, but now constituting a county by itself, and for more than fifteen years it was believed and claimed by its citizens to be the center of the true and only orange belt in California, and that it embraced, as indicated by its topography, about a dozen sections of land.

Until a very recent period the growers of citrus fruits in the southern section of the State stubbornly refused to admit the possibility of producing the orange or lemon in the northern section, except as a curiosity, and then under the most favorable conditions, but time has demonstrated the fact that oranges and lemons by hundreds of car loads are annually shipped from that section, which extends to within a hundred miles of the south line of the State of Oregon.

The citrus industry in nearly every locality where prosecuted has produced, is now producing and will continue to produce oranges and lemons equal to the best found in any market. Not all of the fruit is of that quality because in many instances inferior varieties have been planted, but these are fast being eliminated by budding to varieties of known excellence. Many mistakes have been made by planting too many varieties in one grove—the owner whereof had not sufficient fruit of any one kind to make it an object for a buyer to take except at a very low price. This error has largely been remedied by rebudding.

At first it was urged and argued that the budded tree was short lived and so firmly had the idea been fixed in many minds that the owner of the first twenty acre grove planted in San Diego county, said to me while the question was being discussed, "A seedling grove may reasonably be expected to be in its prime 800 years from planting, while the budded grove cannot be expected to live more than 400 years, so I will not plant budded trees." He has passed over—and the grove after being almost valueless for twenty-five years is now all transformed to Washington Navels, and this is only one of many instances.

All of this has been expensive but it shows progress.

It is but a few years since the first car load of oranges was shipped from this State and from that small beginning the exported product has reached fifteen thousand (15,000) car loads in a single year.

The unprecedented drought of the past two years has reduced the quantity exported and has postponed the planting of a vast acreage to citrus fruits—especially is this true of the present season.

The citrus fruit grower of California has many difficulties to encounter which are unknown to his Mediterranean competitor, and which result in reducing his profits. Although an import duty of about eighty-five (85) cents per box is charged against the foreign product, yet this is more than offset by difference in transportation to the same market and to this difference must be added the difference in the cost of labor required in cultivation, irrigation, and every process required in preparing the fruit for market.

In the Mediterranean country the common day laborer is paid from nine (9) to about twenty (20) cents per day, while with us he is paid from $1.25 to $1.50 per day. Must our labor be degraded to Mediterranean prices? Yet there are compensations for this disparity, in our improved methods and machinery as well as in the more elevated character of the laborer.

The California grower of citrus fruits has yet many things to learn before he will lay his fruit down in first class condition in markets more than three thousand miles distant, by rail transportation. Prominent among them is, careful handling of the fruit from the moment it is cut from the tree until it is loaded into the car for market, and after that, the absolute control of temperature in the car until its arrival at destination, and its immediate marketing. If the average grower would carefully consider all these things and then act upon them, I have no doubt that seventy-five per cent of the average loss by "breaking down" of fruit, would be avoided.

The prayers of every fruit grower on the Pacific coast are never ceasing that Congress will authorize the building of the Nicaragua canal by the government at the earliest moment possible—then will have arrived a time of such phenomenal development of fruit growing and such a reduction in eastern market cost that the poorest paid artisan or laborer may have on his table daily, luxuries, which are now seldom, if ever, tasted.

Every word which has been said in relation to citrus fruit growing may be said of the olive, which is now growing successfully in every county in the State. With the great canal built we may supply, in unlimited quantities, the pickled ripe olive, a food product equal in value, pound for pound, with beef or mutton, and at a much less price. The transportation of a barrel of olives from Spain to New York costs fifty cents, from California about six dollars by rail.

The lime is but little grown, as the cost is merely nominal in Mexico, where the lumber vessels carry large quantities of potatoes which are exchanged, sack for sack, for limes—this fact has killed the industry.

The almond production of the northern central part of the State is enormous, the quality excellent, the varieties numerous, the market good, and the industry prosperous.

The guava is more extensively grown in San Diego county than at any other point; it is extremely productive, easy to cultivate, and the results satisfactory.

The Japanese persimmon, of all the fruits one of the most delicious, is slow in coming into public favor, not only as a domestic product, but especially so when sent to eastern markets, and results, as a rule, have been unsatisfactory.

The loquat is a favorite jelly-making fruit in all districts where it is known, but its distribution is quite restricted.

I cannot express my regret at not being able to lay before the Society a more complete report, but the environment of the Committee has made it impossible and it is for this reason submitted in this unsatisfactory state.

F. A. KIMBALL,
Chairman of Committee.

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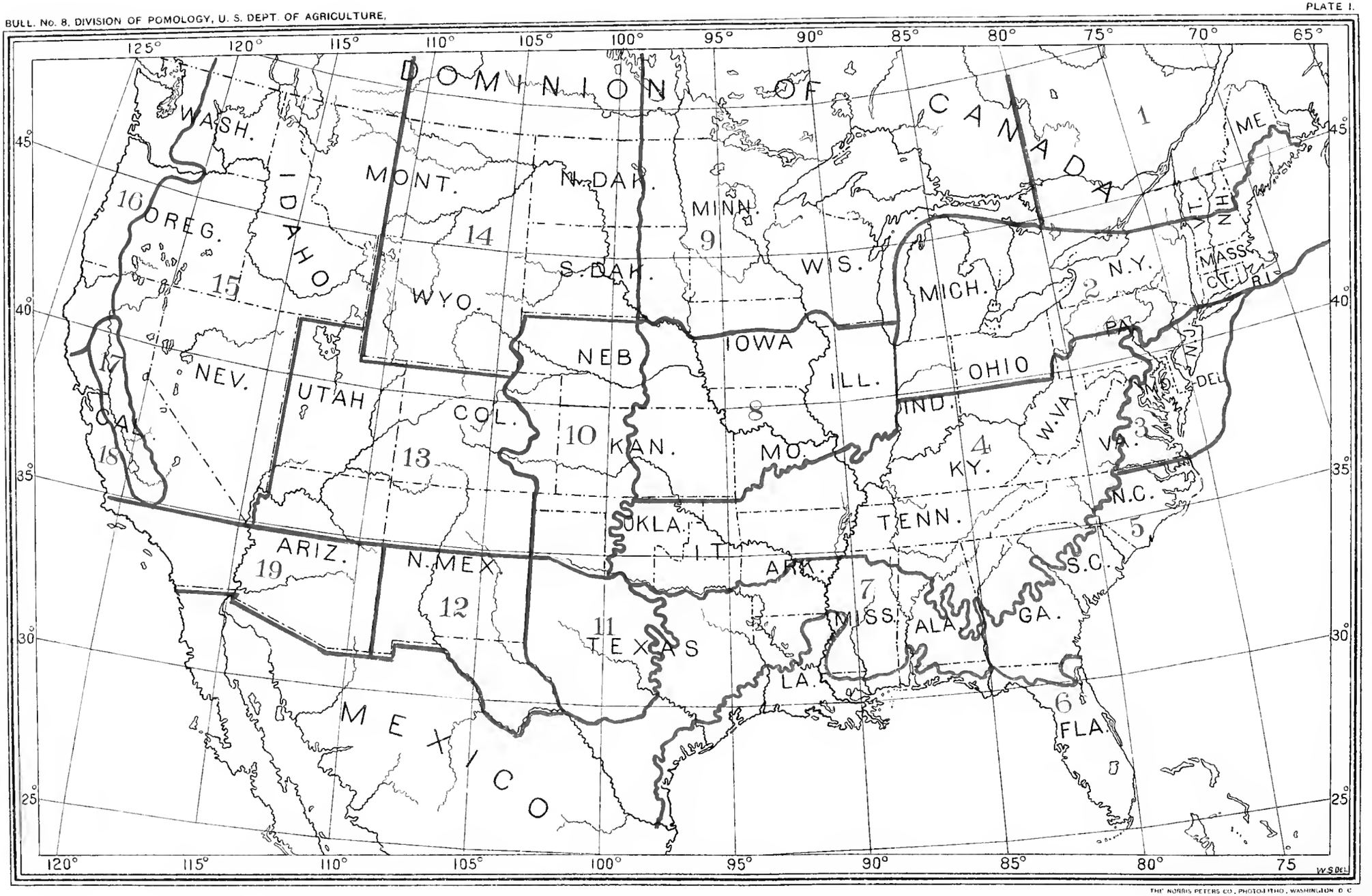
PART II

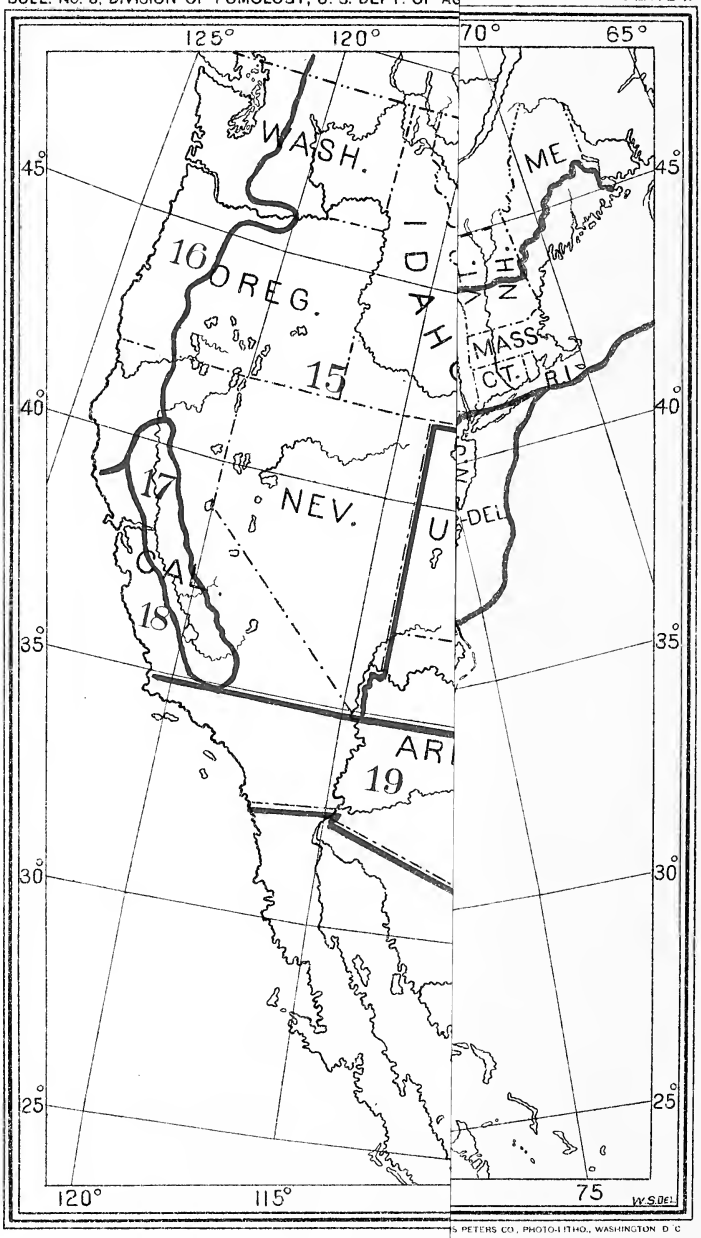
CATALOGUE OF FRUITS

1899



THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

MAP SHOWING POMOLOGICAL DISTRICTS.



BULLETIN No. 8.

U. S. DEPARTMENT OF AGRICULTURE.

DIVISION OF POMOLOGY.

G. B. BRACKETT, POMOLOGIST.

REVISED

CATALOGUE OF FRUITS

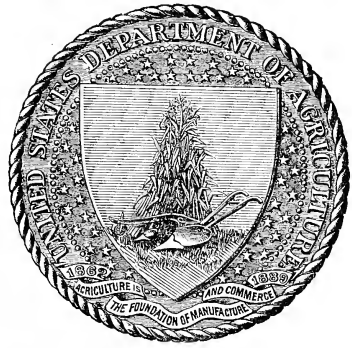
RECOMMENDED FOR CULTIVATION IN THE VARIOUS SECTIONS OF THE UNITED STATES AND THE BRITISH PROVINCES

BY THE

AMERICAN POMOLOGICAL SOCIETY.

REVISED BY A COMMITTEE OF THE SOCIETY,

W. H. RAGAN, CHAIRMAN.



WASHINGTON:

GOVERNMENT PRINTING OFFICE.

1899.

LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
DIVISION OF POMOLOGY,
Washington, D. C., June 15, 1899.

SIR: In my letter of transmittal of August 18, 1897, accompanying the matter embraced in Bulletin No. 6 of this Division, the mutual arrangement that had been entered into between the Department of Agriculture and the American Pomological Society was fully set forth. The relationship thus established still exists, and the bulletin has been carefully revised and compiled for publication under the joint auspices of the Society and the Division. I now, therefore, have the honor to submit to you this revision, and trust that you may authorize its early publication.

As heretofore this revision has been made by a regularly appointed committee of the American Pomological Society, of which Prof. W. H. Ragan is chairman, and Mr. T. T. Lyon, Prof. E. J. Wickson, Prof. C. S. Crandall, Mr. Silas Wilson, and Mr. L. A. Berckmans are members.

Owing to the varied conditions of soil, climate, and elevation of the Pacific coast region it was thought advisable to make a special investigation of the pomological conditions in that section, and Prof. E. J. Wickson, of California, was accordingly appointed a special agent of this division for that purpose, and to him special credit is due for his valuable services rendered.

While it is manifestly impossible to construct a general fruit list that will constitute an infallible guide to the planter, it is hoped and believed that this revised catalogue of fruits will be of service to him in the selection of varieties adapted to his own locality.

With the above explanations I have the honor to recommend the publication of this catalogue as Bulletin No. 8 of this Division.

Very respectfully,

G. B. BRACKETT, *Pomologist.*

Hon. JAMES WILSON,
Secretary of Agriculture.

In accordance with agreement, publication as recommended is hereby authorized.

JAMES WILSON,
Secretary of Agriculture.

CONTENTS.

ILLUSTRATION.

INTRODUCTION.

The Revised Catalogue of Fruits prepared under the joint auspices of the American Pomological Society and the Division of Pomology of the United States Department of Agriculture is herewith submitted.

In making this revision the chairman of the committee on revision has availed himself of the experience of his able predecessor, Hon. T. T. Lyon, and, through correspondence, of many practical pomologists. Many sources of information have been sought and repeated efforts have been made to secure accurate and conservative opinions on the merits of varieties and their adaptability to the several districts. But notwithstanding these efforts the chairman of your committee is aware that this revision is not without defects.

The highest aim and desire of your committee has been to present reliable data concerning the behavior of varieties in various sections of our country. If this desire has not been realized it has been largely due to the difficulties experienced in outlining districts sufficiently homogeneous in soil, climate, and other important features, and in securing responses to the numerous inquiries sent out to practical fruit growers. While these difficulties have been quite real, it is yet due the fruit growers to say that they are as a class very generous in giving out information gathered through their experience.

Actuated by a desire to make the work as reliable as possible and therefore a safe guide to planters and others seeking such information, the work of this revision has been done at Washington, where easy access could be had to the library and records of the Division of Pomology as well as opportunity for frequent consultations with the Pomologist and his corps of assistants. All uncertainties of origin, nomenclature, etc., have been carefully investigated with a view to arriving at correct conclusions.

The general plan of the Catalogue is based on that of its immediate predecessor, which was largely the work of that eminent pomologist, the former chairman of your committee on revision, Hon. T. T. Lyon, of Michigan. The districts have been somewhat changed in boundaries and increased in number, in order, if possible, to conform more closely to practical as well as scientific principles. The map has also been enlarged and the boundaries of the districts made more distinct.

In view of the lack of knowledge on the part of any but a resident expert concerning the behavior of varieties and the true status of fruit

growing in that section of our country bordering on the Pacific coast, Prof. E. J. Wickson, of the University of California, was appointed by the Pomologist to prepare that portion of the Catalogue which is embraced in districts Nos. 15, 16, 17, 18, and 19, and this revision is based almost wholly on his report. The thanks of your committee are extended to Professor Wickson for his valuable services.

The list of public-spirited fruit growers generously contributing assistance is too large to attempt individual acknowledgment, but on behalf of the Society and its committee, I feel bound to refer especially to the invaluable aid of Colonel Brackett and his able assistant, Mr. William A. Taylor.

Respectfully submitted.

W. H. RAGAN, *Chairman.*

PLAN OF THE CATALOGUE.

This catalogue embraces species and varieties of fruits and nuts recommended for cultivation in the United States and the British American Provinces. These are arranged alphabetically in three divisions, as follows:

Division 1. Species and varieties mainly adapted to culture in the Northern and Middle States of the Union and in adjacent portions of the British Provinces.

Division 2. More southern, tropical, and subtropical species and varieties.

Division 3. Species indigenous and introduced, not included in the foregoing, which have not deviated under cultivation so far from their original types as to have deserved varietal names.

Varieties known to succeed in a given district are indicated by an asterisk (*); if highly successful, by two asterisks (**); if considered promising, by a dagger (†); if tested and found undesirable, by a dash (—); and if not reported on, by a dotted line (. . . .). These conclusions are not, however, to be accepted as absolutely correct and infallible, but rather as reflections of the opinions and experiences of practical fruit growers within the district. On account of the extended range of the districts and of the varying soil and climatic conditions the above caution must be kept in mind in considering the recommendations made in this catalogue. No planter should attempt to follow its markings absolutely, but should rely rather largely upon the experience of others and a correct knowledge of his own location and environment within the district.

Following the rules and recommendations of the American Pomological Society (which see, p. 162), prefixes, suffixes, secondary words and apostrophic or possessive terminations, together with words whose significations are expressed in the descriptive columns, are eliminated from the names of varieties when not required to insure their identity, and such words when used are italicized. Synonyms are also italicized and included within parentheses. Foreign names of varieties are only anglicized in the interest of brevity or for convenience of pronunciation.

The entire territory represented is divided into nineteen pomological districts, with little regard to State or provincial boundaries, but with primary reference to the influence of latitude, elevation, prevailing

winds, and oceanic and lacustrine exposures upon their adaptation to pomological pursuits (see map).

Size and quality, as usually expressed in pomological phraseology, are stated in the tabulations of varieties upon the scale of 1 to 10, as follows:

Scale of size and quality.

Size.	Scale.	Quality.
Very small	1	Very poor.
Small	2-3	Poor.
Small to medium	3-4	Poor to good.
Medium	5-6	Good to very good.
Medium to large	7-8	Very good.
Large	8-9	Very good to best.
Very large	10	Best.

District No. 1.—Maine above 500 feet elevation; New Hampshire, Vermont, and New York north of latitude 44°; Ontario north of Lake Simcoe and east of longitude 80°; Quebec, New Brunswick, and Prince Edwards Island. The dominant natural feature of this district is the St. Lawrence Valley. Many of the hardier fruits flourish within its borders.

District No. 2.—Nova Scotia; Maine below 500 feet elevation; New Hampshire and Vermont south of latitude 44°; Massachusetts; Rhode Island; Connecticut; New York south of latitude 44°, except Long Island; northern New Jersey above 500 feet elevation; Pennsylvania east of the Susquehanna River and above 500 feet elevation, north of latitude 41° west to the Allegheny River, and all of that portion of the State lying north of the Ohio River; Ohio and Indiana north of latitude 40°; and the lower peninsula of Michigan. The Annapolis Valley of Nova Scotia, the North Atlantic coast, the lake region of western New York, Ohio, and Michigan, and the Hudson River Valley are the leading features of District No. 2. This may be considered the northern grape, peach, and winter apple district.

District No. 3.—Long Island; New Jersey, except a small portion north; eastern Pennsylvania below 500 feet elevation; Delaware; and Maryland and Virginia below 500 feet elevation. This is the Delaware and Chesapeake Bay district. Though a small district, its productive capacity is great of the fruits that succeed within its borders.

District No. 4.—Pennsylvania above 500 feet elevation and south of latitude 41°; Maryland, Virginia, North Carolina, South Carolina, Georgia, Mississippi, and Alabama above 500 feet elevation; West Virginia; Tennessee and Kentucky; Ohio and Indiana south of latitude 40°; southern Illinois below the general elevation of 500 feet, from the Wabash to the Mississippi; Missouri south of a line from near St. Louis and along the elevation of 1,000 feet to the southeast corner of Kansas;

Oklahoma below 2,000 feet elevation; Indian Territory; and Arkansas north of latitude 35°, also south of it wherever the elevation exceeds 500 feet. The Allegheny and the Ozark mountains and the valleys of the Ohio, the Tennessee, and the Cumberland, and portions of the Wabash, the Mississippi, and the Arkansas rivers are embraced within this district. Portions of it are noted fruit regions, while throughout its vast territory the hardier deciduous fruits flourish. Many of the varieties recommended succeed best in certain localities within the district. An exception to the general character of the district occurs in those portions of Kentucky, Tennessee, Arkansas, and southeastern Missouri lying near the Mississippi River, where varieties adapted to culture in districts 5 and 7 generally succeed.

District No. 5.—Eastern North Carolina, South Carolina, and Georgia below 500 feet elevation; and Florida north of latitude 30° east of the Chattahoochee River and above 100 feet elevation. This district embraces the southern Atlantic seaboard, with its many frith-like indentations and valleys. The climate is generally mild, and within its borders many of the more tender deciduous fruits flourish.

District No. 6.—Florida south of latitude 30°, and the remaining portions of the State with elevations below 100 feet, and those portions of Alabama, Mississippi, Louisiana, Arkansas, and Texas lying below the 100-foot contour line as it skirts the coast from Florida to the Rio Grande. This is the Southern Peninsula and the Gulf Coast district. The successful culture of citrous and other subtropical fruits and nuts is restricted to the peninsula portion of Florida and to the delta of the Mississippi. Tropical species are only recommended for that portion of Florida lying south of latitude 27°, and are indicated by the letter s in connection with the starring.

District No. 7.—Florida west of the Chattahoochee River and above 100 feet elevation, Alabama, Mississippi, Louisiana, and Arkansas above 100 and below 500 feet elevation; and Texas south of Red River and above 100 and below 1,000 feet elevation. This may be denominated the Valley district. It embraces portions of the Chattahoochee, Alabama, Pearl, Mississippi, Arkansas, Red, Sabine, Colorado, and Rio Grande valleys. The climate in the eastern and larger portion is warm and moist, in the extreme west more dry and tending toward aridity. A wide range of the more tender varieties and species is adapted to culture in the district.

District No. 8.—Illinois north of the 500-foot contour line as it crosses the State between 38° and 39° latitude; a small portion of southwest Wisconsin; Iowa south of about latitude 42° 30′; the Missouri River Valley portion of southeastern South Dakota; Nebraska and Kansas below 2,000 feet elevation; and Missouri north of a line drawn from near St. Louis and along the elevation of 1,000 feet to the southeast corner of Kansas. The Missouri and Mississippi valley sections of the district are its dominant features. The hardy deciduous fruits

succeed in most portions, and commercial fruit growing is a rapidly developing industry.

District No. 9.—Wisconsin except the southwest corner; Minnesota; upper Michigan; Iowa north of about latitude 42° 30′; North and South Dakota east of longitude 99°; and the British Provinces west of longitude 80° and east of longitude 99°. This district embraces the upper lakes including Winnipeg, the Upper Mississippi and the Red River valleys. Only the hardier fruits succeed, but fair progress has been made in recent years in developing varieties adapted to this region.

District No. 10.—Nebraska, Kansas, and Oklahoma above 2,000 feet elevation; Texas above 2,000 feet elevation and north of Red River and latitude 35°; also Colorado below 5,000 feet. This is the Central Plain and Foot Hill district. It lies on the eastern slope of the Continental Divide. There are small sections, especially in eastern Colorado, where the apple and other hardy fruits are very successfully grown.

District No. 11.—Texas above 1,000 feet and south of Red River and latitude 35° and east of longitude 103° and the Pecos and Rio Grande rivers. This may be accepted as an extension southward of District No. 10, with very similar conditions but a warmer and more southern climate.

District No. 12.—Texas west of longitude 103° and the Pecos River, and New Mexico south of latitude 35°. The Pecos and Rio Grande valleys are the characteristic features of this district. Considerable effort at growing fruit, especially the apple and the hardier *vinifera* grapes, is being made in many localities.

District No. 13.—New Mexico and Arizona north of latitude 35°; Utah; and Colorado above 5,000 feet elevation. This district embraces the Continental Divide and the Great Salt Lake, and it also embraces the valley and canyon of the Colorado and the sources of the important streams south of the Missouri and Yellowstone. It affords a great diversity of soils and climatic conditions, and hence a wide range of fruit growing. The species successfully grown within the boundaries of this district range from the *vinifera* grapes to the hardy iron clad apples.

District No. 14.—The Dakotas west of longitude 99°; Wyoming; Montana east of longitude 111°; and the British Provinces lying between longitude 99° and 111°. The upper Missouri and Yellowstone valleys are the distinctive features of the district. There is perhaps no section of the district in which fruit growing has reached a very high state of development. Leading causes of this condition may be found in the comparatively undeveloped, or unsettled, state of the country and its great elevation.

District No. 15.—British America west of longitude 111° and east of longitude 122°; Montana west of longitude 111°; Idaho; Nevada; and Washington, Oregon, and California east of the general coast con-

tour line of 1,000 feet elevation, commencing at the British boundary near longitude 122° and southward on said elevation to its intersection of the Southern Pacific Railway in the Upper Willamette Valley, thence along the line of said railway to the Sacramento Valley, thence east and south on the eastern rim of said valley and that of the San Joaquin at an elevation of 1,000 feet to latitude 35°, thence east on said latitude to the Colorado River. The characteristic features of this district are the Upper Columbia Valley and the Sierra Nevada Mountains. An exception to the general recommendation will appear in certain portions of Snake River Valley, where the *vinifera* grapes and other tender fruits succeed.

District No. 16.—The coast section of British America west of longitude 122° and of Washington, Oregon, and California north of about latitude 39° 30′, and bounded on the east by Districts Nos. 15 and 17. This district embraces the highly developed fruit-growing sections on Puget Sound, the Lower Columbia, and the Willamette.

District No. 17.—The Sacramento and San Joaquin valleys, bounded on the east by District No. 15 and on the west by the western rim of this great interior basin. The diversified fruit and nut products of this district are marvelous. There are localities in which the semi-tropical species and others in which the apple, pear, and other hardy fruits and nuts are grown to the highest perfection.

District No. 18.—The coast section of California lying between latitude 35° and about 39° 30′ and bounded on the east by District No. 17. Its characteristic features are the Coast Range of mountains, the Russian River, the Sonoma, the Santa Clara, and the Pajaro valleys.

District No. 19.—California and Arizona south of latitude 35°. The dominant characteristics are the valleys of the Gila, the Colorado, the San Gabriel, and the Santa Ana and the Sierra Madre mountains. It includes the celebrated fruit districts of Santa Ana, Riverside, Santa Barbara, the Salt River Valley, San Diego, and many others.

Districts 16, 17, 18, and 19 are peculiarly adapted to fruit and nut culture. Perhaps no portion of the earth's surface is more highly favored in climate and soil and affords a wider range of crop products than that lying within the boundaries of these four districts. The commercial value of the fruit and nut products of this section are already felt and recognized the world over.

REVISED CATALOGUE OF FRUITS.

Division I.—FRUITS MAINLY ADAPTED TO NORTHERN LOCALITIES.

This division includes such cultivated species, commonly designated "hardy" fruits and nuts, as have developed distinct varieties which are propagated on a commercial scale by some of the various methods of bud propagation.

Section 1.—APPLES. (Pyrus.)

SUBSECTION 1.—CRABS. (*P. PRUNIFOLIA.*)[1]

[KEY.—Size, scale 1 to 10: 1, very small; 10, very large. Form: c, conical; i, irregular; o, oblate; ob, oblong; ov, ovate; r, round. Color: d, dark; g, green; r, red; ru, russet; s, striped; w, white; y, yellow. Flavor: a, acid; m, mild; s, sweet. Quality, scale 1 to 10: 1. very poor; 10, best. Season: e, early; m, medium; l, late; v, very. Use: c, cider; d, dessert; k, kitchen; m, market. Abbreviations of names of places of origin: Am., America; Eng., England; Eur., Europe; Fr., France; Ger., Germany; Holl., Holland; Ont., Ontario; Rus., Russia; Scot., Scotland.]

Name.	Description.								Districts and starring.																		
	Size.	Form.	Color.	Flavor.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Ball *Winter*	5	r	wy	.....	5-6	vl	k	Vt....	*	....	....	....	....	....	....	....	**	....	....	....	....	....	....	....	....	....	....
Beach	7	r	r	s	5	em	km	Am....	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Brier	7	r	r	s	5	em	km	Wis..	....	....	....	....	....	....	....	*	*	....	....	....	*	....	....	....	....	....	....	....
Elgin	7	rob	yr	a	6	l	km	Ill....	*	*	....	*	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....
Excelsior	8	ro	yrs	a	6	e	k	Minn.	....	*	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....
Gibb	6	o	yr	a	9	e	k	Wis..	**	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Hyslop	6	r	r	a	3	em	km	Am....	*	**	**	**	....	*	*	**	**	**	....	....	*	*	....	....	....	....	....	....
Island Gem	6	r	r	.....	7-8	m	dk	Vt....	*	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Jumbo	10	ob	ry	.....	10	l	dkm	Vt....	*	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Marengo	6	ro	yr	a	3-4	l	km	Ill....	*	**	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....
Martha	5	o	yr	a	5-6	e	km	Minn.	**	**	....	....	....	....	....	**	....	....	....	....	*	*	....	....	....	....	....	....
Minnesota	10	ob	yr	a	5	l	km	Minn.	**	*	....	....	....	....	....	....	....	†	....	....	*	†	....	....	....	....	....	....
Montreal	8	rob	yr	a	3-4	ml	ckm	Am....	*	*	**	....	....	....	....	....	....	*	....	....	*	*	....	....	....	....	....	....
Orange	5	r	y	.....	3-4	l	k	Am....	*	*	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Pringle *Sweet*	5	ro	rs	s	8	m	dkm	Can....	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Queen *Choice*	5	r	r	.....	7-8	l	km	(?)	*	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Red Siberian	4	rob	r	m	3-4	e	k	Fr....	**	*	*	*	*	....	....	*	....	....	....	....	*	....	....	....	....	....	....	....
Stanstead, *Rose of*	5	ob	r	.....	10	l	k	Can..	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

Transcendent	7–8	r	yr	a	5–6	e	km	Am...	*	**	*	**	*	*	*	*	....	**	....	....	*	*	....	....	....	....	....
Van Wyck	8 9	rc	wr	s	4–5	e	d	N. Y..	*	**	....	*	....	....	....	....	....	....	....	....	*	*	....	....	....	....	....
Whitney	8	rc	r	m	8–9	em	dkm	Ill....	*	**	*	*	....	*	*	**	....	....	....	....	*	....	....	....	....	....	....
Yellow Siberian	5	r	y	a	3–4	e	km	Am...	*	*	**	*	....	....	....	*	....	*	....	....	*	*	....	....	....	....	....

[1] Includes such possible hybrids as strongly manifest Crab parentage.

SUBSECTION 2.—APPLES. (*P. MALUS.*)

Alexander	9–10	oc	yrs	a	5	m	km	Rus...	*	*	*	*	....	....	—	....	—	—	....	....	**	....	*	....	*	*	....
Anisim	4–5	rc	yr	m	7	m	dm	Rus...	....	....	....	....	....	....	....	†	*	....	....	....	....	....	....	....	....	....	....
Antonovka	6	ovc	y	ma	7	m	km	Rus...	*	†	....	....	....	....	....	*	*	....	....	....	....	*	....	....	....	....	....
Arctic	7–8	rc	yr	.....	8	l	km	N. Y..	†	†	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Arkansas (*Arkansaw, Mammoth Black Twig*)	7–8	ro	yr	m	7–8	l	km	Ark..	*	*	**	**	†	*	**	*	....	*	*	....	†	....	*	†	†	†	*
Arnold	5–6	o	yr	m	5–6	l	dm	Ont...	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Autumn Bough	5–6	rc	gy	s	5–6	m	d	Am...	....	*	—	*	....	....	....	*	....	*	....	....	*	....	....	....	....	....	....
Autumn Swaar	6–7	rc	yrw	m	5–6	em	d	Am...	....	*	....	*	....	....	....	*	....	....	....	....	....	....	*	....	....	....	....
Babbitt (*Western Baldwin*)	5–6	r	r	.....	5–6	l	dkm	Mo....	....	....	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....
Bailey *Sweet*	8–9	r	r	s	7–8	l	dm	N. Y..	**	**	—	**	....	....	....	*	....	*	....	....	**	....	*	....	....	....	....
Baker	8–9	roc	yr	m	5–6	l	em	Conn..	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Baldwin	7–8	roc	yr	m	5–6	l	km	Mass..	*	**	*	*	....	....	....	....	....	*	....	....	*	....	**	**	†	**	**
Beach (*Richardson's Red, Apple of Commerce*)	7–8	ob	r	.....	9	vl	m	Ark..	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Belmont (*Waxen*)	6–7	rc	yr	m	9	l	d	Pa....	....	*	—	*	....	....	....	—	....	....	....	....	....	....	....	*	....	....	....
Belle Bonne	7–8	rov	gy	.....	8–9	l	km	Fr....	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Ben Davis	6–9	rov	yrs	m	4–5	l	m	Ky...	*	**	*	**	*	....	*	**	....	**	....	**	**	†	**	**	....	**	**
Benoni	4–5	ro	yrs	m	8–9	e	d	Mass..	....	**	**	**	....	....	*	**	....	*	....	**	....	....	....	....	....	....	....
Bentley	5–6	ra	ygr	s	5–6	vl	k	Va....	....	*	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Bethel	7	oc	ys	.....	8–9	l	m	Vt....	*	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Bietigheimer	8–10	oc	wgr	m	4	em	m	Ger..	†	*	*	*	....	....	....	*	....	....	....	*	†	†	....	....	....	....	....
Black, *Jersey*	5–6	ro	dr	m	4–5	l	d	N. J..	....	*	....	*	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....
Bledsoe	7–8	o	s	.....	7	me	km	Tex....	....	....	....	....	....	....	*	....	....	†	....	....	....	....	....	....	....	....	....
Blenheim	8–9	roc	yrs	ma	4	ml	km	Eng..	*	*	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....
Blue Pearmain	8–9	rc	drs	m	6	l	dm	Am...	**	*	....	*	....	....	....	*	....	....	....	....	....	....	*	....	....	....	....
Bogdanoff	6–7	ov	ry	.....	6–7	l	dkm	Rus..	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Bonum	5–6	o	yr	m	6	ml	d	N. C..	....	—	*	**	**	....	*	....	....	....	....	....	....	....	....	....	....	....	....
Borovinka	6	rob	yrs	ma	7	em	km	Rus..	*	*	....	....	....	....	....	†	†	....	....	....	....	....	....	....	....	....	....
Bough, *Sweet*	7–8	rc	y	s	7–8	e	d	Am...	*	**	*	**	*	—	*	**	....	....	....	*	....	†	....	....	....	....	....
Bradford (*Kentucky Redstreak*)	5–6	rc	yrs	m	4	l	dm	Tenn..	....	—	*	*	....	....	*	**	....	....	....	....	....	....	....	....	....	....	....
Broadwell	6	oc	yr	s	7	l	dk	Ohio..	....	*	....	*	....	....	*	**	....	....	....	*	**	....	....	....	....	....	....
Bryan, *Mrs.*	7–8	c	or	.....	9	me	dkm	Ga....	....	....	....	....	....	....	*	....	....	....	....	....	**	....	....	....	....	....	....
Buckingham (*Fall Queen*)	6–8	oc	gyr	m	7–8	l	km	Va....	....	*	....	**	**	....	**	*	....	....	....	....	....	....	....	....	....	....	....
Bullock (*American Golden Russet*)	3–4	oc	yru	m	8–9	l	d	N. J..	....	....	....	*	....	....	....	....	....	....	....	*	....	....	....	....	....	....	....
Buncombe (*Red Winter Pearmain*)	5–6	robc	wyr	m	4–5	ml	dm	N. C..	....	*	*	**	*	....	*	*	....	....	....	*	....	†	....	....	....	....	....
Camack	5–6	rc	yrg	s	4	l	dk	N. C..	....	....	....	*	—	....	—	....	....	....	....	....	....	....	....	....	....	....	....
Canada Baldwin	5–6	rov	r	.....	5–6	l	k	Can...	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Canada Reinette	7–8	oci	gru	m	7–8	l	dm	Fr. ?..	*	*	—	....	....	....	....	*	....	....	....	*	....	....	....	....	....	....	....
Cannon *Pearmain*	5–6	rc	yrs	m	4–5	vl	dm	N. C..	....	....	....	*	....	....	....	**	....	....	....	*	....	....	....	....	....	....	....
Carlough	7–8	rc	gy	.....	5–6	l	m	N. Y..	....	....	....	†	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

Section 1.—APPLES. (Pyrus.)—Continued.

Subsection 2.—APPLES. (*P. MALUS.*)—Continued.

Name.	Description.								Districts and starring.																	
	Size.	Form.	Color.	Flavor.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Carolina Beauty	5–6	rob	dr	.....	7	l	km	N. C	....	....	....	*	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Carter Blue	6–7	ro	gr	m	5–6	m	d	Ala	....	....	....	**	*	....	*	....	....	....	*	....	....	....	....	....	....	....	....
Champlain (*Nyack*)	7	rob	yr	m	5–6	em	dm	N. Y	—	*	*	....	....	....	*	*	....	....	....	....	....	....	....	....	....	....	....
Charlamoff	5–6	rc	grs	a	6	e	dm	Rus	....	....	....	....	....	....	....	*	*	....	....	....	....	....	....	....	....	....	....
Chenango	6–7	obc	yr	m	8	e	dm	N. Y	....	**	*	*	*	....	....	**	....	*	....	....	**	....	....	....	....	....	....
Christmas	4–5	r	yrs	a	6	m	dk	Rus	....	....	....	....	....	....	....	....	†	....	....	....	....	....	....	....	....	....	....
Clark Pearmain	5–6	roc	gyr	m	5–6	m	dm	N. C	....	....	....	....	*	....	*	....	....	....	....	....	....	....	....	....	....	....	....
Clayton	6–8	oc	yrs	m	6–7	vl	km	Ind	—	*	....	*	....	....	....	*	....	....	....	....	*	....	....	....	....	....	....
Clyde *Beauty*	6–8	roi	gr	m	4	l	m	N. Y	....	*	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....
Cogswell	7–8	ro	yr	m	7	l	dm	Conn	—	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Collins (*Champion*)	6	o	s	.....	7	l	m	Ark	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Colton, *Early*	5–6	r	y	.....	7	e	d		....	....	....	*	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Cooper	8	roi	yrs	m	4	m	m	Am.?	....	*	**	*	....	....	....	**	....	*	....	....	**	....	....	....	....	....	....
Cooper Market	5–6	oc	yrs	m	4	l	m	N. J	*	*	*	....	....	....	....	*	....	*	....	....	*	....	....	....	....	....	....
Cornell *Fancy*	5	obc	yrs	m	6–7	em	d	Pa	*	*	....	*	....	....	*	*	....	....	....	....	....	....	....	....	....	....	....
Cracking	7–9	roc	yr	m	4	m	k	Ohio	....	....	....	*	....	....	*	*	....	....	....	....	....	....	....	....	....	....	....
Cross	5	obc	yr	m	6	m	km	Rus	....	....	....	....	....	....	....	....	†	....	....	....	....	....	....	....	....	....	....
Cullasaga	6–7	rc	yr	m	4	l	m	N. C	....	....	—	**	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....
Danvers *Sweet*	5–6	rob	y	s	5–6	l	km	Mass	....	*	....	*	....	....	....	*	....	....	....	....	*	....	....	....	....	....	....
Derby	6–7	i	r	.....	7–8	l	dm	Vt	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Domine	6–7	o	gyr	m	5	l	m	N. Y	*	**	*	*	....	....	*	**	....	....	....	....	**	....	....	....	....	....	....
Donneghan	5–6	r	wrg	s	7–8	me	dkm	Vt	*	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Doyle	8	.....	.....	.....	.....	me	.....	Tex	....	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....
Dutch Mignonne	5–6	roc	yr	m	4–5	l	dk	Holl	....	—	....	....	....	—	....	*	....	....	....	....	*	....	†	....	....	....	....
Dyer (*Pomme Royal*)	5–6	r	yr	m	9–10	em	d	Fr.?	....	**	....	....	....	....	....	**	....	....	....	....	*	....	....	....	....	....	....
Early Cooper	5–6	ro	yr	m	5	e	m	Am	....	—	....	*	....	....	*	*	....	*	....	....	*	....	....	....	....	....	....
Early Harvest	5–6	ro	yw	ma	9	ve	dk	Am	*	**	*	**	*	....	*	**	....	*	....	*	**	....	**	*	*	....	*
Early Joe	3–4	oc	yrs	m	8–9	e	d	N. Y	....	**	*	*	*	....	*	*	....	....	....	....	....	....	....	....	....	....	....
Early Pennock	7–8	rc	yr	m	4–5	e	km	Am	....	*	*	*	....	....	*	*	....	....	....	....	*	....	....	....	....	....	....
Early Ripe	5–6	ro	y	m	3–4	e	dm	Pa	....	—	**	*	*	....	....	*	....	....	....	....	*	....	....	....	....	....	....
Early Strawberry	3–4	rc	yrs	m	6–7	e	dm	N. Y	*	**	**	*	*	—	*	*	*	*	....	....	....	....	....	....	....	....	....
English Russet	5–6	rc	yru	m	5–6	vl	m	(?)	*	*	**	*	*	....	*	*	....	....	....	....	**	....	....	....	....	....	....
Esopus *Spitzenburg*	6–8	obc	r	m	10	l	d	N. Y	....	**	—	*	....	....	*	—	....	*	....	....	**	....	**	**	*	*	....
Evening Party	4–5	o	yrs	m	5–6	l	d	Pa	....	*	—	*	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....
Ewalt	8	rc	yr	m	4–5	l	k	Pa	....	*	....	*	....	....	....	....	....	....	....	....	*	....	....	....	....	....	....
Fallawater (*Tulpehocken*)	9–10	rc	ygr	m	6	l	m	Pa	....	*	**	*	....	....	....	*	....	*	....	....	**	....	....	....	....	....	....
Fall Harvey	7–8	roi	yr	m	4–5	m	dk	Mass	*	**	....	....	....	....	....	....	....	....	....	....	*	....	....	....	....	....	....
Fall Jenneting	7–8	oic	yr	m	3–4	m	m	Conn	*	*	....	*	....	....	....	....	....	*	....	....	*	....	....	....	....	....	....

Fall Orange	8-9	r	yr	ma	3-4	m	k	Mass					*			**														
Fall Pippin	7-9	roc	yr	m	9	m	dk	Am	*	*	**	**	—			*		*		*	**		**							
Fall Wine	5-6	ro	yr.	m	8-9	m	d	Am	—	*	**	*	*			**					*									
Fameuse (*Snow*)	5-6	ro	yrs	m	8-9	m	dm	Fr. ?	?	**	—	*				**		?			**		*							
Family	5-6	oc	yrs	m	5-6	em	d	Ga				*	*			*					*									
Fanny	7-8	roc	rs	m	5-6	e	m	Pa		**	**	**			*	*			*											
Farrar (*Robinson Superb*)	7-8			m	4	e	dm	Va				*			*															
Fink	3-4	o	wyr	m	4-5	vl	m	Ohio		—		*				*					**									
Foundling	8	rov	rs		7-8	ml	dkm	Mass		*																				
Fulton	6-7	o	yr	m	7-8	ml	dm	Ill		—	—	*				**					**									
Gano	7-8	oi	yrs	m	5-6	ml	m	Tenn. ?	*	*	*	**	*		**	**	†	*	*		**		**	†						
Garden Royal	4-5	roc	yrs	m	10	e	d	Mass		*						*														
Garfield	7-8	oc	grs		8-9	l	dkm	Ga								†	†													
Garrettson	5-6	rc	y	m	4	e	k	N. J		—	*		*		*															
Gideon	5-6	rc	y	a	5	e	k	Minn	**	**		*				†	†				**	**								
Gilbert	7-8	ob	r		6-7	l	km	Tenn				*																		
Gilpin (*Little Red Romanite*)	4-5	rob	ry	ma	4-5	vl	kc	Va		*	*	*				*					*									
Glass Green	5-6	ov	ys		4	me	km	Rus								†	†													
Golden Russet (N. Y.)	4-6	ro	yru	m	5-6	vl	dm	Eng	*	**	—	*				*	*				*			*						
Golden Sweet	6-7	ro	y	s	5-6	e	dk	Conn		**	*	*				**					**			†						
Golding (*Ameriean Golden Pippin*)	6-8	roc	yr	m	5-6	m	dk	Am	—	*		*				*					*									
Gravenstein	8-9	oi	yr	ma	8-9	em	dkm	Ger	**	**	**	**				*		*			*		**	**	**	*	**			
Green Cheese	5-6	oi	gy	m	7-8	l	km	Tenn			*	*	*		*															
Green Newtown	5-6	ri	gr	ma	8-9	vl	dkm	N. Y		*		*				*														
Green Sweet	5-6	roc	gr	s	6-7	l	k	Mass	*	**																				
Grimes *Golden*	5-6	roc	y	m	9-10	l	d	Va	*	**	**	**	*			**	†	*		**	**		**							
Haas (*Fall Queen, Gros Pomier*)	5-7	oc	gyr	m	4-6	em	km	Mo	**	*	*					*	*	*			**		—							
Hagloe	6-8	rc	gyr		6	e	mk	Am			*	*																		
Hall	3-4	oc	r	m	6-7	ml	d	N. C		—		*	*		*	*														
Heslep	3-4	rc	yr		6-7	l	mk	Ga				*	†																	
Hewes (*for eider only*)	3	r	rgy	a	2	m	c	Va		*		*	*								*									
Hibernal	5-7	obc	rs	a	3-5	m	km	Rus	**								*				*	**								
Hightop *Sweet*	4-5	r	y	s	5-6	e	d	Mass		**		*				*					*									
Hockett	5-6	ro	yrs	s	3-4	l	m	N. C				*	*		—															
Hoover	6-8	ro	y s	m	5-6	l	km	S. C				*	—			**								*		*	*			
Hopewell	8	o	s		8	e	km	Mo				†				*														
Horn	4-5	o	yrs	m	3-4	l	m	Ga				*	*																	
Horse	7-8	r	yrs	m	4-5	e	mc	N. C			*	**	*		**	**														
Hubbardston	7-8	rov	yrs	m	8-9	l	dm	Mass	*	**	**	*				**		*			**		†							
Hunge	8-9	ro	yrs		8	ml	dkc					*	*																	
Hunt *Russet*	4-5	roc	yru	m	7-8	l	d	Mass	*	**			—																	
Huntsman	7-8	oc	yr	m	6-7	l	dm	Mo				*				**		*		*	*									
Ingram	7	o	s		9	e	dm	Mo				†				*														
Irish Peach	6	c	ywr		7-8	me	km		*	*																				
Isham *Sweet*	7-8	rob	r		5-6	l	km	Wis								*														
Jacobs Sweet	7-8	r	yr	s	7-8	l	dm	Mass		*																				
Jefferis	5-6	oc	yrs	m	8-9	e	d	Pa		**	*	**			*	**		*		*	**		**							
Jersey Sweet	5-6	roc	yrs	s	8	em	dk	N. J		*	—				*	*					**									
Jewett *Red* (*Nodhead*)	5-6	ro	grs	m	6-7	l	d	N. H	*	**	—		*		*	*														
Jonathan	5-6	rc	yr	m	8-9	l	dkm	N. Y		**	*	**	*		*	**		**		**	**		**	**	*		**			
Judson	7-8	c	grs		4	me	km	Minn								†	†													
Julian	6-7	rc	wrs		4-6	e	d	N. C			*	*	*																	

Section 1.—APPLES. (Pyrus.)—Continued.

Subsection 2.—APPLES. (*P. MALUS.*)—Continued.

Name.	Description.								Districts and starring.																		
	Size.	Form.	Color.	Flavor.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
July, *Fourth of*	4–5	roc	wyr	m	3–4	ve	cm	Ger		—	**	*				—											
Junaluskee	5–6	ro	y	m	4–6	l	d	N. C				*	*														
Kaump	6–7	r	y		7	l	km	Wis								†	*										
Kent *Beauty*	8–9	ro	gyr	m	3–4	m	k	Eng	*	—		*				*											
Kernodle	7–8	rob	ys		7–8	vl	dm	N. C				†	*														
Keswick	6–7	ci	gyr	a	5–6	cm	k	Eng	*	*	**	*				*		*			**		†				
Kinnard	5–6	oci	yr	m	5–6	l	dk	Tenn		*	**	*	*		**	†											
Kirkbridge	4–5	obi	yro	m	3–4	c	km	Am		*		*				*					*						
Krauser	5–6		rs		6	vl	dk	Pa		†		†															
Lady	1–2	o	yr	m	6–7	l	dm	Fr		*	—	*	*								*						
Lady Sweet	7–8	rob	ygr	s	6–8	l	dk	N. Y	*	*	*	—									*						
Lankford	7–8	rc	grc		7–8	l	dm	Md			*	*	*														
Lansingburg	5–6	ro	yr	m	3–4	vl	m	N. Y		*	*	*				*					*						
Late Strawberry	5–6	rc	wrs	m	5–6	m	d	N. Y	*	*		*	*			*		*			*		*				
Lawver	7–8	ro	r	m	5–6	vl	dm	Mo	*	*	*	*			*	—		*			**		**	†			
Lehigh *Greening*	6–7		y		6–7	vl	dkm	Pa		†		†															
Lilly *of Kent*	7–8	orc	g		7–9	e	dm	Del			*																
Limbertwig	6–7	roc	gyr	m	3–6	vl	m	N. C		*	*		*		—	*		*			**						
Longfield	5–6	rc	y	m	4–5	e	k	Rus	**	*		†				*	*										
Louise, *Princess*		ro	we		5–6	l	d	Ont	†	*																	
Lowe	8–9	ob	y	m	6–7	e	km	Am				*	*														
Lowell	8–9	ob	y	m	7–8	e	km	Am		*	*	*				**					*						
Lowland *Raspberry*	6	r	ys	m	4–5	e	km	Rus									*										
McAfee	7–8	ro	ygr	m	5–7	l	m	Ky	—	—	*	*	*								*						
McCuller	7–8	ro	r		6–7	l	dm	N. C				†	*														
McIntosh	6–7	ro	nyr	m	5–6	ml	dm	Ont	**	**	†	*				*	†						*				
McLellan	5–7	roc	yrs	m	5–6	m	d	Conn		*	*					*											
McMahon	8–9	ro	yr	m	4–5	m	dm	Wis	**	*						*	*	*			**	*	*				
Magog *Red Streak*	7–8	rob	yrs		7–8	l	dkm	Vt	*																		
Maiden Blush	5–6	o	yr	m	5–6	e	km	N. J		**	*	**	*		*	**	*	*	*	*	**		*				*
Malinda	6–7	rc	yr		5–6	vl	dkm	Vt	*								*										
Mangum (*Gulley*)	5–6	oc	yrs	m	6–8	m	d	Ala	—	—		*	*								*						
Mann	6–7	ro	yg	m	4–5	vl	mk	N. Y	*	**	*	*				*		†			*	*	*				
Margaret, *Early Red*	5–6	ro	yr	m	5–6	e	d	Eng		—	**	**	*			**					*						
Mason Stranger	5–6	o	yr	m	5–6	l	d	Va			**		*														
Maryland *Maiden Blush*	4–6	rc	yr		7–8	ml	mk	Md			*	†	*														
Mattamuskeet	5–6	roc	yr	m	3–4	l	k	N. C			*		*														
Maverack	7–8	ro	yr	s	4–6	l	mk	S. C					*		*												

Melon, *Norton*	6-7	roc	yrs	m	7-8	l	dm	N. Y.		*	—	*				—															
Millboy	6-7	rc	r		6-7	me	d	W. Va				†																			
Milwaukee	7-8	ro	yrs		5-6	l	km	Wis								*	*														
Minister	7-8	oc	yrs	m	5-6	ml	dm	Mass		*		*				*															
Minkler	6-7	rc	gyr	m	6-8	l	m	Pa				*				**					*										
Missouri *Pippin*	5-6	rc	yrs	m	3-4	l	m	Mo			*	*	—			**		**		**	**		*								*
Monmouth (*Red Cheek Pippin*)	7-8	oc	yr	m	6-8	l	dm	N. J		—		*				*							*								
Moore Sweet	5-6	ro	r	s	5-6	l	k	Am		*		*				*															
Mother	5-6	rc	yr	m	8-9	ml	d	Mass		*	—	*	*			*							*								
Munson	5-6	o	yr	s	5-6	ml	k	Mass	†	**		*																			
Nansemond	5-6	roc	yrs	m	4-5	l	dk	Va			**	†	*			*															
Nero	5-6	ro	r		5-6	l	km	N. J ?			**					†															
Newell	7-8	rob	yrs		5-6	l	km	Wis									*														
Newtown Spitzenburg	5-6	oc	yrs	m	7-8	l	d	N. Y		*			*			*					*		*								
Nickajack	8-9	oc	yrs	m	4-5	l	m	Ga	—	*		—	*	†	—	*					*										
Northern Spy	8-9	roc	yrs	m	8-9	ml	dkm	N. Y	**	**	—	*			—	*	—				*					**	**				
Northfield	5-6	ro	rys		6-8	me	dkm	Vt	*																						
Northwestern *Greening*	8-9	rc	gy	m	6	l	km	Wis	†	*		†				*	*	*			*	†									
Nottingham *Brown*	8	ob	yr		8	l	dkm	Pa		†	†	†																			
Noyes, *Doctor*	6-7	ro	ry		8	e	mdk	Am			*	†																			
Oconee	8-9	ro	yr	m	4-5	m	dk	Ga		—	*	*	*		—																
Ogle (*Winter Snow*)	5-6	ro	r		7-8	vl	dkm	Ill									*														
Ohio Nonpareil	7-8	r	yr	m	5-6	m	dm	Ohio		*	**	*				—															
Ohio Pippin (*Shannon*)	8-9	ro	yr	a	5-6	ml	km	Ohio		*		*				*	*														
Okabena	5	rob	rs		4-6	me	km	Minn								†	*														
Oldenburg, *Duchess of*	5-6	o	yrs	a	4-5	e	km	Rus	**	**	*	**		*	**	**		**		*	**	**	**	*							*
Oliver (*Senator*)	7		r		7-8	ml	m	Ark								†															
Ontario	5	ob	wyr	a	6	e	m	Ont	*	*																					
Ortley	7-8	rob	gyr	m	7-8	ml	dm	N. J	—	*		*				*					**		*								
Paragon	7-8	rc	yr	m	8	l	dm	Tenn			*	**	*			*		**			*										
Patten *Greening*	8-9	r	y		5-6	ml	km	Iowa									*														
Peach of *Montreal*	5-6	rc	yrs	m	5-6	l	dm	Fr	**	**						†	*														
Pease, *Walter*	8-9	rob	rys		7-8	me	dk	Conn		*	†	*				*															
Peck *Pleasant*	7-8	ro	yr	m	7-8	l	dkm	R. I		**	*	*				*					**										
Peerless	5	or	s		5-6	l	m	Minn									*														
Perfection	7-8	r	yrs		5-6	me	km	Iowa									†														
Perry Russet	5-6	rc	yru	m	5-6	ml	dk	N. Y		*	*					*	*														
Peter	7-8	r	gy	m	6-7	m	km	Minn									*														
Pewaukee	8-9	ro	yrs	m	4-5	l	km	Wis	**	*		*				*		*			*	*	*								
Plumb Cider	5-6	rc	yrs	m	5-6	m	dm	Wis	*	*	*						*	**			*	*									
Pomme Gris	3-4	ro	yrur	m	8-9	ml	d	Eur. ?	*	*																					
Porter	7-8	obc	yr	m	8-9	em	dm	Mass	**	**	**	*				**		*			*										
Primate	5-6	rc	yr	m	9	e	d	N. Y	—	*	*	*				—					*										
Pryor *Red*	5-6	oi	gyr	m	7-9	l	dk	Va	—	—		*	*			*															
Pumpkin Sweet (*Pound Sweet*)	8-9	r	gw	s	5-6	ml	k	Conn	*	*		*				*															
Quince, *Cole*	7-8	ro	y	a	5-6	e	k	Me	**	*						*		*													
Ralls *Genet* (*Janet, Neverfail*)	5-6	oc	yrs	m	6-7	vl	m	Fr		*	*	**				**		*		**	**										
Rambo	5-6	o	wyr	m	7-8	m	dk	Pa		*	**	*	—		—	*		*			**										*
Ramsdell *Sweet*	7-8	obc	r	s	6-7	m	km	Am		*	*	*			—	**		*			*										
Raspberry	3-4	obi	r		6-7	me	km	Rus	*								†														
Red Astrachan	7-8	rc	rgy	a	5-6	e	km	Rus	*	**	**	**	*	†	**	*		*		*	*	**	**	**	*	**	**				
Red Canada	5-6	oc	yr	m	8-9	l	dm	Am	*	**	—	*				*					*										

Section 1.—APPLES. (Pyrus.)—Continued.

SUBSECTION 2.—APPLES. (*P. MALUS.*)—Continued.

Name.	Description.								Districts and starring.																		
	Size.	Form.	Color.	Flavor.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Red June, *Carolina*	3-4	ovc	rs	m	6-7	ve	dm	N. C	....	*	*	**	*	**	**	**	....	**	*	*	**	....	*	†	*	*	*
Red Stripe	5-6	obc	wrs	m	5-6	e	km	Ind	....	*	....	**	....	....	....	**	....	....	....	....	*	....	....	....	....	....	....
Repka Malenka	3-4	rc	rs	m	5	lm	k	Rus	....	....	....	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....
Rhode Island *Greening*	8-9	ro	gy	a	7-8	l	dkm	R. I	*	**	—	*	*	....	....	—	—	*	....	....	**	†	**	**	*	....	**
Ribston	5-6	r	yr	a	7-8	l	dk	Eng	*	*	*	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Ridge *Pippin*	7-8	rci	yru	m	5-6	l	m	Pa.?	....	—	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Rolfe (*Macomber*)	7-8	o	yrs	m	8	m	dkm	Me	†	*	†	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Romanite, *South*	3-4	rc	yr	m	6-7	l	d	Am.?	....	....	....	**	*	....	....	....	....	....	....	*	*	....	....	....	....	....	....
Roman Stem	5-6	r	wyr	m	8-9	l	dk	N. J	....	*	**	*	....	....	....	**	....	**	....	....	**	....	....	....	....	....	....
Rome *Beauty*	8-9	rc	yrs	m	6-7	ml	dkm	Ohio	....	*	**	**	*	....	*	**	....	**	*	*	**	....	**	....	....	....	*
Roxbury	5-6	ro	yru	m	6-7	l	km	Mass	*	**	*	*	—	....	—	—	....	....	....	....	**	....	....	....	....	....	....
Russell	....	rov	yr	....	7-9	e	d	Am	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Russian Baldwin	5-6	or	grs	....	7-8	l	dkm	Rus	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Salome	5-6	rob	yr	....	7-8	vl	dkm	Ill	....	....	....	*	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....
Saint Johnsbury	5-6	r	yrs	s	7-8	l	dkm	Vt	*	†	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Saint Lawrence	5-6	oc	yrs	m	6-7	m	dm	Am	**	*	*	....	....	....	....	*	*	....	....	....	*	....	....	....	....	....	....
Scott Winter	5	rc	rs	a	5-7	l	km	Vt	**	*	....	....	....	....	....	†	†	†	....	....	*	*	....	....	....	....	....
Shiawassee	5-6	o	wrs	m	7-8	m	dkm	Mich	*	**	....	*	....	....	....	*	....	....	....	....	....	....	†	....	....	....	....
Shockley	3-4	rc	yr	m	5-6	l	dm	Ga	....	....	*	**	**	*	**	†	....	*	*	....	....	....	*	....	....	....	....
Smith *Cider*	6-7	roc	yrs	m	5-6	l	km	Pa	....	*	**	*	*	....	....	*	....	*	....	....	**	....	*	....	*	....	*
Smokehouse	6-7	ro	yr	m	6-7	ml	k	Pa	—	*	**	*	*	....	*	....	....	....	....	....	*	....	....	....	....	....	....
Sops of Wine	5-6	r	yr	m	5-6	e	d	Eur.?	*	*	*	*	....	....	....	*	....	*	....	....	**	....	....	....	....	....	....
Stark	8-9	robc	yrs	m	5-6	l	m	Ohio	*	**	**	**	....	....	....	*	....	*	....	....	*	....	....	....	....	....	*
Starkey	7-8	ocr	ys	m	8	ml	dkm	Me	*	—	*	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Stayman Winesap	8-9	rc	r	....	8-9	l	mdk	Kans	....	....	**	*	*	....	....	*	....	....	....	....	....	....	....	....	....	....	....
Stephenson	5-6	rob	yrs	m	5-6	l	dm	Miss	....	—	*	**	*	....	—	—	....	....	....	....	....	....	....	....	....	....	....
Sterling (*American Beauty*)	8-9	rc	yr	m	7-8	l	d	Mass	....	*	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....
Summer King	7-8	ro	yrs	m	6-7	e	dk	N. C	....	....	*	**	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Summer Pearmain	5-6	rc	rru	m	9-10	em	d	Am	....	**	*	*	*	....	**	**	....	....	*	....	**	....	....	....	....	....	....
Summer Queen	6-7	rc	yrs	a	5-6	e	km	Am	....	*	*	*	*	....	**	**	....	....	....	....	*	....	....	....	....	....	....
Summer Rose	4-5	r	yrs	m	6-7	ve	d	N. J	—	*	*	*	**	....	....	*	....	....	....	....	*	....	†	....	....	....	....
Sutton	6-7	roc	yrs	m	7-8	l	dm	Mass	†	**	†	†	....	....	....	†	....	....	....	....	*	....	....	....	....	....	....
Swaar	7-8	ro	gy	m	7-8	l	d	N Y	....	*	—	....	....	....	....	....	....	*	....	....	*	....	*	....	*	*	....
Swazy *Pomme Gris*	2-4	ro	or	am	8-9	l	dm	Can	†	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sweet Winesap	5-6	oc	r	s	6-7	l	dk	Pa	....	*	....	....	....	....	....	—	*	....	....	....	....	....	....	....	....	....	....
Switzer	5-6	r	wr	m	6-7	e	k	Rus	**	*	....	†	....	....	....	*	*	....	....	....	*	**	....	....	....	....	....
Taunton	7-8	oc	yrs	a	5-6	m	k	{Ala.?} {Ga.?}	....	—	....	*	*	*	**	....	....	....	....	....	....	....	....	....	....	....	....

Terry *Winter*	2-3	rc	yr	.....	5-6	l	dm	Ga	....	....	....	*	**	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Tetofski	5-6	roc	yrs	a	4-5	e	m	Rus	**	**	....	*	....	....	....	*	*	....	....	....	**	*	....	....	....	....	....	....
Titovka	7-8	oci	yrs	m	5-6	m	km	Rus	*	*	....	....	....	....	....	....	....	....	....	....	*	*'	....	....	....	....	....	....
Tolman *Sweet*	5-6	ro	y	s	6-7	l	km	R. I	**	**	....	*	*	....	....	*	....	—	....	....	**	....	†	....	....	....	....	....
Tompkins King	8-9	roc	yrs	m	8-9	l	dm	N. J	*	**	*	*	....	....	....	....	....	....	....	....	*	....	*	**	....	....	....	....
Townsend	5-6	oc	yrs	m	6-7	l	dm	Pa	....	—	*	*	....	....	*	*	....	....	....	....	....	....	....	....	....	....	....	....
Trenton Early	6-7	ci	yg	m	7-8	e	km	Am	....	—	....	*	....	....	*	**	*	....	....	....	....	....	....	....	....	....	....	....
Twenty Ounce (*Cayuga Redstreak*)	9-10	r	yrs	m	6-7	ml	km	Conn	**	**	*	*	....	....	....	—	....	....	....	*	*	....	....	....	....	....	....	....
Utter	7-8	r	yr	.....	6-7	m	dm	Am	....	....	....	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....
Vandevere	5-6	o	yrs	m	5-6	ml	km	De	....	*	....	*	....	....	....	—	....	....	....	....	*	....	....	....	....	....	....	....
Vanhoy	8-9	ro	yrs	.....	6-7	l	dm	N. C	....	....	*	*	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Virginia Greening	8-9	o	gyr	m	5-6	l	m	Am	....	....	....	*	....	....	....	....	....	....	....	....	*	*	....	....	....	....	....	....
Wagener	6-7	ro	yrs	m	7-8	l	dm	N. Y	*	**	—	*	....	....	....	*	....	....	....	....	**	....	**	*	....	....	....	....
Walbridge (*Edgar Redstreak*)	5-6	oc	yrs	m	5-6	l	m	Ill	*	*	....	*	....	....	....	*	*	*	....	....	**	....	*	....	....	....	....	....
Washington *Strawberry*	8-9	oc	yrs	m	7-8	e	dm	N. Y	....	**	*	*	....	....	—	....	....	....	....	....	*	....	....	....	....	....	....	....
Watson, *Carolina*	8-9	oc	grs	m	5-6	e	d	Am	....	....	....	**	*	*	**	....	....	....	....	....	....	....	....	....	....	....	....	....
Wealthy	6-7	ro	yrs	m	6-7	m	dkm	Minn	**	**	**	**	....	*	†	**	....	**	....	*	**	**	**	†	....	....	....	....
Westfield *Seek-no-further*	5-6	rc	gr	m	8-9	ml	dm	Conn	*	**	....	*	....	....	....	*	....	*	....	....	*	....	....	....	....	....	....	....
Wetmore	5-6	r	r	.....	7-8	l	dk	Tenn	....	....	....	†	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Whinery	6-7	rc	rs	.....	5-6	l	km	Ohio	....	†	....	†	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
White Juneating (*Yellow May*)	4-5	r	yr	.....	6-7	e	d	....	....	....	....	*	**	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
White Pearmain (*W. W. Pearmain*)	5-6	robc	yr	m	8-9	l	dm	Am	....	*	....	*	*	....	....	*	....	*	....	*	**	....	**	*	*	*	*	**
White Pigeon	5-6	rc	ruy	s	6-7	me	dk	Rus	*	....	....	....	....	....	....	....	†	....	....	....	....	....	....	....	....	....	....	....
White Pippin	7-8	ro	wyr	m	8-9	l	dm	Am	....	*	....	**	....	....	....	**	....	....	....	....	**	....	*	....	....	*	....	....
Williams *Favorite*	5-6	robc	r	m	6-7	e	dm	Mass	*	*	*	*	....	....	....	*	....	....	....	....	**	....	....	....	....	....	....	....
Willow *Twig*	6-7	roc	yr	m	5-6	vl	m	Va.?	....	*	**	**	....	....	....	**	....	*	....	....	**	....	*	....	....	....	....	....
Windsor	5-6	r	yr	m	6	ml	m	Wis	....	....	....	....	....	....	....	....	**	....	....	....	*	....	....	....	....	....	....	....
Wine, *Hays*	7-8	ro	yr	m	6-7	l	dm	Del	....	—	**	**	*	....	—	**	....	*	....	....	*	....	†	....	....	....	....	....
Winesap	5-6	rob	yr	a	7-8	vl	dkm	N. J	....	*	**	**	*	....	*	**	....	**	*	**	**	....	**	....	....	*	*	....
Winter St. Lawrence	5-6	r	rs	.....	7-8	l	d	Eng	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wistal	7-8	r	y	.....	7-8	me	km	Tex	....	....	....	....	....	....	*	....	....	....	*	....	....	....	....	....	....	....	....	....
Wolf River	9-10	ro	wrs	m	5-6	m	km	Wis	**	*	....	*	....	....	....	*	**	*	....	....	**	*	*	†	....	....	....	....
Wythe	5-6	oc	wrs	m	5-6	l	dk	Ill	*	....	....	....	....	....	—	**	....	....	....	....	*	....	....	....	....	....	....	....
Yates	2-3	oc	yrs	m	5-6	vl	m	Ga	....	....	....	*	**	....	**	....	....	....	*	....	*	....	....	....	....	....	....	....
Yellow Bellflower	8-9	obc	yr	a	8-9	l	dkm	N. J	*	*	*	*	—	*	*	—	....	....	....	**	*	....	**	**	**	*	**	....
Yellow June	3-4	ro	y	a	5-6	e	dk	Am	....	....	*	*	....	....	**	*	....	....	....	....	....	....	....	....	....	....	....	....
Yellow Newtown (*Albemarle*)	7-8	ro	yr	a	9-10	vl	dkm	N. Y	....	*	**	**	*	....	—	—	....	*	....	**	**	....	**	**	**	*	**	....
Yellow Transparent	6-7	rc	wy	a	5-6	e	km	Rus	**	**	**	**	*	....	*	**	*	**	*	*	**	**	**	**	....	....	....	....
Yopp	8-9	rc	gyr	m	5-6	m	dk	Ga	....	....	....	....	*	*	**	....	....	....	....	....	....	....	....	....	....	....	....	....
York Imperial (*Johnson's Fine Winter*)	7-8	oi	yrs	m	6-7	l	dm	Pa	....	*	**	**	*	....	*	**	....	**	....	**	**	....	*	....	....	....	....	....

Section 2.—APRICOTS. (Armeniaca vulgaris.)

[KEY.—Size, scale 1 to 10; 1, very small; 10, very large. Form: c, compressed; co, conical; o, oblate; ob, oblong; r. round. Color: o, orange; r, red; y, yellow. Pit and kernel: b, bitter; c, cling; f, free; i, impervious; p, pervious; s, sweet. Quality, scale 1 to 10; 1, very poor; 10, best. Season: e, early; m, medium; l, late; v, very. Use: d, dessert; k, kitchen; m, market. Abbreviations of names of places of origin: Afr., Africa; Eng., England; Eur., Europe; Fr., France.]

Name.	Description.								Districts and starring.																		
	Size.	Form.	Color.	Pit and kernel.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Alexander	4–5	ob	oy	.....	4–5	m	dm	Rus.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	....	....	*	...
Blenheim	6–7	o	oy	.....	6–7	m	dm	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	**
Breda	3–4	ro	o	s	7–8	m	dm	Afr.	....	*	*	*	....	....	—	—	—	....	....	....	**	....	....	....	....	*	*
Early Golden	2–3	r	o	f	7–8	e	d	N. Y.?	....	*	....	....	....	....	—	*	....	....	....	....	**	....	....	....	....	....	*
Eureka	6–7	.....	.....	.....	5–6	ve	.....	Cal.	....	....	....	....	....	....	*	....	....	....	*	....	....	....	....	....	....	....	...
Harris	5–6	obc	or	.....	6–7	ve	dm	N. Y.	....	†	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	...
Hemskirke	8–9	ro	or	ib	6–9	ve	d	Eng.	....	—	....	....	....	....	—	—	....	....	....	....	*	....	....	....	*	*	*
Large Early	5–6	obc	or	bf	7–8	e	d	Fr.	....	—	....	....	....	....	—	—	....	....	....	....	*	....	....	....	....	....	*
Moorpark	8–9	r	or	pb	7–8	m	d	Eng.	....	**	**	....	....	....	*	*	....	*	*	....	**	....	**	*	*	*	**
Newcastle	5–6	r	oy	f	6–7	m	.....	Cal.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	**
Orange	5–6	or	or	cs	3–4	e	k	Eur.?	....	....	....	*	....	....	—	....	....	*	....	....	*	....	....	....	....	....	...
Peach	10	rcoc	yo	pb	7–8	m	d	Italy	....	*	....	....	....	....	—	—	....	*	....	....	**	....	*	....	....	**	*
Routier *Peach*	6–7	.....	yr	.....	6–7	.....	m	Cal.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	...
Royal	7–8	roc	yor	i	7–8	ve	d	Fr.	....	*	....	....	....	....	*	*	....	*	*	....	*	....	*	*	**	**	**
St. Ambroise	8–9	rc	yr	.....	7–8	l	d	Fr.?	....	*	....	....	....	....	—	....	....	....	....	....	*	....	....	....	....	*	...

Section 3.—BLACKBERRIES AND DEWBERRIES. (Rubus.)

Subsection 1.—BLACKBERRIES. (*R. VILLOSUS.*)

[Key.—Size, scale 1 to 10: 1, very small; 10, very large. Form: c, conical; o, oblong; ov, oval; r, round. Color: b, black. Quality, scale 1 to 10: 1, very poor; 10 best. Season: e, early; m, medium; l, late; v, very. Use: d, dessert; k, kitchen; m, market. Abbreviations of names of places of origin: Am., America.]

Name.	Description.							Districts and starring.																	
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Agawam	7-8	ro	b	8-9	e	dm	Am	*	**								*									
Allen	7-8	oc	b	9-10	ve	dm	Pa		†																	
Briton, *Ancient*	5-6	oov	b	5	m	m	Wis	*	**	*	*		*	*	**	**	**			**		*				
Brunton	5-6	o	b	9-10	e	dm	Am		*				*	**												
Crandall					ve		Tex.?															*		*	*	**
Dallas	7-8		b	7-8	m	dkm	Tex					**	*	**			—	*								
Early Harvest	4-5	ro	b	7-8	e	dm	Ill		**	**	*	**		**	**		*			*		†			*	
Eldorado	7-9	o	b	7-9	e	dkm	Ohio	*	*	*				*	†							†				
Erie	8-9	rov	b	5	m	m	Pa	*	**	**	*	**			**		*			*		**	†			
Kittatinny	7-9	ro	b	7-8	ml	d	N. J	—	*	*	**	**	*	**	—		*			*		**	**	*	*	*
Lawton	8-9	ov	b	7-8	m	m	N. Y	—	*	—	**	*			*		*			*		**	**	*	*	*
Minnewaska	9	ov	b	6	m	dm	N. Y	*	*	**	*	*		*			*					—				
Robison	7-8	ro	b	7-8	em	km	Tex							*				*								
Snyder	6-7	o	b	7-8	ml	dm	Ind	*	**	*	**	**			**		*			**	*	*	*			
Stone	5	ro	b	7-8	l	d	Wis	*	*			**								*		—	*			
Taylor	6-7	ro	b	7-8	l	d	Ind	*	**	*	*			*	**		*			**						
Triumph, *Western*	5-6	oov	b	6	l	d	Am	*	*		†															
Wachusett	5	oov	b	7	e	d	Mass	*	*		*				*											
Wilson	8-9	oov	b	7-8	m	m	N. J		**	*		*					**			**	*	*			*	

Subsection 2.—DEWBERRIES. (*R. CANADENSIS.*)

Lucretia	9-10	oov	b	6	e	dk	W. Va	*	**	**	**	**	**	**	**	*	*			**	**	**				*
Mayes (*Austin*)	9-10	cov	b	5-6	ve	dm	Tex			*	**	*	**	**	**											

Section 4.—CHERRIES. (Cerasus.)

Subsection 1.—HEARTS AND BIGARREAUS. (*C. AVIUM.*)

[Key.—Size, scale 1 to 10: 1, very small; 10, very large. Form: c, compressed; h, heart shaped; o, oblate; r, round. Color: a, amber; b, black; p, purple; r, red; y, yellow. Quality, scale 1 to 10: 1, very poor; 10, best. Season: e, early; m, medium; l, late; v, very. Use: d, dessert; k, kitchen; m, market. Abbreviations of names of places of origin: Am., America; Eng., England; Eur., Europe; Fr., France; Ger., Germany; Ont., Ontario; Rus., Russia.]

Name.	Description.							Districts and starring.																		
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Bing	7–8	.....	b	8–9	l	dm	Oreg.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	**	**	....	....
Black Heart	6–7	hc	b	5–6	ve	dm	Eur.?	—	**	**	**	....	....	*	....	....	....	....	....	*	....	....	....	....	....	....
Centennial	9–10	oh	yr	8–9	.....	dm	Cal.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	*
Coe *Transparent*	5–6	r	yr	10	e	d	Conn.	....	*	**	*	*	....	....	....	....	....	....	....	*	....	....	....	....	....	....
Downer	5–6	rh	r	8–9	m	dm	Mass.	....	*	*	*	....	....	....	—	....	....	....	....	....	....	....	....	....	....	....
Eagle, *Black*	6–7	oh	b	6–7	m	dm	Eng.	—	**	*	*	*	....	....	*	....	....	....	....	*	....	....	....	....	....	....
Early Purple *Guigne*	3–4	rh	pb	6–7	ve	d	(?)	—	*	....	*	*	....	....	—	....	....	....	....	....	....	....	*	....	....	....
Elkhorn	8–9	h	b	7–8	l	dm	.....	....	**	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Elton	8–9	h	yr	9	e	dm	Eng.	....	**	*	*	*	....	....	—	....	....	....	....	....	....	*	....	....	....	....
Hoskins	9–10	rh	pr	7–8	lm	dm	Oreg.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	**	....	....	....
Knight *Early*	8–9	oh	b	7–8	e	d	Eng.	....	*	....	....	*	....	....	....	....	....	....	....	**	....	....	....	....	....	....
Lambert	9–10	h	pr	8–9	ml	dm	Oreg.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	**	....	....	....
Lewelling	8–9	rh	b	8–9	.....	dm	Oreg.	....	*	....	....	....	....	....	....	....	....	....	....	.	....	**	**	*	†	....
Mezel	9–10	oh	rb	7–8	m	d	Eur.	—	*	*	....	*	....	....	—	....	....	....	....	....	....	....	....	....	....	....
Napoleon (*Royal Ann*)	8–9	h	yr	5–6	m	m	Eur.	—	**	**	**	*	....	....	*	....	*	....	....	**	....	**	**	**	**	*
Oxheart	7–8	oh	r	5–6	m	dm	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	....	....	....
Republican, *Black*	8–9	.....	b	.....	vl	dm	Oreg.	....	....	....	....	....	....	....	....	....	....	....	....	**	....	*	....	....	....	....
Rockport	8–9	oh	ra	8–9	m	dm	Ohio.	—	**	*	....	*	....	....	....	....	....	....	....	....	....	....	....	*	....	....
Spanish, *Yellow*	9–10	oh	yr	9–10	em	d	Eur.	....	**	**	*	*	....	....	*	....	....	....	....	*	....	*	*	....	....	....
Tartarian, *Black*	9–10	h	b	9–10	em	dm	Rus.	**	**	**	*	*	....	....	*	....	....	....	....	*	....	**	*	**	**	*
Windsor	8	h	yr	7–8	l	dm	Ont.	....	**	*	**	*	....	....	....	....	....	....	....	**	....	**	....	....	....	....
Wood, *Governor*	7–8	rh	yr	7–8	em	um	Ohio.	....	**	*	*	*	....	....	*	....	*	....	....	*	....	*	*	....	....	....

Subsection 2.—DUKE AND MORELLO CHERRIES. (*C. VULGARIS.*)

Amarelle Hative	6–7	r	.....	7–8	e	m	Eur.	*	....	....	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....
Archduke	8–9	oh	r	7–8	em	dk	Eur.	....	*	....	....	....	....	....	—	....	*	....	....	*	....	....	....	....	....	....
Bessarabian	5–6	r	r	5	l	k	Rus.	**	**	....	....	....	....	....	†	*	....	....	....	....	....	....	....	....	....	....
Brusseler Braune	9	r	r	8–9	l	k	Eur.	**	..	....	....	....	....	....	†	*	....	....	....	....	....	....	....	....	....	....
Carnation	8–9	r	yr	4–5	em	k	Eur.	....	*	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....
Choisy, *Belle de*	6–7	r	ra	10	e	d	Fr.	....	*	*	*	*	....	....	—	....	....	....	....	**	....	....	....	....	....	....
Dyehouse	5–6	ro	r	5–6	ve	k	Ky.	*	**	....	**	*	....	....	*	†	*	....	....	*	....	†	....	....	....	....

Eugenie, *Empress*	7–8	r	ra	8–9	e	d	Fr	....	**	....	*	....	....	....	....	....	....	....	....	**	....	....	....	....	....	....	....	....	....
Hortense, *Reine*	8–9	rh	r	7–8	ml	dm	Fr	....	**	*	**	....	....	....	—	....	....	....	....	**	....	....	....	....	....	....	....	....	....
Large Montmorency	7–8	ro	r	7–8	em	km	Fr	*	**	**	**	*	....	....	**	**	*	....	....	**	....	*	....	....	....	....	....	....	....
Late Duke	7–8	oh	r	6–7	l	k	Eng	....	**	*	**	*	....	....	....	....	*	....	....	**	....	**	*	....	....	....	....	....	....
Late Kentish	5–6	r	r	4–5	lm	k	Am.?	....	**	**	....	....	....	....	**	....	....	....	....	....	....	*	**	....	....	....	....	....	....
Lutovka	7–8	r	r	4–5	em	k	Rus	**	*	....	....	....	....	....	*	*	*	....	....	....	....	....	....	....	....	....	....	....	....
Magnifique, *Belle*	7–8	rh	r	6–7	l	k	Fr	....	*	*	....	*	....	*	—	....	....	....	....	....	....	....	....	....	....	....	....	....	....
May Duke	6–7	rh	r	8–9	e	dk	Fr	*	**	**	**	*	....	....	—	....	*	....	....	**	....	**	*	....	....	....	....	....	....
Montmorency Ordinaire	7–8	r	r	7–8	em	km	Fr	*	**	**	**	....	....	*	**	....	....	....	....	**	....	....	....	....	....	....	....	....	....
Morello, *English* (*Wragg*)	6–7	rh	rb	5–6	l	km	Eng	*	**	*	**	*	....	....	**	*	*	....	....	**	**	**	*	....	....	....	....	....	*
Northwest	5–6	r	r	5–6	e	k	Ill	....	....	....	....	....	....	....	†	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Olivet	7–8	r	r	6–7	e	dk	Fr	....	**	**	*	....	....	....	*	....	**	....	....	*	....	†	....	....	....	....	....	....	....
Ostheim	6–7	e	rb	6–7	m	dkm	Rus	*	*	....	*	....	....	....	*	*	....	....	....	....	....	*	....	....	....	....	....	....	....
Philippe, *Louis*	7–8	r	r	5–6	e	k	Fr	*	*	*	....	....	....	....	*	....	....	....	....	*	....	*	....	....	....	....	....	....	....
Plumstone *Morello*	8–9	rh	r	5–6	m	k	Am	....	—	....	....	....	....	*	*	....	....	....	....	*	....	....	....	....	....	....	....	....	....
Richmond	5–6	r	r	5–6	e	km	Eur	*	**	**	**	*	....	....	**	....	*	....	....	**	....	....	....	....	....	....	....	....	....
Royal Duke	7–8	rh	r	5–6	e	k	Fr	....	*	*	....	....	....	....	....	....	....	....	....	**	....	....	....	....	....	....	....	....	....
Shadow Amarelle	6–7	r	.....	5–6	m	m	Eur	*	....	....	....	....	....	....	....	†	....	....	....	....	....	....	....	....	....	....	....	....	....
Suda *Hardy*	6–7	c	r	7–8	m	dkm	Mo	....	....	....	†	....	....	....	†	....	....	....	....	....	....	....	....	....	....	....	....	....	....

Section 5.—CURRANTS. (Ribes.)

Subsection 1.—*R. NIGRUM* and *AUREUM.*

[Key.—Size, scale 1 to 10: 1, very small; 10 very large. Form: r, round. Color: b, black; r, red; w, white. Quality, scale 1 to 10: 1, very poor; 10, best. Season: e, early; m, medium; l, late. Use: d, dessert; k, kitchen; m, market. Abbreviations of names of places of origin: Am., America; Eng., England; Eur., Europe; Fr., France; Ont., Ontario.]

Name.	Description.							Districts and starring.																		
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Champion	8–9	r	b	5–6	em	km	Eng..	*	*	....	*	....	....	....	*	*	....	....	....	....	*	*	....	....	....	....
Crandall	9	ro	b	6–7	l	k	Kan..	....	....	....	*	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....
English	5–6	r	b	4–5	m	km	Eng..	....	*	....	....	....	....	....	....	*	*	....	....	....	....	....	....	....	....	....
Lee *Prolific*	8–9	r	b	6–7	m	km	Am.?.	*	**	*	*	....	....	....	*	*	*	....	....	*	*	....	....	....	....	....
Naples	6–7	r	b	6–7	m	km	Eur...	*	*	*	—	—	....	....	....	*	....	....	....	*	*	....	†	....	....	....
Saunders	7–8	r	b	6–7	m	km	Ont..	*	**	....	....	....	....	....	....	*	....	....	....	....	*	....	....	....	....	....
Wales, *Prince of*	7–8	r	b	6–7	m	km	Ont...	**	*	....	*	....	....	....	*	*	....	....	....	....	*	....	....	....	....	....

Subsection 2.—*R. RUBRUM.*

Albert, *Prince*	7–8	r	r	7–8	e	dm	Eur...	*	**	....	....	....	....	....	....	*	*	....	....	....	*	....	....	....	....	....
Cherry	9–10	r	r	5–6	m	m	Eur...	**	**	**	*	—	....	....	**	*	*	....	....	**	**	**	**	*	....	....
Fay	9–10	r	r	5–6	m	m	N. Y..	**	**	**	*	—	....	....	*	*	**	....	....	**	....	**	**	*	....	....
Holland, *Long Bunch*	5–6	r	r	4–5	em	km	Eur...	....	**	....	....	....	....	....	*	*	*	....	....	**	*	....	....	....	....	....
London *Market*	5–6	r	r	4–5	m	km	Eng..	....	**	....	....	....	....	....	....	*	....	....	....	**	*	....	....	....	....	....	....
Moore Ruby	9–10	r	r	6–7	m	km	N. Y..	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
North Star	5–6	r	r	5–6	l	km	Minn..	....	†	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Red Cross	9–10	r	r	9–10	m	dm	N. Y..	**	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Red Dutch	6–7	r	r	8–9	m	dm	Eur...	**	*	*	**	—	....	....	**	*	**	....	....	**	**	*	....	*	....	....
Red Grape	5–6	r	r	7–8	m	km	Eur.?.	*	—	....	....	....	....	....	....	*	....	....	....	†	*	....	....	....	....	....
Raby Castle	6–7	r	r	6–8	m	km	.....	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
St. Giles, *Belle de*	9–10	r	r	7–8	m	km	.....	....	†	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Versaillaise	9–10	r	r	5–6	.....	m	Fr....	*	**	*	*	—	....	....	*	*	*	....	....	*	*	....	....	....	....	....
Victoria	6–7	r	r	5–6	m	m	Eng..	*	**	*	*	—	....	....	**	*	*	....	....	*	**	....	*	....	....	....
White Dutch	6–7	r	w	9–10	m	d	Eur...	*	*	*	*	—	....	....	*	*	**	....	....	**	*	....	....	....	....	....
White Gondouin	6–7	r	w	9–10	m	d	Eur...	—	*	*	....	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....
White Grape	7–8	r	w	8–9	m	m	Eur...	**	**	*	*	—	....	....	**	*	*	....	....	**	**	**	**	....	....	....
Wilder	8–9	r	r	7–8	m	m	N. Y..	**	**	*	*	....	....	....	*	....	*	....	....	....	....	....	....	....	....	....

Section 6.—GOOSEBERRIES. (Ribes.)

Subsection 1.—*R. GROSSULARIA.*[1]

[Key.—Size, scale 1 to 10: 1, very small; 10, very large. Form: o, oval; r, round. Color: g, green; r, red; w, white; y, yellow. Quality, scale 1 to 10: 1, very poor; 10, best. Season: e, early; m, medium. Use: d, dessert; k, kitchen; m, market. Abbreviations of names of places of origin: Am., America; Eng., England; Ont., Ontario.]

Name.	Description.							Districts and starring.																		
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Chautauqua	8–9	ro	gw	9–10	m	km	N. Y.	....	**	*	*	....	....	....	*	....	*	....	....	*	....	....	....	....	....	....
Columbus	8–9	ro	gy	9–10	m	km	Am.	....	*	*	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....
Crown Bob	8–9	o	r	7–8	e	km	Eng.	....	*	*	....	....	....	....	*	....	....	....	....	**	....	....	....	....	....	....	....
Industry	9–10	ro	r	6–7	e	km	Eng.	*	**	*	*	....	....	....	*	....	—	....	....	**	*	*	*	....	....	....
Triumph	8–9	ro	gw	7–8	e	dm	Pa.?	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wellington	8–9	o	gw	5–6	e	mk	Eng.	....	*	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....
Whitesmith	8–9	o	g	5–6	e	km	Eng.	*	**	....	....	....	....	....	—	*	....	....	....	**	*	....	....	....	....	....	....

Subsection 2.—*R. OXYACANTHOIDES.*[2]

Champion	5–6	ro	gy	5	e	km	Am.	....	**	*	....	....	....	....	*	....	**	....	....	*	....	**	**	*	....	....
Downing	5–6	r	g	5–6	m	km	N. Y.	**	**	**	*	....	....	....	**	*	**	....	....	**	....	**	*	....	....	....
Houghton	2–3	ro	gr	7–8	m	dk	Mass.	**	*	**	*	*	....	....	**	*	**	....	....	**	**	**	....	*	....	*
Pale Red	2–3	ro	r	9–10	m	dk	Am.	....	*	....	**	....	....	....	**	....	....	....	....	*	*	....	....	....	....	....
Pearl	5–6	r	g	9–10	m	dk	Ont.	**	**	....	....	....	....	....	*	*	....	....	....	*	....	....	....	....	....	....
Red Jacket	5–6	ro	r	8	e	km	Ont.	*	**	*	*	*	....	....	**	*	†	....	....	*	....	....	†	....	....	....
Smith	5–6	o	yg	9	e	kd	Vt.	*	**	**	*	....	....	....	*	*	**	....	....	*	*	*	....	....	....	....

[1] Includes American seedlings of this parentage.

[2] Includes apparent hybrids of this with other species.

Section 7.—GRAPES. (Vitis.)

Subsection 1.—*V. ÆSTIVALIS.*[1]

[Key.—Size, scale 1 to 10: 1, very small; 10, very large. Form: o, oval; r, round. Color: a, amber; b, black; g, green; r, red; w, white; y, yellow. Quality, scale 1 to 10: 1, very poor; 10, best. Season: e, early; m, medium; l, late; v, very. Use: d, dessert; m, market; w, wine. Abbreviations of names of places of origin: Am., America; Ont., Ontario.]

Name.	Description.							Districts and starring.																		
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Northern Group.																										
Cynthiana	2–3	r	b	7–8	e	w	Ark	....	*	....	*	**	....	**	*	....	....	....	....	*	....	....	....	....	....	....
Eumelan	5–6	r	b	7–8	m	d	N. Y.	*	*	....	*	†	—	....	—	—	*	....	....	....	....	....	....	....	....	....
Gold Coin	6–7	r	w	8–9	me	dm	Tex	....	....	....	....	....	....	**	....	....	....	....	....	....	....	....	....	....	....	....
Muench	7–8	r	b	9	me	dm	Tex	....	....	....	*	**	....	*	....	....	....	....	....	....	....	....	....	....	....	....
Norton *Virginia*	2–3	r	b	5–6	e	w	Va	....	*	....	**	....	....	**	*	....	....	....	....	*	....	....	....	....	....	....
Superb	7–8	r	b	9	ml	dm	Ga	....	....	....	*	**	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Southern Group (*Syn. V. Bourquiniana*).																										
Delaware	2–3	r	r	10	m	dm	N. J.?	*	**	....	**	**	....	**	**	*	**	**	....	**	....	**	*	....	....	....
Elvicand	....	r	r	8–9	m	d	Tex	....	—	....	....	....	....	....	....	....	....	....	....	*	....	....	....	....	....	....
Herbemont	2–3	r	b	7-8	l	dw	South?	....	—	....	*	*	*	**	*	....	....	**	....	*	....	....	....	....	....	....
Lenoir	2–3	r	rb	5–6	l	dm	N. C	....	....	....	....	....	*	*	....	....	....	*	....	....	....	....	....	....	....	....
Walter	5–6	r	r	7–8	ml	d	N. Y.	....	—	....	....	*	....	....	....	....	....	....	....	*	....	....	....	....	....	....
Wylie	2–3	r	r	8–9	ve	d	S. C.	....	—	....	....	....	....	*	....	....	....	*	....	....	....	....	....	....	....	....

Subsection 2.—*V. LABRUSCA.*[1]

Agawam	8–9	ro	rb	6–7	m	dm	Mass	*	**	*	*	*	....	....	*	....	**	....	....	**	....	†	....	....	....	....
Barry	8–9	r	b	6–7	m	dm	Mass	*	*	—	*	*	....	....	....	....	*	....	....	*	....	....	....	....	....	....
Brighton	7–8	r	r	7–8	e	d	N. Y.	**	**	*	**	**	....	*	*	....	*	....	....	**	....	*	....	....	....	....
Brilliant	5–6	r	r	7–8	e	dm	Tex	....	*	†	**	*	....	**	....	†	....	**	....	....	....	....	....	....	....	....
Catawba	6–7	r	r	8–9	vl	dm	N. C	—	**	*	*	*	*	*	*	....	**	....	....	*	....	....	....	....	....	....
Champion	5–6	r	b	2–3	ve	m	Am	....	*	*	*	—	....	*	—	....	*	....	....	*	....	....	....	....	....	....
Concord	7–8	r	b	5–6	m	m	Mass	*	**	**	**	*	—	*	**	....	**	....	....	**	....	**	**	....	....	....
Cottage	7–8	r	b	5–6	m	m	Mass	**	*	**	**	*	....	*	*	—	....	....	....	*	....	....	....	....	....	....
Diamond	6 7	r	gw	7–8	m	dm	N. Y.	**	**	*	....	**	*	**	*	....	....	....	....	*	*	*	*	....	....	....
Diana	5–6	ro	r	7–8	m	d	Mass	....	*	....	....	*	—	....	—	....	....	....	....	*	....	....	....	....	....	....
Dracut Amber	7–8	ro	a	7–8	me	dm	Mass	....	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....
Duchess	4–5	ro	gy	8–9	m	d	N. Y.	*	*	—	*	*	....	....	....	....	....	....	....	**	....	....	....	....	....	....
Elvira	3–4	r	w	7–8	m	d	Mo	....	—	—	*	*	—	—	**	....	....	....	....	*	....	....	....	....	....	....

Empire *State*	3-4	r	w	7-8	m	d	N. Y.	....	*	*	....	**	....	*	*	*	....	....	....	*	....	....	....	....	....	....	....
Goethe	9-10	o	ygr	7-8	l	d	Mass.	....	*	*	*	—	....	....	**	....	....	....	....	**	....	....	....	....	....	....	....
Hartford	6-7	r	b	4-5	e	m	Conn.	*	*	*	*	—	....	*	*	....	*	....	....	*	....	....	....	....	....	....	....
Hayes	5-6	r	yw	6-7	e	d	Mass.	....	*	—	*	....	....	....	....	....	....	....	....	*	....	....	....	....	....	....	....
Herbert	7-8	r	b	7-8	e	dm	Mass.	**	*	**	*	*	—	....	....	....	....	....	....	*	....	....	....	....	....	....	....
Iona	5-6	ro	r	9-10	m	d	N. Y.	....	*	—	—	*	....	....	....	—	*	....	....	*	....	....	....	....	....	....	....
Isabella	7-8	ro	b	7-8	m	dm	S. C.	—	*	—	—	*	....	....	....	—	....	....	....	**	....	*	....	....	....	....	....
Ives	5-6	ro	b	5-6	e	mw	Ohio	....	*	*	**	*	*	**	*	....	*	*	....	*	....	....	....	....	....	....	....
Janesville	5-6	r	b	3-4	e	m	Wis	....	....	....	....	....	....	....	....	**	....	....	....	....	....	....	....	....	....	....	....
Jefferson	5-6	r	r	7-8	ml	d	N. Y.	—	*	—	*	*	*	*	....	....	—	*	....	*	....	....	....	....	....	....	....
Lady	7-8	r	w	6-7	em	d	Ohio	**	*	**	*	*	....	....	....	....	....	....	....	*	....	....	....	....	....	....	....
Lindley	5-6	ro	r	5-6	m	dm	Mass.	**	**	*	*	*	*	*	*	....	*	....	....	**	....	....	....	....	....	....	....
Loretto, *Queen*	5-6	r	w	7-8	m	d	Tenn.	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Lutie	5-6	r	r	5-6	l	dm	Tenn.	....	....	....	*	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Massasoit	7-8	r	r	5-6	m	dm	Mass.	*	**	....	*	*	....	....	—	....	....	....	....	*	....	....	....	....	....	....	....
Merrimac	8-9	r	b	7	m	dm	Mass.	*	*	—	*	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....
Moore *Early*	8-9	r	b	6-7	e	m	Mass.	**	**	**	**	**	....	**	**	....	**	....	....	**	....	**	*	....	....	....	....
Moyer	3-4	r	r	8-9	m	dm	Can.	**	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Murray	8	r	m	8	ml	dm	....	*	†	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Nectar	4-5	r	b	8-9	e	d	N. Y.	*	†	**	†	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Niagara	8-9	r	w	7-8	ml	m	N. Y.	**	**	**	**	*	*	**	**	....	*	*	....	**	....	**	....	....	....	....	....
Olita	5-6	r	w	6-7	m	d	Tex.	....	—	....	*	**	*	*	....	....	....	....	....	*	....	....	....	....	....	....	....
Perkins	7-8	r	r	2-3	ve	m	Mass.	....	*	*	*	....	....	*	*	....	....	....	....	*	....	....	....	....	....	....	....
Pierce	8-9	....	b	7-8	....	d	Cal.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	†	....
Pocklington	8-9	r	wy	6-7	em	m	N. Y.	....	*	—	—	....	....	*	**	....	*	....	....	*	....	*	....	....	....	....	....
Prentiss	5-6	r	w	7-8	m	d	N. Y.	....	*	*	....	....	....	....	....	....	....	....	....	**	....	....	....	....	....	....	....
Salem	9-10	r	b	7-8	m	dm	Mass.	*	**	*	*	*	....	—	....	....	*	....	....	**	....	....	....	....	....	....	....
Triumph	7-8	r	y	7-8	vl	d	Ohio	—	—	....	*	....	....	*	*	....	....	....	....	*	....	....	....	....	....	....	....
Ulster	5-6	r	a	9-10	m	d	N. Y.	—	*	*	....	*	....	....	....	....	....	....	....	*	....	....	....	....	....	....	....
Vergennes	7-8	o	r	8-9	m	dm	Vt.	*	*	....	*	*	....	*	....	....	....	....	....	*	....	....	....	....	....	....	....
Victor	5-6	r	b	7-8	ve	dm	Kans.	**	*	—	*	....	....	....	....	....	....	....	....	*	....	....	....	....	....	....	....
Washington, *Lady*	6-7	r	yn	7-8	l	d	N. Y.	....	....	*	*	....	....	....	*	....	....	....	....	*	....	....	....	....	....	....	....
Wilder	9-10	r	b	7-8	m	m	Mass.	*	*	*	—	**	—	**	....	....	**	....	....	*	....	†	....	....	....	....	....
Winchell (*Green Mountain*)	4-5	r	w	7-8	e	d	Vt.	**	**	*	*	*	....	*	*	**	....	....	....	....	....	....	....	....	....	....	....
Woodbury	8-9	ro	w	7-8	m	dm	Maine	**	†	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Woodruff	8-9	r	r	6-7	em	m	Mich.	....	*	....	*	*	....	....	**	....	....	....	....	*	....	*	....	....	....	....	....
Worden	7-8	r	b	7-8	em	dm	N. Y.	**	**	**	**	**	*	*	**	....	**	....	....	**	....	**	†	....	....	....	....

SUBSECTION 3.—*V. LINCECUMII.*[1]

America	3-4	r	b	5-6	m	w	Tex.	....	....	....	....	....	....	**	....	....	....	**	....	....	....	....	....	....	....	....	....
Bailey	6-7	r	b	8-9	e	dm	Tex.	....	....	....	....	....	....	**	....	....	....	**	....	....	....	....	....	....	....	....	....
Beacon	7-8	r	b	8-9	e	dm	Tex.	....	....	....	....	....	....	*	....	....	....	*	....	....	....	....	....	....	....	....	....
Carman	7-8	r	b	7-8	vl	dm	Tex.	....	—	....	*	**	....	**	*	....	....	**	....	....	....	....	....	....	....	....	....
Fern *Munson*	3-5	r	b	4-5	l	w	Tex.	....	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....
Laussel	4-5	r	b	7-8	vl	nm	Tex.	....	....	....	....	....	....	**	....	....	....	....	....	....	....	....	....	....	....	....	....
Jaeger, *Herman*	5-6	r	b	7-8	m	dm	Tex.	....	—	....	*	....	*	*	*	....	....	....	....	....	....	....	....	....	....	....	....

[1] Includes apparent hybrids.

Section 7.—GRAPES. (Vitis.)—Continued.

Subsection 4.—*V. ROTUNDIFOLIA.*

Name.	Description.							Districts and starring.																		
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Eden	7–8	r	b	9	l	dw	Ga.				*	**														
Flowers	8–9	r	b	4–5	vl	dw	South.				**	**		**												
James	9–10	r	b	6–8	vl	d	N. C.				*	**	**	**												
Memory							South.				*	**	**	**												
Mish	6–7	o	b	5–6	ve		N. C.				*	*	**	**												
Scuppernong	8–9	r	y	5–6	m	w	N. C.				**	**		**				**								
Tenderpulp	8–9	r	b	4–5	m	w	S. C.				**	**		**												
Thomas	6–7	r	b	7–8	e	w	S. C.				**	**		**												

Subsection 5.—*V. VINIFERA.*

[Key.—Size, scale 1 to 10: 1, very small; 10, very large. Form: o, oval; r, round. Color: a, amber; b, black; g, green; p, purple; r, red; w, white; y, yellow. Flavor: m, muscat; s, sweet. Season: e, early; l, late; m, medium; v, very. Use: t, table; w, wine; r, raisin. Abbreviations of names of places of origin: Eur., Europe; For., Foreign.]

Alexandria, *Muscat of*	8–9	ov	w	m	l	r	Africa					†	*	*				*	**	**		**		*	**	**
Black Hamburg	9–10	rov	b	s	m	t	Ger.						*	*					*	*		**	*	*	*	*
Black Morocco	8–9	o	b	m	l	t	For.													*					*	*
Black Prince	5–6	o	b	s	e	t	For.													**		*				*
Calabrian			w	s	l	t	Italy							*												
Cornichon, *Black*	8–9	ov	pb	s	l	t	Eur.													*				*	*	*
Emperor	8–9	ob	r		l	t	Eur.															†		*	†	
Flame Tokay	8–9	r	r	s	m	t	Eur.												**	*		*		*	**	*
Gordo Blanco (*Muscatel*)	8–9	r	w	m		rt	Spain.																		*	*
Griesa, *Piedmont*	9–10	r	b		e	t	Italy							*												
Malaga	8–9	o	w		m	t	Spain.											*	*							
Mataro																								*		
Mission	6–7	r	pb	s	m	w	Cal.							*				*	*	**				*		**
Olivet *Cadinet*	9–10	o	b	s	m	t	Italy																			
Palomino (*Golden Chasselas*)	5–6	r	yg	s	e	t	For.																		*	
Peru, *Rose of*	8–9	r	b	s	e	t	Eur.						—	*						*		*		*	*	*
Prince, *Black*	8–9	ov	b	s	m	t	Eur.						—	*												
Reisling, *Johannisburg*	4–5	r	w	s		w	Ger.																	*		
Sweetwater, *White*	6–7	r	w	s	e	t	Eur.													**		**	**	*	*	*

Name.	Description.							Districts and starring.																		
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Sultana	4–5	ov	y	s	m	r	Asia	....	....	....	....	....	....	....	....	....	....	....	....	*	....	....	....	*	*	*
Thompson *Seedless*	3–4	o	y	s	e	tr	Tur'y[1]	....	....	....	....	....	..	....	....	....	....	*	....	....	....	....	....	*	*	**
Verdel	8–9	ov	y	s	l	t	Mad	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Zinfandel	.....	.....	b	s	m	w	Eur	....	....	....	....	....	*	....	....	....	....	....	....	**	....	*	....	**	*	*
SUBSECTION 6.—*V. VULPINA : syn. RIPARIA.*[1]																										
Bell	2–4	r	w	7–8	me	w	Tex	....	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....
Berckmans	5–6	r	r	10	m	d	S. C	—	—	....	*	*	—	*	....	....	....	....	....	*	....	....	....	....	....	....
Clinton	2–3	r	b	5–6	vl	w	N. Y	*	*	*	*	....	....	*	....	....	....	....	....	*	....	....	....	....	....	....
Missouri Reisling	5–6	r	gw	7–8	m	w	Mo	....	*	*	*	—	—	*	*	....	....	....	....	....	....	....	....	....	....	....
Noah	2–3	r	w	5–6	vl	w	Ill	....	—	....	....	*	—	*	—	....	....	....	....	*	....	....	....	....	....	....
Rommel	5–6	r	w	8–9	em	dm	Tex	....	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....

[1] Includes apparent hybrids.

Section 8.—MULBERRIES. (Morus. Alba and rubra.)

[KEY.—Size, scale 1 to 10: 1, very small; 10, very large. Form: c, cylindrical; l, long; s, short. Color: b, black. Quality, scale 1 to 10: 1, very poor; 10, best. Season (June): b, beginning. Use: d, dessert; k, kitchen.]

Name.	Description.							Districts and starring.																		
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Downing	5–6	lc	b	8–9	b	dk	N. Y	....	*	*	**	*	*	*	**	....	....	....	....	*	....	....	....	....	....	....
Hicks	4–5	sc	b	7–8	b	dk	Ky	....	....	....	**	*	**	*	....	....	....	....	....	....	....	....	....	....	....	....
New American	5–6	lc	b	8–9	b	dk	N. Y	....	**	....	....	....	....	....	*	....	....	....	....	†	....	....	....	....	....	....
Stubbs	9–10	lc	b	9–10	.....	d	South	....	*	....	....	**	**	**	....	....	....	....	....	....	....	....	....	....	....	....

Section 9.—NECTARINES AND PEACHES. (Persica vulgaris.)

Subsection 1.—NECTARINES. (*P. VULGARIS var. LÆVIS.*)

[Key.—Size, scale 1 to 10: 1, very small; 10, very large. Form: c, compressed; o, oblate; ov, oval; r, round. Color: c, creamy; g, green; r, red; w, white; y, yellow. Adhesion: c, cling; f, free; s, semicling. Quality, scale 1 to 10: 1, very poor; 10, best. Season: e, early; m, medium; l, late; v, very. Use: d, dessert; k, kitchen; m, market. Abbreviations of names of places of origin: Am., America; Belg., Belgium; Eng., England; Eur., Europe; Fr., France.]

Name.	Description.									Districts and starring.																		
	Size.	Form.	Color. Skin.	Color. Flesh.	Adhesion.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Boston	7–8	rov	yr	y	f	5–6	m	d	Mass		*	*					*					**					*	
Downton	7–8	rov	gr	gr	f	5–6	ve	d	Eng			*										*						
Early Newington	7–8	rov	gr	gwr	c	9–10	e	d	Eng		*		*									*					*	
Early Violet	7–8	r	yr	wr	f	7–8	ve	d	Fr		*		*	*								*						
Elruge	5–6	rov	gr	g	f	7–8	l	d	Eng		*											*						
New White	6–7	r	w	w	f	6–7		dm														**						
Stanwick	6–7	rov	gr	w	f	4–5	l	d	Eng		*	*		*			*					*						

Subsection 2.—PEACHES. (*P. VULGARIS.*)[1]

Albright	7–8	r	w		c	7	l	dm	N. C.				*	*														
Alexander	5–6	r	wr	cw	s	5–6	ve	dm	Ill		*	*	**	**		**	**		*	**	**	**		**	*	**	*	*
Allen *October*	7–8	r	yr	yr	f	5	l	dm	Mo				*	*		**	*											
Amelia	7–8	r	wr	w	f	7–8	e	dm	N. C.		—		*	**	*	**	*					**						
Ameliaberta	6		y	y	f				Ga			†																
Angel	7–8	r	wr	gw	f	7–8	e	dm	Fla						*					*								
Banner											*																	
Beers Smock	7–8	ov	yr	yr	f	5–6	l	km	N. J.		**	**	**	*		*	**		*			‡						
Bequett Cling	7–8	roi	gwr		c	6–7	me	mk	Tex			*	*															
Bequett Free	7–8	roi	gwr		f	6–7	me	m	Tex			**	*															
Bergen *Yellow*	8–9	r	yr	y	f	8–9	m	d	Am		*	*			**							**						
Bidwell Early	4–5	ov	wr	gw	c	5–6	ve	dk	Fla						**													
Bidwell Late	5–6	ov	wr	gw	c	7–8	l	dk	Fla						**													
Bilyeu	7–8	r	gw	w	f	6–7	vl	dkm	Md			*	**															
Bishop *Early*	7	r	w		f	8	ml	m	Cal			*	*			**												
Blood Cling	8–9	rov	y	yr	c	5–6	vl	k	Am		*	—	*	*		**	*		*					*				
Blood Free	8–9	rov	y	yr	f	5–6	vl	k	Am		—			*		*						*						
Brandywine	8–9	roi	ygr		f	6	me	m	Del			*	†															
Brigdon (*Garfield*)	5–6	rov	yr	yr	f	7–8	m	dm	N. Y		**																	
Cabler *Indian*	8–9	r	r	r	c	4–5	m	k	Tex		—	—	*			**	*			*		*						

Chairs *Choice*	7-8	r	yr	yr	f	6-7	m	km	Md		**	**	**	*			*		*			*		*				
Champion	7-8	r	cr	w	f	7-8	em	dm	Ill		**	**	**	*			**		*			**						
Chili, *Hills*	5-6	ovc	yr	yr	f	5-6	me	m	N. Y	*	**		*	*		*	**					*						
Chinese Cling	9-10	rc	cwr	wr	c	7-8	m	km	Am		—	*	*	*	*	—	*					*						
Columbia	7-8	r	w	y	f	5-6	ml	m	Ga		*		*	*	—	*						**						
Connett *Southern Early*	8	ob	w		s	7-8	m	m	N. C			*	*	*														
Cox Cling	7-8	r	gw	g	c	7-8		dm	Tex							*								*				
Crosby	6-7	r	yr	y	f	7-8	m	m	Mass		**	*	**	*		†	**		*			**						
Curtis																*												
Early Barnard	5-6	r	yr	y	f	6-7	m	m	Ill		**	—	*			*	*					*						
Early China	5-6	ov	w	w	f	7-8	ve	dm	Tex		—				*					*								
Early Crawford	8-9	rov	yr	y	f	8-9	m	dm	N. J		**	**	**	*	*	*	**		*			**		**	**	**	**	**
Early Toledo	7-8	r	wr	w	f	7-8	e	dm	Ohio		*																	
Early York	5-6	rov	wr	w	f	8-9	e	dm	Eng		*	—	*	*		**	*		*			**		*				
Eaton	6-7	r	yr	y	c	5-6	m	dm	N. C		—	—	*	**								*						
Elberta	8-9	rc	yr	y	f	7-8	ml	m	Ga		**	**	**	**	*	**	**		**		**	**		**			*	*
Emma	8-9	rc	yr		f	8-9	ml	m	Ga			†		**														
Family Favorite	7-8	ro	gw	g	s	7-8	e	dm	Tex							**												
Fitzgerald	7-8	ov	ry	yr	f	8-9	me	dm	Can		**																	
Forrester	8-9	r	yr			8-9	m	dm	Ga				†	†														
Foster	9-10	r	yr	y	f	9-10	m	dm	Mass		**	**	**	**		**	**					**		*		*	**	**
Fox *Seedling*	7	r	w	cw	f	7-8	l	m	N. J		*	**	*															
Galveston	4-5	ro	yg	yg	c	6-7	l	d	Tex						**					**								
Georgia, *Belle of*	7	rob	wr	w	f	7-8	e	km	Ga			*	*	**														
Globe	8-9	rov	yr	y	f	7-8	m	m	Pa		**	*	*	—			*		*			*						
Golden Cling	8-9	ovc	yr	y	c	7-8	l	km	Cal																	*		*
Greensboro	7-8	r	r	w	s	7-8	e	m	N. C			†	†	*														
Hale	4-5	r	gwr	gw	s	5-6	e	m	Ohio		**	—	—	**	*	—	*		*	*		*		**	**	*	*	*
Heath Cling	8-9	rov	wr	w	c	9-10	vl	km	Md		—	*	*	*		**	**		*		*	**		*		*	*	*
Henrietta	6-7	ro	yr	yr	c	6-8	l	mk	D. C			*	*			*												
Honey	4-5	ov	cr	wr	f	8-9		dk	N. Y			—			*	*												
Hynes *Surprise*	4-5	r	r	cr	s	7	l	dm	Ky		*		*	*		**												
Ingold, *Lady*	6-7	r	yr	yr	f	8	me	dm	N. C		*	**	*	**		*												
Kalamazoo	7-8	ov	ry	yr	f	8-9	me	dkm	Mich		**																	
Kerr, *Jessie*	7-8	ov	wr	w	f	5-6	ve	m	Md			—	*	*		*	*					*						
Keyport	7-8	rov	wr	w	f	4-5	l	m	Am		—	—	*				*					*						
Largo York	6-7	r	wr	w	f	7-8	e	dm	Eng		*		*			**	—											
Late Admirable	8-9	rov	gr	w	f	8-9	m	d	Fr		—	**	*				*											
Late Crawford	8-9	r	yr	y	f	8-9	l	dm	N. J		**	**	**	*		*	**		*			**		**	*	*	*	**
Late Rareripe	7-8	rov	yr	w	f	8-9	m	dm	Am		—	*	*		—		*					*						
Lee, *General*	8-9	ro	g	g	c	8	e	m	Am			*	*	*		*						*						
Lemon Cling	8-9	rov	yr	y	c	8-9	m	dm	S. C		*	—	*	*		*	**					*		*				**
Lemon Free	8-9	ob	y	y	f	8-9	l	dm	Ohio		*		**	*														
Lewis	6-7	r	rw	cr	f	7-8	l	dkm	Mich		**																	
Louise	5-6	r	r	w	f	7-8	e	dm	Eng		—	—	**	*		*	—					*						
Lolo, *Miss*	6-7	r	rw	cr	f	8	e	dm	Tex				*	*		*												
Lovell	5-6	rc	yr	y	f	7-8	l	km	Cal																	*	*	
Mamie Ross	6-8	ro	w	y	c	7-8	e	dm	Tex			*				**				**								
Mary *Choice*	8-9	r	yr	yr	f	8-9	l	m	Md			**	*													*	*	*

[1] The distinctive peculiarities of the families or strains of peaches known as Chinese, Persian, and Spanish being more or less ill defined and obscured by crossing or hybridization, a correct classification of varieties under these heads is not deemed practicable.

Section 9.—NECTARINES AND PEACHES. (Persica vulgaris.)—Continued.

SUBSECTION 2.—PEACHES. (*P. VULGARIS.*)—Continued.

Name.	Description.									Districts and starring.																		
	Size.	Form.	Color. Skin.	Color. Flesh.	Adhesion.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Morris White	7–8	ov	cw	w	f	5–6	m	km	Am	....	*	—	*	....	....	....	*	....	....	....	....	**	....	*	....	*	....	†
Mountain Rose	6–7	r	wr	w	f	8–9	em	dm	N. J	....	*	*	**	*	—	**	**	....	*	....	....	**	....	*	....	....	....	....
Muir	8–9	w	y	y	f	8–9	m	dkm	Cal	....	....	....	....	....	....	....	....	....	....	....	....	....	....	**	*	**	**	**
McDevitt	8–9	obc	yr	yr	c	7–8	m	km	Cal	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	....	*
Oldmixon Cling	7–8	rov	c	w	c	7–8	m	km	Am	....	*	—	**	*	....	**	*	....	*	....	....	**	....	....	....	....	....	....
Oldmixon Free	7–8	rov	c	w	f	8–9	m	dm	Am	....	**	**	**	*	....	**	**	....	*	....	....	**	....	....	....	....	....	....
Onderdonk	7–8	ov	w	w	f	7–8	m	dm	Tex	....	....	....	....	....	*	*	....	....	....	*	....	....	....	....	....	....	....	....
Orange Cling	7–8	r	y	y	c	5–6	m	km	....	....	....	....	....	....	....	....	....	....	....	....	....	**	....	....	....	*	**	**
Pallas	7–8	ov	w	w	f	6–7	e	dm	Ga	....	....	....	*	*	—	**	....	....	....	*	....	....	....	....	....	....	....	....
Parham	5–6	r	yw	wr	f	5–6	l	mk	Am	....	....	....	....	....	....	**	....	....	....	....	....	....	....	....	....	....	....	....
Peen to	4–5	f	w	w	c	7–8	e	d	Ga	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....
Peninsula	8	o	y	y	f	7–8	ml	m	Md	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Phillips Cling	7–8	oc	y	y	c	7–8	ml	dm	Cal	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	....	....	....
Picquet	7–8	r	yr	y	f	5–6	l	d	Ga	....	....	—	**	*	....	*	**	....	....	....	....	*	....	....	....	....	....	*
Prize	7	ob	y	yr	f	8	l	m	....	....	....	**	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Red Cheek *Melocoton*	7–8	rov	yr	y	f	6–7	m	dm	Am	....	*	*	....	—	....	....	*	....	....	....	....	....	....	....	....	....	....	....
Reeves Favorite	8–9	rov	yr	y	f	7–8	m	m	N. J	....	*	**	**	*	—	—	**	....	....	....	....	*	....	*	....	....	....	....
Richmond	8–9	r	yr	y	f	6–7	m	m	N. J	....	**	....	....	—	....	....	....	....	....	....	....	**	....	....	....	....	....	....
Rivers	6–7	rc	cw	w	f	7–8	e	dm	Eng	....	**	*	*	*	....	*	*	....	....	....	....	*	....	....	....	....	....	....
Royal George	5–6	r	wr	w	f	10	m	d	Eur	....	*	....	**	—	....	**	*	....	....	....	....	*	....	....	....	....	....	....
Russell	7–8	r	wr	w	f	7–8	e	dkm	Nebr	....	....	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....
Salway	7–8	rov	yr	y	f	5–6	l	m	Eng	....	**	—	**	*	....	*	**	....	....	*	....	*	....	*	*	*	**	**
Smock	7–8	ov	yr	y	f	5–6	l	m	N. J	....	**	**	**	—	....	*	**	....	....	....	....	**	....	*	....	....	....	*
Sneed	6–7	ov	gw	w	c	4–5	ve	m	Tenn	....	*	....	*	*	....	*	*	....	....	*	....	*	....	....	....	....	....	....
Snow	7–8	r	w	w	f	6–7	m	dm	Am	....	*	—	*	*	....	....	*	....	....	....	....	*	....	....	....	....	....	....
Stevens *Rareripe*	6–7	rov	cw	w	f	7–8	ml	m	N. J	....	**	*	*	*	....	....	*	....	*	....	....	**	....	....	....	....	....	....
St. John	7–8	r	yr	y	f	7–8	e	m	Am	....	**	**	**	*	....	**	*	....	....	*	....	....	....	*	....	....	....	*
Stonewall *Jackson*	7–8	ro	gy	g	c	6–7	e	km	Tex	....	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....
Strawberry	5–6	ov	r	w	f	7–8	em	dm	N. J	....	....	....	*	....	....	....	*	....	....	....	....	*	....	....	....	*	*	*
Stump	8–9	rov	wr	w	f	6–7	ml	m	N. Y	....	**	**	**	**	....	**	**	....	*	....	....	*	....	*	....	....	....	*
Susquehanna	9–10	r	yr	y	f	9–10	m	dk	Pa	....	—	*	*	*	*	*	*	....	*	....	....	*	....	*	....	*	*	**
Texas	4–5	ro	yg	g	sc	5–6	l	d	Tex	....	....	....	....	....	*	*	....	....	....	....	....	....	....	....	....	....	....	....
Thurber	6–7	rov	wr	w	f	7–8	e	d	Ga	....	—	*	*	*	*	*	*	....	....	....	....	*	....	....	....	....	....	....
Tillotson	5–6	r	wr	w	f	7–8	e	d	N. Y	—	*	—	*	**	....	**	*	....	....	....	....	*	....	....	....	....	....	....
Tippecanoe	8–9	r	yr	y	c	6–7	l	dm	Pa	—	—	—	*	*	....	....	....	....	....	....	....	*	....	....	....	....	....	....
Triumph	5–6	r	yr	yr	s	8–9	e	dm	Ga	....	*	*	*	**	....	**	....	....	....	....	....	....	....	....	....	....	....	....

Troth	3-4	r	wgr	wr	f	5	me	m	N.J			*	*																		
Tuskena	8-9	oc	y	yr	c	7-8	e	dkm	South																			*		*	*
Wager	5-6	ov	y	y	f	4-5	m	m	N.Y		*	—				*	*										*		*		
Waldo	4-5	ov	w	w	f	6-7	e	dm	Fla			—			*	*															
Walker *Var. Free*	8	o	wr	wr	f	7-8	l	dm	Del		*	**																			
Ward *Late*	7-8	rov	wr	w	f	7-8	vl	dk	Am	—	*	*					*							*							
Waterloo	5-6	r	wr	gw	s	5-6	ve	dm	N.Y		*	—	*	—			*							†		*					
Wheatland	9-10	r	yr	y	f	6-7	m	dm	N.Y	—	*	*	*	*			*							**		*					
Yellow Rareripe	7-8	r	yr	y	f	7-8	m	dm	Am	—	*	—	*	*			*							*							

Section 10.—PEARS. (Pyrus communis and sinensis.)

[KEY.—Size, scale 1 to 10: 1, very small; 10, very large. Form: i, irregular; o, oblate; ob, oblong; obo, obovate; obt, obtuse; ov, ovate; p, pyriform; r, round; t, turbinate. Color: b, brown; c, crimson; g, green; r, red; ru, russet; y, yellow. Texture: b, buttery; f, firm; g, granular; m, melting; t, tender. Flavor: a, acid; as, astringent; j, juicy; s, sweet; v, vinous; p, perfumed. Quality, scale 1 to 10: 1, very poor; 10, best. Season: e, early; m, medium; l, late; v, very. Use: d, dessert; k, kitchen; m, market. Abbreviations of names of places of origin: Am., America; Belg., Belgium; Eng., England; Eur., Europe; Flem., Flemish Provinces; Fr. France; Hol., Holland.]

Name.	Description.									Districts and starring.																				
	Size.	Form.	Color.	Texture.	Flavor.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Alamo				bm					Tex							*												
Ananas *d'Ete*	6-7	p	ybru	bm	sp	5-6	em	d	Hol		*	—		*														
Andrews	6-7	pi	gyr	m	v	4-5	e	d	Mass		—		*	*		—												
Angouleme, *Duchess de*	9-10	obobo	gyru	b	v	5-9	m	dm	Fr		**	**	**	*		*	**				*	**		*	*	*	*	
Anjou	7-8	obtp	grc	m	vp	8-9	m	dm	Fr		**	**	*	*		*	**		**	*	*	**		**	**	*		
Ansault	4-5	rob	gyru	m	sv	4-5	e	m	Fr	*	*																	
Archangel	8-9	obop	yru	bm	jp	4-5	m	m	Fr		*	*	**	*		**												
Bartlett	7-8	obobtp	yrur	bt	jop	6-8	em	dm	Eng	—	**	**	**	*	—	*	**		**		**	**		**	**	**	**	**
Bessemianka	5-6	oobo	y	g	js	4-5	e	m	Rus	**			*				—					*						
Bloodgood	4-5	topo	yru	bm	sp	6-7	e	d	N.Y.?		**		*	*		—			*			*						
Bordeaux, *Duchess de*	5-6	rop	yru	t	js	6-7	l	m	Fr		*			*			*					*						
Bosc	8-9	p	yrur	mb	p	8-9	m	dm	Belg		**	*	*	*		—						*			*			
Boussock	7-8	obop	yru	bm	jp	6-8	m	m	Belg		**	*	*	*		—						*						
Brandywine	5-6	p	ygru	m	jop	6-7	e	m	Pa		**	**	*	*		—						*						
Buffum	5-6	obobo	yr	b	sv	6-7	m	km	R.I		**	*	**	*		—	*					*						
Chambers	4-5	robo	yr	gf	s	4-5	ve	d	Md.?		*		*															
Clairgeau	7-8	p	yc	bg	jsp	4-5	l	m	Fr		*	*	*	*		—	**					**		*	*	*		
Clapp *Favorite*	7-8	obop	yc	bm	jsv	5-6	em	m	Mass	—	**	*	*	*	*	—	*		*		**	**		**	*			*
Columbia	8-9	obo	y	m	jsp	6-7	l	m	N.Y		*						*					**						
Comice, *Doyenne du*	8-9	rp	yc	mb	jsp	8-9	ml	dm	Fr		*	*										*						
Danas Hovey	3-4	obop	yru	m	jsp	9-10	l	d	Mass		*	**	*				*					*						
Diel	8-9	obop	yru	gb	sv	5-6	m	d	Belg		**											*						
Drouard, *President*	8	ovi	gy	t	sp	5-6	l	m	Fr	*	†																	

Section 10.—PEARS. (Pyrus communis and sinensis.)—Continued.

Name.	Description.									Districts and starring.																		
	Size.	Form.	Color.	Texture.	Flavor.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Easter *Beurre*	7–8	robo	ygru	bm	js	5–6	vl	d	Eur		*	*	—	*	*	—						*		**	*	*		
Elizabeth, *Manning's*	4–5	obop	yr	m	jsp	6–7	e	d	Belg		*	**	*	*														
Flemish *Beauty*	8–9	obobt	yrur	m	jsp	6–7	em	dm	Belg	*	**	*	*	*		—	*	*	**			**		**				*
Frederick Clapp	6–7	rp	y	m	jvp	5–6	m	dm	Mass		*											*						
Garber	7–8	robtp	yr	fg	ja	3–4	ml	km	Pa	—	—	**	*	**	**	**	*					*						
Ghislain	5–6	p	y	b	jrich	4–5	m	d	Belg	—	—			*		—						*						
Giffard	5–6	p	gyr	m	jvp	7–8	e	dm	Fr	*	**	**	*	*		—						**						
Glout Morceau	6–7	obop	gyb	bm	srich	6–9	l	d	Flem		*	—	*	*	—	—	*					*						
Goodale	7–8	obp	ycru	mg	svp	5–6	m	dm	Me	*	**																	
Grand Isle	5	c	gy	m	s	7	me	dm	Vt	*	†																	
Gray Doyenne	5–6	ovobo	ru	bm	rich	8–9	m	d	Fr		*	*		*		—	—					*						
Hardy, *Beurre*	7–8	obop	grur	bm	jv	6–8	m	m	Eur. ?		*			*												*		
Heyst, *Emile de*	8–9	obop	yru	m	svp	8–9	ml	d	Belg	—	*	—		*														
Howell	6–7	rp	yr	m	jv	5–6	m	dm	Conn		**	**	**	*	*	*	**				*	**		*				
Idaho	8–9	obot	yru	m	sv	8–9	m	dm	Idaho															**	†			
Kieffer	7–9	rov	yru	gm	js	3–5	ml	mk	Pa	—	**	**	**	**	**	**	**		*			**		—				
Kirtland	4–5	obtobo	yrru	m	jsp	7–8	e	d	Ohio		*	—	—	*		—	—					*						
Langelier	5–6	obop	ycru	mg	v	3–4	l	d	Eng		—			*			—											
Lawrence	5–6	obop	yru	m	sp	7–8	l	dm	N. Y		**	**	**	*	*	—	*					**						
Le Conte	7–8	robtp	yr	m	s	3–4	m	m	Am		—	*	*	**	**	**			*			*						
Lawson	6–7	obo	yr	fg	s	3–4	e	m	N. Y			*																
Lincoln	6–7	obop	yr	bm	s	7–8	m	dm	Ill				*				*											
Louise *Bonne de Jersey*	6–7	obp	gbr	m	j	5–6	m	dm	Fr		**	*	*	*		*	—		*		*	**		*	*			
Lucrative, *Belle*	5–6	obop	ygru	m	s	7–9	m	dm	Flem		**	**	*	*		—			**			**						
McLaughlin	7–8	obtp	gyru	m	jvp	4–5	l	dk	Me		*																	
Madeleine	4–5	obop	ygb	m	sp	6–7	e	d	Fr		*	—		*		—						*		*				
Magnolia	7–8	obgr	ru	m		5	e	mk	Ga				†	*		†												
Malines, *Josephine de*	5–6	rop	gyru	m	jsp	7–8	l	dm	Belg	*	**		—	*								*						
Marguerite, *Petite*	4–5	obtp	yb	bm	jsp	5–6	e	d	Fr		*		*	*			*					**		*				
Marie Louise	6–7	obp	gyru	bm	jvas	5–6	ml	dk	Belg		*			*														
Merriam	5–6	ro	yru	gm	jvp	4–5	m	dm	Mass		*																	
Mount Vernon	6–7	obtp	yrur	gm	jvp	5–6	ml	dm	Mass	†	*		*	*			*					*		*				
Napoleon	6–7	obtp	gy	m	js	5–6	ml	km	Belg		*	*					—											
Onondaga (*Swan's Orange*)	8–9	obtp	yru	bmg	jv	6–7	ml	km	Conn		**	*	*	*		—					*	*						
Osband *Summer*	3–4	obop	y	m	jsp	5–6	ve	dm	N. Y		**	*	*	*		*	*					**						
Ott	3–4	robo	gyrur	m	sp	4–5	e	dm	Pa	—		**		*		—												
Paradise *d'Automne*	7–8	obp	yru	gm	jvp	5–6	m	dk	Belg		*	*					—											
Pound	8–9	p	ygb	fg	v	2–3	vl	k	Eur		*	*	—	*								*		—				

Rostiezer	3-4	obop	yrb	mb	svp	8-9	e	d	Eur		*	†	*	*		—	—													
Rutter	6-7	rp	gyru	gm	sv	5-6	ml	dm	Pa		*	*	*				*						**							
Seckel	3-4	obo	bgrur	bm	jp	9-10	ml	d	Pa		**	**	**	*		**	**		**				**		**	*	*	*	**
Sheldon	6-8	robo	gyrub	m	jsvp	7-8	ml	dm	N. Y.		**	**	*	*		—	**		**				**		**				
Smith	7-8	rov	ry	t	vas	3-4	m	km	South					*	**	**													
Souvenir *du Congress*	7-9	obobtp	yr	bt	jvp	5-6	em	m	Fr		**		*	*			*						**						
Sterling	5-6	rop	yruc	m	js	4-5	e	dm	N. Y.		*		*	*															
Stevens	7-8	r	y	b	sp	4-5	e	d	N. Y.	—	*	*	*				—												
Summer Doyenne (*Doyenne d Eté*)	2-3	robo	yr	m	js	6-7	ve	d	Belg		**	—	*	*		—							**						
Superfine	6-7	rp	ycru	bm	v	6-7	m	km	Fr		**		*	*		—							*						
Tyson	4-5	p	yruc	m	jsp	8-9	m	dm	Pa		**	**	**			—	*		**				**						
Urbaniste	5-6	obop	yru	bm	jp	7-8	ml	dm	Belg	*	*	**	*			—	—						**						
Vermont *Beauty*	4-5	obob	yru	t	s	8-9	l	dm	Vt	**	*							†											
Vicar *of Winkfield*	7-8	p	yb	b	js	4-5	l	km	Fr		*	—	*	*		—	*						**						
Washington	5-6	ovobo	yr	m	js	5-6	e	d	Del		—	**	*	*			—												
White Doyenne	5-6	obo	yr	bm	jsv	8-10	ml	dm	Fr		*	—	*	**		—	*						*		**	**			
Wilder Early	4-5	obobbr	yr	t	sv	7-8	e	dm	N. Y.	**	*		*				†												
Winter Nelis	5-6	robo	ygru	bm	jsp	8-9	l	dm	Belg		**	**	**	**		—							**		**	**	*	**	**

Section 11.—PLUMS. (Prunus.)

SUBSECTION 1.—*P. AMERICANA.*

[KEY.—Size, scale 1 to 10: 1, very small; 10, very large. Form: c, compressed; f, flattened; o, oval; ob, obovate; obl, oblong; r round. Color: b, black; br, brown; g, green; p, purple; r, red; v, violet; w, white; y, yellow. Quality, scale 1 to 10: 1, very poor; 10, best. Season: e, early; m, medium; l, late; v, very. Use: d, dessert; k, kitchen; m, market; c, curing. Abbreviations of names of places of origin: Am., America; Belg., Belgium; Eng., England; Eur., Europe; Fr., France; Ger., Germany; Jap., Japan; Ont., Ontario; Rus., Russia.]

Name.	Description.							Districts and starring.																		
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Aitkin	8	o	r	6	me	dkm	Minn														†	†				
American *Eagle*	6-7	ro	r	5	me	m	Mo									*										
Black Hawk	8	ro	r	8	ml	dkm	Iowa															†				
Comfort	8	r	r	5	l	dkm	Iowa															†				
Cottrell	8	ro	ry	7	me	km	Minn															†				
De Soto	5-6	ro	yr	5-6	m	km	Wis							**	*		*				**		**			**
Forest Garden	5-6	r	r	5	em	k	Iowa	*	*						*		**			**						
Gaylord	8	ro	ry	7	l	dk	Iowa								†	†										
Hawkeye	5-6	r	r	6-7	ml	km	Iowa	*							*		*			**						
Louisa	6	ro	r	5	ml	m	Mo			*																
New Ulm	9-10	ro	yr	7	l	dk	Minn								†	†										
Ocheeda	6	ro	ry	8	ml	dk	Minn								*	*										

Section 11.—PLUMS. (Prunus.)—Continued.

Subsection 1.—*P. AMERICANA*—Continued.

Name.	Description.							Districts and starring.																	
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Piper	7	r	r	8	l	dk	Minn	....	....	....	....	....	....	....	†	†	....	....	....	....	....	....	....	....	....	....
Quaker	8	ro	ry	8	e	dk	?	....	....	....	....	....	....	....	*	*	....	....	....	....	....	....	....	....	....	....
Rockford	5-6	ro	yr	8-9	m	d	Iowa	*	....	....	....	....	....	....	*	....	*	....	....	*	....	....	....	....	....	....
Rollingstone	6-7	ro	r	6-7	m	dk	Minn	*	*	....	—	....	....	....	*	....	*	....	....	**	....	....	....	....	....	....
Stoddard	8-9	r	r	5	me	m	Iowa	....	....	**	†	....	....	....	†	....	....	....	....	....	....	....	....	....	....	....
Surprise	7-8	o	dr	9-10	m	dm	Minn	....	....	....	....	....	....	....	....	†	....	....	....	....	....	....	....	....	....	....
Weaver	5-6	oc	r	5-6	m	km	Iowa	*	*	....	*	....	....	....	**	**	*	....	....	*	....	....	....	....	....	....
Wolf	6-7	ro	r	6-7	m	km	Iowa	**	*	....	*	....	....	....	**	**	*	....	....	**	....	....	....	....	....	....
Wyant	4-5	ro	yr	5-6	m	k	Iowa	*	*	....	*	....	....	....	**	....	*	....	....	*	....	....	....	....	....	....

Subsection 2.—*P. ANGUSTIFOLIA*.

Caddo Chief	5-6	o	r	6	ve	dm	La	....	....	....	*	*	*	*	**	....	....	....	....	*	....	....	....	....	....	....
Cluck	5	ro	r	5	me	m	Tex	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Lone Star	2-3	o	r	3	m	k	Tex	....	—	*	....	....	....	**	....	....	....	....	....	....	....	....	....	....	....	....
Munson	5	ro	r	5	me	m	Tex	....	....	**	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Newman	5-6	o	r	3-4	m	km	Ky	....	*	**	—	—	....	*	†	....	....	....	....	*	....	....	....	....	....	....
Pottawattamie	5-6	r	r	3-4	ml	km	Tenn	....	*	....	....	....	*	....	**	**	*	....	....	**	....	....	....	....	....	....	....
Texas Belle (*Paris Belle*)	5-6	r	r	.....	m	.....	Tex	....	....	....	....	....	*	**	....	....	....	....	....	....	....	....	....	....	....	....	....
Yellow Transparent	7-8	o	y	5-6	e	km	Tex	....	....	....	**	....	....	**	*	....	....	**	....	....	....	....	....	....	....	....	....

Subsection 3.—*P. CERASIFERA*.[1]

De Caradeuc	5-6	r	dr	3-4	e	k	S. C	....	....	....	*	*	....	**	....	....	....	....	....	....	....	....	....	....	....	....
Marianna	5-6	r	r	2-4	l	km	Tex	....	*	....	*	*	—	....	*	....	....	....	....	*	....	....	....	....	....	....	....

[1] Includes supposed hybrids.

Agen, *Prune d'*, (*French Prune, Petite*)	5–6	o	vp	8–9	m	c	Fr			*										*			**	**	**	**	**
Archduke	7–8	ro	b	6–7	e	km	Eur			*		*							*								
Arctic, *Moore*	4–5	ro	b	5	e	dk	Me.?		**	*		*							**								
Aubert, *Yellow*	8–9	o	y	7	e	km	Eur			*						*											
Bavay (*Bavay Green Gage, Reine Claude de Bavay*)	5–6	r	y	9–10	m	dm	Belg			**	*	*	*			*	*	*						*			
Bradshaw	7–8	oob	rp	4–5	e	dm	Am		*	**		*								*			**	**	*	*	
Clyman	6–7	or	bv	7–8	ve	dm	Cal			†	*															**	
Columbia	8–9	r	bvp	8–9	e	dk	N. Y		—	*		**	*										**	**	*		
Damson	3–4	o	p	3–4	l	km	Eur		*	**		**	*			**		*		*			*	*	*	*	**
Diamond, *Black*	7–8	o	b	4–5	m	km	Eng		—	**																	
Duane *Purple*	8–9	o	rp	3–4	em	km	N. Y			*												**				*	
Emigrant	8–9	o	p	3–4	m	km	Kans															*					
Englebert, *Prince*	7–8	ro	b	5–6	em	km	Belg			*												*					
German *Prune*	6–7	o	p	6–7	m	c	Ger		*	**	**	*	*						**		**	**	**		*	*	*
Giant *Prune*	9–10	rob	rp	8	l	c	Cal			†																	†
Glass *Seedling*	8–9	ov	p	3–4	m	m	Ont		**	*																	
Golden Drop, *Coe* (*Silver Prune*)	7–8	o	yr	7–8	m	dmc	Eng			**	*	*	*			—		*				**		**	**	*	*
Golden Prune	8–9	o	y	9–10	m	dc	Oreg																	**	*		
Grand Duke	9–10	o	b	5–6	ml	km	Eur.?			**																	
Green Gage	4–5	ob	g	9–10	m	d	Fr			**															*	*	**
Gueii	8–9	ob	b	5–6	m	dm	N. Y		*	**		**															
Hand (*Gen. Hand*)	6–9	ro	y	5–6	m	m	Pa.?			*	*	*										**					
Hudson *River Purple Egg*	7–8	o	rp	7–8	m	dm	N. Y.?			*						*						**					
Hulings *Superb*	8–9	ro	gy	5–6	em	k	Pa			*	*	*				*											
Imperial Gage	6–7	o	gy	10	m	dm	N. Y			**	*	*	*	—		*		*		**		**		**	*	*	*
Italian Prune (*Fellenberg*)	7–8	o	b	8–9	l	mc	Eur.?		—	**		*	*			*		**				**		**	*	*	*
Jefferson	7–8	o	yrp	8–9	e	dk	N. Y			**		*				—						*			*		*
Kingston	8–9	o	b	5–6	m	km	Am. ?		—	**																	
Lombard	5–7	ro	vr	5–6	e	m	N. Y		**	**		*				**		**				**					
McLaughlin	8–9	r	yr	9–10	e	dm	Me		*	*						—						**					
Macomber							Vt		*																		
Moldavka	7–8	o	y	6–7	e	m	Rus		—	*								*					*				
Monarch	8–9	ro	pb	8–9	ml	dkm	Eng		*	*																	
Monroe *Egg*	5–7	o	gy	5–6	m	m	N. Y			*						—						*					
Orleans	5–6	r	rp	4–5	e	m	Eng		*	*												*					
Peach	8–9	rf	brr	4–5	ve	k	Am.?		*	*												**		**	**		*
Pond (*Fonthill, Hungarian Prune*)	10	o	yr	4–5	m	m	Eng		*	*									*			**		**	**	*	**
Prince *Yellow Gage*	6–7	o	y	7–8	e	dm	N. Y		*	*	*					—						*					
Purple Favorite	6–7	rob	brp	9–10	e	dm	Am.?		—	*												*					
Purple Gage	5–6	rf	vy	5–6	m	dk	Eur			*												*					
Quackenboss	8–9	obbr	p	6–7	m	m	N. Y			**		*										**					
Richland	5–6	o	rp	5–6	e	km	Pa			*	**	*										*					
Royale Hative	5–6	r	pbry	5–6	e	k	Fr		—													*			*		
Saratoga	7–8	ro	rp	6–7	e	m	N. Y			*									**			*					
Saunders	7–8	ro	gy	4–5	m	km	Ont		—	*			*														
Sergent, *Robe de*	5–6	ro	b	6–7	m	dk	Eur																		*	*	
Shropshire *Damson*	3–4	ob	pb	5–9	m	k	Eng			**	*	**	*			**		**				**					
Spaulding	7–8	r	g	6–7	m	m	Pa		*	*																	

Section 11.—PLUMS. (Prunus.)—Continued.

Subsection 4.—*P. DOMESTICA*—Continued.

Name.	Description.							Districts and starring.																	
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
St. Ann, *Bonne*	.....	.....	b	7–8	.....	dm	Vt	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sharp *Emperor*	8–9	ro	yp	3–4	ml	km	Eng	—	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Smith Orleans	8–9	o	rp	4–6	e	m	N. Y	*	*	...	...	...	...	...	*	...	*	...	...	...	...	...	...	...	...	...
Tennant	.....	.....	.....	.....	.....	e	Wash	...	...	...	...	...	...	...	...	...	...	...	...	...	...	*	*	...	...	...
Tragedy	5–6	o	rp	7–8	e	dk	Cal	...	...	...	...	...	...	...	...	...	...	...	...	**	...	*	...	*	**	*
Transparent *Gage*	6–7	rf	gyr	8–9	m	dk	Fr	**	—	...	...	...	...	...	...	...	...	...	...	*	...	...	...	...	...	...
Wales, *Prince of*	8–9	robl	rp	8–9	m	m	Eng	—	*	...	...	...	...	...	...	...	...	...	...	*	...	...	...	...	...	...
Wangenheim	5–6	o	p	5–6	e	m	Ger	—	—	*	*	...	...	...	*	...	...	...	...	...	...	...	...	...	...	...
Washington	8–9	ro	ygc	7–8	em	dm	N. Y	*	*	...	*	...	...	...	*	...	*	...	...	**	...	*	**	**	*	...
Willamette	7–8	o	rbr	8–9	me	dcm	Oreg	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	*	...	...	...
Yellow Egg	8–9	o	y	3–4	e	km	Eur	*	**	—	*	*	...	...	*	...	*	...	...	**	...	**	**	*	*	*

Subsection 5.—*P. HORTULANA*.

MINER GROUP.																										
Miner	5–6	r	r	5–6	ml	km	Tenn	...	*	**	*	*	...	*	**	...	*	...	...	**	...	...	...	...	...	...
Prairie Flower	5	ro	r	5	ml	m	Mo.?	...	...	**	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
WAYLAND GROUP.																										
Benson	4–5	r	r	6	l	mk	Nebr	...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cumberland	5–6	r	y	4–5	l	km	Ga	...	...	...	**	*	...	**	*	...	...	...	...	*	...	...	...	...	...	...
Golden Beauty	4–5	ro	y	4–5	ml	km	Tex	...	—	*	*	**	*	**	*	...	*	**	...	*	...	...	...	...	...	...
Moreman	5	r	dr	5–6	l	km	Ky	...	...	**	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Reed	3–4	r	r	6	l	mkd	N. J	...	...	**	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
WILDGOOSE GROUP.																										
Choptank	5	ro	r	5	ml	m	Md	...	...	**	†	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Downing, *Charles*	6–7	ro	r	5–6	me	m	Iowa	...	*	*	*	...	...	...	**	...	*	...	...	...	...	...	...	...	...	...
Dunlap *No. 2*	6	ro	r	5	e	m	Nebr	...	...	**	†	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Indian Chief	6–7	r	r	8	l	km	Tex	...	...	...	*	*	...	...	...	...	...	...	...	*	...	...	...	...	...	...
Milton	5	ro	r	5	l	m	Iowa	...	...	**	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Roulette	5	ro	r	5	me	m	Tex	...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Smiley	5	ro	r	5	me	m	Ala	...	...	**	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

Sophie	5	oc	r	6	me	mk	Md			*																
Whitaker	5	ro	r	5	e	m	Tex			**	*			*												
Wildgoose	7–8	r	rp	5–6	ml	dm	Tenn	—	*	**	**	**	—	**	**	*	*			**						
Wooten	6–7	ob	r	7–8	e	km	Tex			*				*												

SUBSECTION 6.—*P. TRIFLORA.*

Abundance (*Botan*)	6–7	ro	brr	4–5	em	m	Jap		**	**	**	**	*	**	**	†	—			**					*	
Babcock	7–8	r	r	5–6	m	dm	Jap					**	—	*												
Burbank	6–8	r	py	4–5	ml	km	Jap	*	**	**	**	*	**	*	**	†	—			**		†		*	*	**
Chabot (*Yellow Japan*)	6–8	ro	rp	5	em	km	Jap	†	**	**	**	**	*	**				**		**				*		
Excelsior	5–6	r	rp	6–7	e	dm	Fla			*		—	**	*												
Georgeson	7–8	o	y	7–8	e	km	Jap		*		*	**	*													
Hale	7–8	r	r	8–9	ml	dm	Cal		†																	
Kelsey	9–10	ro	gy	8–9	l	dkm	Jap		—		—	*	†	—										*	*	**
Kerr	5–6	o	y	4–5	m	km	Jap			*		**	*	*												
Normand	5–6	r	r	9	ve	dm	Jap		*			**	†	**												
Ogon	6–7	r	y	3–4	e	km	Jap		*	*	**	†	†	—	*		—			**						
Red June	5–6	ov	r	4–5	ve	km	Jap		**	**	**	**	†	**	*	†		*		*						
Red Nagate	5–6	ro	r	5–6	m	km	Jap		*	**				*	*					*						
Satsuma	6–7	r	p	7–9	ml	km	Jap		*	*	*	—	*	*	*		*			**					*	**
Simon[1]	7–9	r	p	2–7	e	m	Chi																		*	*
Wickson	8–9	rw	br	8–9	m	m	Cal		*		*													*	*	*
Willard	3–4	ro	r	2–3	m	m	Jap		*	*	*	*			*					*						

[1] Belongs to species *Prunus Simonii.*

SUBSECTION 7.—*P. PUMILA.*

Minnie	3	r	br	5	me	k	Man									†					†					
Brandon	2	r	br	2	me	k	Man									†					†					
Challenge	3	r	br	3	me	k	Man									†					†					
Othello	3	r	br	3	me	k	Man									†					†					
Progress	3	r	br	3	me	k	Man									†					†					
Standard	1	r	br	3	me	k	Man									†					†					
Victor	4	r	br	5	me	k	Man									†					†					

Section 12.—QUINCES. (Cydonia vulgaris.)

[KEY.—Size, scale 1 to 10: 1, very small; 10, very large. Form: o, oblate; ob, obtuse; p, pyriform; r, roundish. Color: g, greenish; o, orange; y, yellow. Quality, scale 1 to 10: 1, very poor; 10, best. Season: e, early; m, medium; l, late. Use: k, kitchen; m, market. Abbreviations of names of places of origin: Am., America; Fr., France; Ont., Ontario; Port., Portugal.]

Name.	Description.							Districts and starring.																	
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Champion	6-7	obp	gy	8-9	m	km	Am...	—	**	*	*	*	*	....	**	....	*	....	....	**	....	....	....	....	....	....
Meech	7-8	ro	oy	6-7	m	km	Conn.	*	*	*^	*	*	....	*	*	....	....	....	....	*	....	*	....	....	....	....
Missouri *Mammoth*	9-10	ro	oy	8-9	e	km	Mass.	—	*	*	*	....	....	....	**	....	....	....	....	**	....	*	....	....	....	....
Orange (*Apple*)	8-9	ro	oy	8-9	e	km	Am...	*	**	**	**	*	....	*	*	....	*	....	....	**	....	....	....	....	....	....
Pear	8-9	p	oy	7-8	em	km	Am...	—	*	....	**	....	....	....	—	....	....	....	....	....	....	....	....	....	....	....
Rea	8-9	rob	py	7-8	e	km	N. Y..	—	**	**	*	....	....	*	*	....	....	....	....	**	....	....	....	....	....	....

Section 13.—RASPBERRIES. (Rubus.)

SUBSECTION 1.—*R. IDÆUS.*[1]

[KEY.—Size, scale 1 to 10: 1, very small; 10, very large. Form: c, conical; o, obtuse; r, roundish. Color: b, black; c, crimson; p, purple; r, red; s, scarlet; y, yellow Quality, scale 1 to 10: 1, very poor; 10, best. Season: e, early; m, medium; l, late. Use: d, dessert; k, kitchen; m, market. Abbreviations of names of places of origin: Eng., England; Eur., Europe; Fr., France; Ont., Ontario.]

Name.	Description.							Districts and starring.																	
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Clarke	7-8	c	c	7-8	e	d	Conn.	**	—	....	....	....	....	*	*	....	....	....	....	*	....	....	....	....	....	....
Fastolff	9-10	rc	pr	7-8	e	d	Eng..	*	*	....	....	....	....	....	—	....	....	....	....	*	....	....	....	....	....	....
Franconia	8-9	oc	pr	5-6	m	dm	Fr.?..	*	*	....	....	....	....	....	—	....	....	....	....	*	....	....	....	....	....	....
Hudson River *Antwerp*	8-9	c	r	7-8	m	m	Eng..	*	—	—	....	*	....	....	....	....	....	....	....	*	....	....	....	....	....	....
Orange (*Brincklé's Orange*)	8-9	rc	y	8-9	m	d	Pa....	*	*	....	....	....	....	*	*	....	....	....	....	....	....	....	....	....	....	....
Red Antwerp	7-8	roc	r	5-6	m	d	Eur..	....	—	....	*	....	....	—	*	....	....	....	....	*	....	....	**	*	....	....
Vermont	6-7	ro	y	8-9	l	dk	Vt....	*	l	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

[1] Includes possible hybrids.

SUBSECTION 2.—*R. NEGLECTUS.*

Caroline	5–6	ro	y	3–4	e	km	N. Y.		*	*	*				*					*					
Columbian	9–10	r	p	6–7	e	km	N. Y.	†	**	*	*				**	*	**									
Philadelphia	4–5	r	p	4–5	em	km	Pa	*	—		—						*									
Reliance	5–6	ro	p	5–6	m	km	N. J		—		*				—		*			*						
Shaffer	8–9	r	p	6–7	m	km	N. Y.	**	**	*	**	*		—	**		*			**		*	*			

SUBSECTION 3.—*R. OCCIDENTALIS.*

Conrath	8–9	ov	b	8–9	e	dm	Mich		**																
Cumberland	9–10	ov	b	9–10	e	dm	Pa		*	*															
Doolittle	5–6	r	b	5–6	e	km	N. Y.	*	*	*	*	*		—	*	—	*			*					
Earhart	4–6	r	b	5–6	el	k	Ill	**	—						*										
Eureka	6–7	r	b	5–6	em	km	Ohio		**		**				**		**								
Gregg	7–8	ro	b	5–6	m	m	Ind	**	**	**	**	*		—	**	**	**			**		**	**		*
Hilborn	7–8	ro	b	6–7	e	dm	Ont	**	**	*	*														
Kansas	6–7	r	b	6–7	m	km	Kans		**	**	**				**		*			*		**			
Lotta	6–7	r	b	6–7	m	km	Kans	†	*						*										
McCormick	5–6	r	b	5–6	m	km	Ind	*	—	*	*	*		—	**		*			**					
Mills	5–6	r	b	6–7	m	km	N. Y.		*																
Nemaha	7–8	ro	b	5–6	e	m	Nebr		**		*				**		*			*					
Ohio	5–6	r	b	4–5	e	km	Ohio?	**	**	*	*			—	**	*	*			**		*			
Older	5–6	r	b	5–6	em	km	Iowa	**	*						**										
Palmer	6–7	r	b	5–6	e	km	Ohio	*	**	*	**				**		*			**		*			
Souhegan	3–4	r	b	5–6	m	km	N. H.	*	*	*		*		—	*		*			**		*			
Tyler	3–4	r	b	5–6	m	km	N. Y.	*	*	*	—	*		—			**			*					
Winona	8	r	b	6–7	e	m	Ohio				†														

SUBSECTION 4.—*R. STRIGOSUS.*

Blair	5	r	r	7–8	m	dk	P. Q	*																	
Brandywine	5–6	rc	r	5–6	e	km	Del		*	**	*	**			*	—	*			**					
Cuthbert	7–8	rc	r	6–7	m	m	N. Y.	**	**	**	**	**		—	**	**	**			**		**	**	*	*	**
Golden *Queen*	7–8	rc	y	6–7	m	dk	N. J	**	**	*	**	**		—	*		*			*		*	*			
Hansell	5–6	r	r	5–6	e	dm	N. J	*	*	*	*														
Kenyon	7–8	r	r	6	m	km	Iowa			*	*														
Loudon	6–7	rc	r	5–6	m	dm	Wis	*	**	*	**	**			**	**	*			*		*			*
Marlboro	7–8	r	r	4–5	m	m	N. Y.	*	*	*				—	*	*	**			**		*			
Miller	7–8	r	r	7–8	e	dm	Del	**		**	*				†	†									
Thwack	7–8	r	pr	4–5	m	m	N. Y.		*		*				**					*					
Turner	4–5	rc	r	7–8	m	dm	Ill	*	**	*	**	*		**	**	*	*			**					

Section 14.—STRAWBERRIES. (Fragaria.)

[KEY.—Sex: b, bisexual; p, pistillate. Size, scale 1 to 10: 1, very small; 10, very large. Form: c, conical; co, compressed; l, long; o, oblate; ob, oblong; ov, ovate; r, roundish; i, irregular. Color: c, crimson; d, dark; l, light; r, red; s, scarlet. Quality, scale 1 to 10: 1, very poor; 10, best. Season: e, early; m, medium; l, late. Use: d, dessert; m, market. Abbreviations of names of places of origin: Am., America; Austr., Australia; Can., Canada; Ont., Ontario.]

Name.	Description.								Districts and starring.																	
	Sex.	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Arizona *Everbearing*																											**
Australian *Crimson*								Austr																			*
Bederwood	b	4–5	rc	bs	5–6	m	dm	Ill	**	*	**	**		*	*	**	**	**			**						
Belt, *William*	b	7–8	obci	dc	8–9	m	dm	Ohio			**	*															
Beverly	b	5–6	ci	ds	7–8	m		Mass			*																
Bismarck	b	7–9	rc	c	7–8	m		Ark			**																
Blonde	b	7–8	rc	r	8	m	dm	Ind		*		*															
Brandywine	b	8–10	oc	c	8–9	ml	dm	Pa		**	**	*	**	*	**												
Brunette	b	7–9	r	dr	10	m	dm	Ind		*		*															
Bubach *No. 5*	p	8–9	rob	s	5–6	e	m	Ill	**	**	**	**	*	*	**	**	*					*	*				
Captain Jack	b	7	r	r	6	m	d	Mo						*	**												
Carrie	p	7–8	l	c	7–8	m	m	Va	**	*																	
Champion	p	6–7	rc	s	5–6	e	m	Pa		*	*							**			*						
Cloud	p	6–7	co	lc	6–7	e	dm	La						*	**												
Clyde	b	7–8	lc	c	7–8	em	m	Kans	**	**	*				*												
Crawford	b	7–8	rc	lc	7–9	m	dm	Ohio	*	*													*				
Crescent	p	5–6	rc	bs	6–7	e	m	Conn	**	**	*	**	*	*	**	**	**	**			**	**					
Cumberland	b	9–10	ro	bs	5–6	m	m	Pa		*		*	*	*	*	**					**						
Dollar	b	7–9	rc	bc	8–9	m	d	N. J. ?															*			*	*
Downing	b	6–7	c	ds	6–7	m	dm	Ky	*	*	*	*	*	*	**	**	*	**			*	*	*				
Enhance	b	7–8	c	bc	7–8	m	dm	Ohio		*	*	*	*	*								*					
Enormous	p	8–9	ob	dc	7–8	ml	dm	Ill			**	*															
Eureka	p	6–7	r	br	5–6	ml	dm	Ohio		*		*		*				*									
Excelsior	b	6–7	c	r	6–7	ve	d	Ark						*	*												
Gandy	b	7–8	c	bc	7–8	l	dm	N. J	*	**	**	**	**	*	**	**	*	**				*	†				
Gardner	b	5–6	lc	bs	7–8	m	dm	Iowa					*		*												
Glen Mary	b	8–9	rco	c	7–8	m	dm	Pa		*	*	*		*	**												
Greenville	p	7–8	roc	bc	7–8	e	dm	Ohio	*	**	**	**	*	*		*	*	*									
Haverland	p	6–7	cco	s	7–8	m	dm	N. J	**	**	**	**	*		*	**	*	**			**	*	*				
Hoffman	b	5–6	c	dc	7–8	m	dm	S. C		—	—	*	**	**	*				*								
Hood River								Oreg															**	**			
Jessie	b	9–10	rc	bs	5–6	m	dm	Wis	*	*	—	*	*		—	*	*	*			**	*	**	†		*	
Lovett	b	6–7	lc	dc	8–9	em	dm	Ky		**	*										*	*					
Magoon								Oreg															†	**			
Manchester	p	5–6	oc	s	7–8	ml	dm	N. J	*	*	—			*	—		—	*			**	*					
Marshall	b	8–9	rc	dr	7–9	m	dm	Mass		*	**																
Meek *Early*	b	3–4	rc	dc	5–6	ec	m	Md					*														

Michel *Early*	b	5–6	oc	r	7-8	e	m	Ark	*	**	—	**	**	**	**	**			*			*								
Miner	b	7–8	c	c	5–6	m	dm	N. J		*	*	*	*	**	**	**	*														
Monarch	b	7–8	roc	br	5–6	m	dm	Ill	—	*	—	*	*		*			**			**						*	**			
Mount Vernon	b	8–9	roc	br	5–6	m	dm	Ky		*	—	*	—				*														
Neuman	p	7–8	c	bs	4–5	m	m	S. C			—		*	**	**	*															
Parker Earle	b	6–7	lc	br	6–7	m	dm	Tex	*	**	—	*	—		*	**	**	**				*	*	**	*						
Pearl	b	5–6	oc	dr	5–6	m	m	South	*	*	—	*					*														
Sandoval	b	6–7	roc	dc	6–7	e	m	Ill	—	*				*		*	*					*									
Saunders	b	7–8	c	c	7–8	e	dm	Ont	**	**	*	*		*		*	*					*									
Seaford	p	7–8	r	c	6–7	e	m	Del			**																				
Sharpless	b	8–9	cco	br	7–8	m	dm	Pa	*	**	*	*	*	*	*	**	*	*				**	*	**	**	*	*	*			
Splendid	b	6–8	cr	dc	6–7	m	m	Ill						*	*																
Tennessee *Prolific*	b	8–9	bi	ds	6	m	m	Tenn			**	*																			
Van Deman	b	5–6	oc	s	7–8	m	d	Ark		*	—				—		*	*				*									
Thompson, *Lady*	b	7–8	ov	c	5–6	e	dm	N. C		†	**	**	**	**	**		*														
Warfield	p	5–6	c	dr	7–8	e	m	Ill	**	**	*	**	*	—	—	**	**	**				*	*	*							*
Williams	b	6–7	rc	dc	9	e	dm	Can	*	—		*																			
Wilson	b	5–6	c	dc	7–8	cm	m	N. Y	**	*	—	**	*	*	*	**	*	**				*	**	*	**						
Woolverton	b	7–8	c	dc	7 8	m	dm	Ont	*	**	*	*		*		*	**					**		*							

Section 15.—NUTS.

Subsection 1.—ALMONDS. (*AMYGDALUS COMMUNIS.*)

[Key.—Size: Scale, 1 to 10; 1, very small; 10, very large. Form: b, broad; l, long; v, very. Flavor: s, sweet. Shell: s, soft; t, thin; v, very. Abbreviation of name of place of origin: Eur., Europe.]

Name.	Description.					Districts and starring.																
	Size.	Form.	Quality.	Shell.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Drake	7–8	b	7–8	t	Cal																*		**	*
Golden State	6–7	bl	6–7	s	Cal																			* *
Harriott	7–8	l	7–8	s	Cal																			* *
I X L	8–9	lb	8–9	s	Cal															†	*	*	**	**
King *Soft Shell*	6–7	b	7–8	vst	Cal																*			
Languedoc	5–6	b	7–8	t	Eur																*			
Ne Plus Ultra	8–9	vl	8–9	s	Cal																*			

SUBSECTION 2.—CHESTNUTS. (*CASTANEA* SPECIES.)

[KEY.—Size: Scale, 1 to 10; 1, very small; 10, very large. Quality: b, best; g, good; v, very. Abbreviation of name of place of origin: Eur., Europe; Fr., France; Jap., Japanese].

Name.	Description.				Districts and starring.																		
	Size.	Quality.	Species.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
"American Sweet"	.....	.....	*dentata*	Am	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*	*	†	*
Anderson	5–6	5–6	*castanea*	N. J	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Alpha	6–8	5–6	*japonica*	N. J	.....	.....	**	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bartram	5–6	5–6	*castanea*	Pa	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Beta	5–6	5–6	*japonica*	N. J	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Biddle	7–8	5–6	*japonica*	N. J	.....	.....	**	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Black	6–7	5–6	*japonica*	N. J	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coe	7–8	7–8	*japonica*	Cal	.....	.....	†	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Combale, *Marron*	8–9	5–6	*castanea*	Fr	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	†	*	.....
Comfort	7–8	6–7	*castanea*	Pa	.....	.....	**	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cooper	6–7	7–8	*castanea*	N. J	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Corson	6–7	8–9	*castanea*	Pa	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dager	5–6	6–7	*castanea*	Del	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Darlington	6–7	6–7	*castanea*	Del	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Felton	6–7	8–9	*japonica*	Del	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hale	7–8	7–8	*japonica*	Cal	.....	.....	†	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hathaway	3–4	9–10	*dentata*	Mich	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
"Italian or Spanish"	.....	.....	*castanea*	Eur	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*	*	†	**
"Japan"	.....	.....	*japonica*	Jap	.....	*	.....	*	.....	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	*	*	†	**
Kent	6–7	5–6	*japonica*	N. J	.....	.....	**	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kerr	7–8	7–8	*japonica*	N. J	.....	.....	**	†	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Killen	9–10	8–9	*japonica*	N. J	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
McFarland	8–9	8–9	*japonica*	Cal	.....	.....	†	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Martin	8–9	5–6	*japonica*	N. J	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Miller	5–6	5–6	*castanea*	Pa.?	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Moncur	5–6	7–8	*castanea*	Del	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Murrell	4–5	9–10	*dentata*	Va	.....	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nouzillard	.....	.....	*castanea*	Fr	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	†	.....	.....	.....
Numbo	7–8	7–8	*castanea*	Pa	.....	†	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	†	.....	.....	.....	.....
Paragon	7–8	7–8	*castanea*	Pa	.....	**	**	*	.....	.....	.....	*	.....	.....	.....	.....	.....	.....	†	†	.....	.....	.....
Parry	9–10	5–6	*japonica*	Jap	.....	.....	**	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Prolific	5–6	5–6	*japonica*	Jap	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Reliance	6–7	5–6	*japonica*	N. J	.....	*	**	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	†	.....	.....	.....	.....
Ridgely	6–7	7–8	*castanea*	Del	.....	.....	**	.....	.....	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Scott	5–6	5–6	*castanea*	N. J	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Success	8–9	6–7	*japonica*	N. J	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Superb	7–8	6–7	*japonica*	N. J	.....	.....	*	.....	.....	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Styer	5–6	5–6	*castanea*	Pa	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Subsection 3.—Filberts and Hazelnuts. (*Corylus avellana.*)

[Key.—Size: Scale, 1 to 10; 1, very small; 10, very large. Form: ob, oblong; ov, oval; r, round. Quality: g, good. Abbreviation of name of place of origin: Eur., Europe.

Name.	Description.				Districts and starring.																	
	Size.	Form.	Quality.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Du Chilly	7–8	ob	8–9	Eur.																		*	
Jones	5–6	ob	6–7	Del.						*													
Purple Leaf	6–7	ob	6–7	Eur.						*													

Subsection 4.—Pecans. (*Hicoria pecan.*)

[Key.—Size: Scale 1 to 10; 1, very small; 10, very large. Form: c, conical; l, long; ob, oblong; ov, oval; r, round. Quality: g, good; v, very.]

Name.	Description.				Districts and starring.																	
	Size.	Form.	Quality.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Centennial	9–10	ob	7–8	La.						*	*												
Columbian	8–9	ob	8–9	La.					**	**	**												
Frotscher *Egg Shell*	8–9	ob	8–9	La.					*	**	**												
Jewett	9–10	ov	7–8	Miss.						*	*												
Russell	8–9	ob	8–9	Miss.					**	**	**												
San Saba	5–6	ov	9–10	Tex.						*					*								
Stuart	8–9	rob	8–9	Miss.					**	**	**												
Van Deman	8–9	ob	8–9	Miss.					**	**	**												

SUBSECTION 5.—PERSIAN, ENGLISH, OR EUROPEAN WALNUTS. (*JUGLANS REGIA.*)

[KEY.—Size: Scale 1 to 10; 1, very small; 10, very large. Form: l, long; ob, oblong; ov, ovate; r, round. Quality: g, good; v, very. Abbreviation of name of place of origin: Fr., France.]

Name.	Description.				Districts and starring.																	
	Size.	Form.	Quality.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Ford *Soft Shell*	8–9	lov	6–7	Cal																		*	**
Franquette	8–9	lov	8–9	Fr																	*		
Mayette	7–8	lov	8–9	Fr																	*		
Mission (*Los Angeles*)	6–7	rov	6–7	Cal																			**
Parisienne	8–9	rob	8–9	Fr																	*		†
Prœparturiens	5–6	ov	7–8	Fr																**	*	*	*

Division II.—SUBTROPICAL AND TROPICAL FRUITS.

This division includes such species only as, under cultivation or otherwise, have so far varied that the departures from the original types are recognized under varietal names.

The climate of the portion of Florida lying south of 27° north latitude is so far modified by its semiinsular position, together with the softening influence of the almost tepid waters of the adjacent Gulf Stream, as practically to adapt it to the successful cultivation of very many strictly tropical fruits. Such, therefore, as are recommended for cultivation in this region are indicated by the letter s in connection with the starring of District No. 6, of which this territory forms a part. A few of the more hardy subtropical fruits, though not succeeding in all portions of District 6, are successful in favored localities in adjacent portions of Districts 5 and 7.

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Section 1.—CITROUS FRUITS.

SUBSECTION 1.—BITTER ORANGES. (*CITRUS BIGARADIA.*)

[KEY.—Size, scale 1 to 10: 1, very small; 10, very large. Form: o, oblate; ob, oblong; ov, oval; r, round. Color: d, dark; l, light; o, orange; y, yellow. Quality, scale 1 to 10: 1, very poor; 10, best. Season: e, early; l, late; m, medium; v, very. Use: d, dessert; k, kitchen; m, market. Abbreviations of names of places of origin: Am., America; Baha., Bahamas; Braz., Brazil; For., Foreign; Jap., Japan; Port., Portugal.]

Name.	Description.							Districts and starring.																		
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Bitter Sweet	8–9	ro	do	.....	.....	dk	Fla	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....
Dwarf	8–9	ro	do	.....	.....	k	For	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....
Phillips *Bitter Sweet*	8–9	ro	do	3–4	.....	dk	Fla	....	....	....	....	....	**	....	....	....	....	....	....	....	....	....	....	....	....	....
Sour	8–9	ro	do	.....	.....	k	Fla	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....	....	....

SUBSECTION 2.—CITRONS. (*C. MEDICA.*)

Lemon	8–9	ov	oy	3–4	.....	k	For	....	....	....	....	....	**s	....	....	....	....	....	....	....	....	....	....	....	....	....
Lyman	5–6	ov	oy	3–4	.....	k	For	....	....	....	....	....	**s	....	....	....	....	....	....	....	....	....	....	....	....	....
Orange	3–4	r	oy	6–7	.....	k	For	....	....	....	....	....	**s	....	....	....	....	....	....	....	....	....	....	....	....	....

Section 1.—CITROUS FRUITS—Continued.

Subsection 3.—KUMQUATS. KINKANS. (*C. JAPONICA.*)

Name.	Description.							Districts and starring.																		
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Marumi	2–3	r	o	.....	.....	dkm	Jap	...	...	...	...	...	**	...	...	...	...	...	...	...	...	...	...	...	...	...
Nagami	2–3	o	ob	.....	.....	dkm	Jap	...	...	...	...	...	**	...	...	...	...	...	...	...	...	...	...	...	...	...

Subsection 4.—LEMONS. (*C. LIMONUM.*)

Belair	5–6	oov	ly	10	.....	.....	For	...	...	...	...	...	**s	...	...	...	...	...	...	...	...	...	...	...	...	...
Eureka	5–6	ov	ly	3–4	.....	.....	Cal	...	...	...	...	...	**s	...	...	...	...	...	...	...	...	...	...	...	*	**
Genoa	5–6	or	ly	5–6	.....	.....	Italy	...	...	...	...	...	*s	...	...	...	...	...	...	...	...	...	...	...	...	*
Lisbon	5–6	ov	ly	5–6	.....	.....	Port	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	*	**
Sicily	5–6	ov	ly	10	.....	.....	Italy	...	...	...	...	...	**s	...	...	...	...	...	...	...	...	...	...	...	*	...
Villafranca	5–6	or	ly	10	.....	.....	For	...	...	...	...	...	**s	...	...	...	...	...	...	...	...	...	...	...	*	**

Subsection 5.—LIMES. (*C. ACIDA.*)

Imperial	8–9	ov	y	5–6	.....	.....	For	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	*
Mexican	5–6	ov	ly	5–6	.....	.....	For	...	...	...	...	...	**s	...	...	...	...	...	...	...	...	...	...	...	*	*
Persian	5–6	ov	ly	6–7	.....	.....	For	...	...	...	...	...	**s	...	...	...	...	...	...	...	...	...	...	...	...	...
Rangpur	4–5	o	or	10	.....	dkm	India	...	...	...	...	...	**s	...	...	...	...	...	...	...	...	...	...	...	...	...
Tahiti	7–8	ov	ly	10	.....	.....	For	...	...	...	...	...	**s	...	...	...	...	...	...	...	...	...	...	...	...	...
Turanj	10	ob	y	2–3	.....	k	India	...	...	...	...	...	*s	...	...	...	...	...	...	...	...	...	...	...	...	...

Subsection 6.—MANDARINS. (*C. NOBILIS.*)

China	5–6	o	lo	5–6	.....	d	For	...	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...
Cleopatra	3–4	o	r	6–7	.....	dm	For	...	...	...	...	...	**	...	...	...	...	...	...	...	...	...	...	...	...	...
Dancy *Tangerine*	6–7	o	r	8–9	.....	dm	Fla	...	...	...	...	...	**	...	...	...	...	...	...	...	...	...	...	...	...	...
Japan *Tangerine*	7–8	o	r	6–7	.....	d	Jap.?	...	...	...	...	...	**	...	...	...	...	...	...	...	...	...	...	...	*	*
King	7–8	o	ro	9–10	.....	dm	Cal	...	...	...	...	...	**	...	...	...	...	...	...	...	...	...	...	...	...	...
Satsuma	5–6	o	o	8–9	.....	dm	Jap	...	...	...	...	...	**	...	...	...	...	...	...	...	...	...	...	...	*	*
Sprack	5–6	o	ro	8–9	.....	dm	Fla	...	...	...	...	...	†	...	...	...	...	...	...	...	...	...	...	...	...	...
Tangerona	5–6	o	lo	8–9	.....	dm	Braz	...	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...

Subsection 7.—POMELOES. GRAPE FRUIT. SHADDOCKS. (*C. DECUMANA.*)

Aurantium	5–6	r	ly	3–4	lm	dm	Fla						**																
Blood	8–9	r	doy	6–7	l	dm	For						**																
Champion	8–9	ro	y	5–6		dm																							*
"Florida *Seedling*"																													**
Forbidden Fruit							For						**																
Hart	3–5	r	ly	5–6	lm	dm	Fla						**																*
Josselyn	3–5	r	ly	3–4	lm	dm	Fla						**																
Mammoth	8–9	r	oy	6–7	l	dm	For						**																
Marsh *Seedless*	3–5	r	ly	6–7		dm	Fla						†															*	**
Pernambuco	9–10	r	ly	8–9	l	dm	Braz						**															*	
Royal	5–8	r	ly	7–8	em	dm	Fla						*																
Tresca *Blood*	6–8	r	y	6–7		l	Baha						†																
Triumph	3–6	r	ly	5–6	lm	dm	Fla						**															*	**
Walter	5–9	r	ly	3–4	lm	dm	Fla						**																

Subsection 8.—SWEET ORANGES. (*C. AURANTIUM.*)

Acapulco	7–9	r	o	3–5	m	dm	For						*																
Acis	7–9	r	o	3–5	l	dm	For						*																
Amory *Blood*	5–6	r	o	3–5	em	dm	For						*																
Bahia (*Washington Navel*)	7–9	rov	o	9–10	em	dm	Braz						*															*	**	**
Beach *No. 5*	6–7	ov	or	3–5	lm	dm	Fla						*																
Bessie	7–9	r	o	7–9	l	dm	Fla						**																
Boone	6–7	r	lo	6–7	ve	dm	Fla						*																
Botelha	5–6	r	o	5–6	m	dm	For						*																
Brazilian	5–6	r	o	5–6		dm	For						*																
Buttercourt	5–6	r	o	10	m	dm	For						*																
Centennial	5–6	r	o	10	em	dm	Fla						**																
China	5–6		o	6–7	m	dm	For						*																
Circassian	3–5	r	o	5–6	m	dm	For						*																
Colmar	5–6	ro	or	5–6	em	dm	For						*																
Cunningham	5–6		o	5–6	em	dm	Fla						*																
Drake *Star*	7–9	r	o	5–6	m	dm	For						*																
Double *Navel*	5–6	ov	o	5–6	m	dm	Am						*																
Dulcissima	3–4	r	o	5–6	e	dm	For						*																
Dummit	7–9		o	7–8	m	dm	Fla						*																
Du Roi	5–6	r	o	6–7	lm	dm	For						*																
Early Oblong	5–6	ob	o	6–7	ve	dm	For						*																
Enterprise *Seedless*	5–6	r	o	5–6	e	dm	Fla						**																
Exquisite	5–6	r	o	5–6	m	dm	For						*																
Fortuna	5–6	ro	o	8–9	m	dm							*																
Foster	5–6	r	o	5–6	e	dm	Fla						**																
Hart *Late* (*Hart's Tardiff*)	5–6	ov	o	7–8	vl	dm	For						**																
Higley *Late*	5–6	r	o	3–5	l	dm	For						*																
Homosassa	5–6	r	o	7–8	m	dm	Fla						**																
Imperial *Blood*	5–6	r	ov	5–6	e	dm	Fla						**																

Section 1.—CITROUS FRUITS—Continued.

Subsection 8.—SWEET ORANGES. (*C. AURANTIUM.*)—Continued.

Name.	Description.							Districts and starring.																		
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Jaffa	5-6	r	o	10	m	dm	For						**													
Jaffa Blood	3-4	ov	or	10	m	dm	Fla						**													
Lamb *Summer*	5-6	ov	o	7-8	vl	dm	Fla						*													
Long	5-6	ov	o	3-5	m	dm	For						†													
Magnum Bonum	7-9	r	o	5-6	m	dm	Fla						*													
Majorca	5-6	r	o	10	lm	dm	For						**													
Maltese Blood	3-4	ov	or	10	m	dm	For						*													*
Maltese Egg	3-5	ov	o	5-6	m	dm	For						**													
Maltese Oval	7-9	ov	o	5-6	l	dm	For						**													
Mays Best	5-6	r	o	5-6	m	dm	Fla						**													
Mediterranean *Sweet*	7-9	ov	o	5-6	l	dm	For						*											†	*	**
Mehtensis *Navel*	7-9	rov	o	5-6	e	dm	For						*													
Nonpareil	7-9	r	o	6-8	em	dm	Fla						**													
Old Vini	7-9	r	o	7-8	m	dm	Fla						**													
Paper Rind *St. Michael*	3-4	ov	lo	5-6	lm	dm	For						*													
Parson *Brown*	5-6	ov	o	5-6	e	dm	Fla						**												*	*
Peerless	5-6	r	o	7-8	m	dm	Fla						*													
Pineapple	7-9	r	ov	7-8	m	dm	Fla						**													
Prolific	5-6	r	o	5-6	m	dm	For						†													
Ruby	5-6	r	or	7-8	em	dm	For						**													*
St. Michael	5-6	r	o	6-7	m	dm	For						*												*	**
St. Michael Blood	5-6	r	o	10	m	dm	For						*													
Saul *Blood*	5-6	ob	or	7-8	m	dm	For						†													
Seville, *Sweet*	3-4	r	o	3-5	ve	dm	For						†													
Star Calyx	7-8	r	o	3-5	m	dm	For						*													
Thompson *Improved*	9-10	rov	o	9-10	em	dm	Cal																		*	**
Valencia *Late*	7-9	ov	lo	7-8	l	dm	For						**													**
Vinous, *Madam*	5-6	r	o	10	m	dm	Fla						**													
White	7-9	r	lo	3-5	m	dm	For						†													
Whittaker	5-6	r	o	5-6	m	dm	Fla						*													

Section 2.—FIGS. (Ficus carica.)

[KEY.—Size: 2-4, small; 4-7, medium; 7-9, large. Color: a, amber; b, black; bl, blue; br, brown; g, green; p, purple; r, red; v, violet; w, white; y, yellow. Quality: 1-6, good; 6-10, best. Season: s, summer. Use: c, curing; d, dessert; k, kitchen; n, near market. Abbreviation of name of place of origin: For., Foreign.]

Name.	Description.						Districts and starring.																
	Size.	Color. Skin.	Color. Flesh.	Quality.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Adriatic, *White*	7-9	gy	r	4-5	dkc	For						*	*				*						*	*	**
Angelique (*Jaune Hative*)	4-7	yw	rw	1-6	dkn	For					**	**													*
Black Ischia	4-7	rb	r	6-10	dkn	For					**	*													
Brown Smyrna				8-9																					*
Brunswick (*Madonna*)	7-9	va	a	1-6	dkn	For					*	**	*											*	
Celestial (*Celeste*)	2-4	rva	a	6-10	dkn	For					*	**	**				*								
Dottato, *White*	5-6	yg	ya		c	For																			*
Genoa, *Blue*	4-7	bl		1-6	dkn	For						**													
Lemon	4-7	y		6-10	dkn							**													
Marseillaise, *White*	4-7	yw	a	1-6	dkc	For						**	*				*								*
Mission	7	rv	r	9	dc	Spain						**	**										**	**	**
Monaco Bianco	8-9	blg	r	8-9	d	For						**	**												*
Osborn *Prolific*	7	br	r	7	d	For						**	**												
Reine Blanche	8			9	d	For						**	**												
San Pedro Black	9-10	vb	r	8-9	d																		*		*
Turkey, *Brown*	4-7	br	r	6-10	dkn	For				*	*	**	**										*		*
White Smyrna																							*	*	**
Zimetza	7-9	w		4	mk							†	†												

Section 3.—GUAVAS. (Psidium.)

[KEY.—Size, scale 1 to 10: 1, very small; 10, very large. Form: ov, oval; r, round. Color: g, green; r, red; y, yellow. Quality, scale 1 to 10: 1, very poor; 10, best; Season: a, autumn; s, summer. Use: d, dessert; k, kitchen; m, market. Abbreviations of names of places of origin: S. A., South America; W. I., West Indies; Mex., Mexico.]

Name.	Description.							Districts and starring.																		
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Apple, *P. guajava*	5-6	r	g	3-4	sa	dkm	W. I.						**s													
Cattley (*Strawberry*) *P. cattleianum*	3-4	r	r	3-4	sa	dkm	S. A.						**												*	*
Chinese (*Mexican*) *P. lucidum?*	3-4	r	y	3-4	sa	km	Mex.						**												*	*
"Common," *P. guajava*			g		sa	dkm	W. I.						*s													
White Winter, *P. guajava*	5-6	ov	g	3-4	a	dkm	W. I.						**s													

Section 4.—KAKIS, JAPANESE PERSIMMONS. (Diospyros kaki.)

[KEY.—Size, scale 1 to 10: 1, very small; 10, very large. Form: c, conical; o, oblate; ob, oblong; obo, obovate; p, pointed; r, round. Color: b, black; br, brown; c, carmine; d, dark; o, orange; r, red; s, salmon. Quality, scale 1 to 10: 1, very poor; 10, best. Season: e, early; l, late; m, medium; v, very. Use: d, dessert; m, market. Abbreviation of name of place of origin: Jap., Japan.]

Name.	Description.							Districts and starring.																		
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Costata	5-6	rcp	sr	4-5	l	dm	Jap.					**	**	**												
Hachiya	10	obop	br	4-5	e	dm	Jap.					**	**	**												
Hiyakume	7-8	roobo	or	3-4	m	dm	Jap.					**	**	**												
Kurokuma	7-8	r	r	5-6	m	dm	Jap.					*	**	**												
Okame	7-8	ro	bc	5-6	em	dm	Jap.					**	**	**												
Taber *129*	5-6	rp	or	4-5	ve	dm	Jap.					**	**	**												
Tanenashi	7-8	rcp	br	10	m	dm	Jap.					*	**	**												
Tsuru	7-8	obp	br	3-4	vl	dm	Jap.					**	**	**												
Yedoichi	5-6	ro	dr	5-6	m	dm	Jap.					**	**	**												
Yemon	7-8	rcp	sr	3-4	m	dm	Jap.					*	**	**												
Zengi	3-4	ro	dr	3-4	ve	dm	Jap.					*	**	**												

Section 5.—OLIVES. (Olea europea.)

[KEY.—Size: Scale, 1 to 10; 1, very small; 10, very large. Form: o, oblique; ob, obovate; ov, oval; r, round. Color: b, black; d, dark; p, purple; v, violet. Abbreviation of name of place of origin: Fr., France.]

Name.	Description.				Districts and starring.																	
	Size.	Form.	Color.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Ascolano																					*		*
Columbella	5–6	ov	dp	Fr																			*
Macrocarpa	8–9	ovob	p	Italy																	*		
Manzanillo	7–8	rov	pb	Spain																	†	**	**
Mission	5–6	ov	pb	Cal																	**	**	**
Nevadillo *Blanco*	4–5	ovo	db	Spain																		*	**
Oblonga	7–8	oov	dp	Fr																			*
Pendulina	6–7	ov		Fr																			*
Regalis		rov	pb	Fr																			*
Rubra	4–5	ovo	b	Fr.?																	*	*	**
Santa Catarina	6–7																				*		*
Sevillano	9–10	oob	p	Spain																			*
Uvaria	4–5	ov	dp	Fr																	*		

Section 6.—PINEAPPLES. (Ananassa sativa.)

[KEY.—Size, scale 1 to 10: 1, very small; 10, very large. Form: c, conical; ob, oblong; r, round. Color: d, dark; l, light; r, red; y, yellow. Quality, scale 1 to 10: 1, very poor; 10, best. Season, s, summer. Use: d, dessert; k, kitchen; m, market. Abbreviation of name of place of origin: For., Foreign.]

Name.	Description.							Districts and starring.																		
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Abachi (*Abakka*)	6–7	ob	dy	8–9	s	dk	For	....	....	....	....	....	*s	....	....	....	....	....	....	....	....	....	....	....	....	....
Albert, *Prince*	8–9	c	.....	10	s	dk	For	....	....	....	....	....	†s	....	....	....	....	....	....	....	....	....	....	....	....	....
Beatrice, *Lady*	8–9	c	.....	10	s	dk	For	....	....	....	....	....	†s	....	....	....	....	....	....	....	....	....	....	....	....	....
Black Antigua	8–9	ob	d	10	s	dk	For	....	....	....	....	....	*s	....	....	....	....	....	....	....	....	....	....	....	....	....
Black Prince	8–9	c	.....	10	s	dk	For	....	....	....	....	....	†s	....	....	....	....	....	....	....	....	....	....	....	....	....
Blood	5–6	r	.....	4–5	s	dk	For	....	....	....	....	....	†s	....	....	....	....	....	....	....	....	....	....	....	....	....
Carrington, *Lord*	8–9	c	.....	10	s	dk	For	....	....	....	....	....	†s	....	....	....	....	....	....	....	....	....	....	....	....	....
Cayenne, *Smooth*	8–9	c	y	10	s	dk	For	....	....	....	....	....	**s	....	....	....	....	....	....	....	....	....	....	....	....	....
Crown Prince	8–9	c	.....	10	s	dk	For	....	....	....	....	....	†s	....	....	....	....	....	....	....	....	....	....	....	....	....
Egyptian *Queen*	5–6	c	y	8–9	s	dk	For	....	....	....	....	....	**s	....	....	....	....	....	....	....	....	....	....	....	....	....
Jamaica, *Black*	8–9	ob	dy	10	s	dk	For	....	....	....	....	....	*s	....	....	....	....	....	....	....	....	....	....	....	....	....
Kew, *Mammoth*	10	c	y	10	s	dk	For	....	....	....	....	....	†s	....	....	....	....	....	....	....	....	....	....	....	....	....
Pernambuco	5	ob	y	10	s	d	Brazil	....	....	....	....	....	**s	....	....	....	....	....	....	....	....	....	....	....	....	....
Porto Rico	10	r	y	5–6	s	dk	For	....	....	....	....	....	**s	....	....	....	....	....	....	....	....	....	....	....	....	....
Ripley Queen	5–6	c	y	8–9	s	dk	For	....	....	....	....	....	**s	....	....	....	....	....	....	....	....	....	....	....	....	....
Rothschild, *Charlotte*	5–6	c	.....	10	s	dk	For	....	....	....	....	....	*s	....	....	....	....	....	....	....	....	....	....	....	....	....
Spanish, *Red*	5–6	r	ry	5–6	s	dk	For	....	....	....	....	....	**s	....	....	....	....	....	....	....	....	....	....	....	....	....
Sugar Loaf	5–6	c	y	7–8	s	dk	For	....	....	....	....	....	*s	....	....	....	....	....	....	....	....	....	....	....	....	....
White Antigua	5–6	ob	l	7–8	s	dk	For	....	....	....	....	....	†s	....	....	....	....	....	....	....	....	....	....	....	....	....

Section 7.—POMEGRANATES. (Punica granatum.)

[KEY.—Size, scale 1 to 10: 1, very small; 10, very large. Form: ov, oval; r, round. Color: r, red; v, violet; y, yellow. Quality, scale 1 to 10: 1, very poor; 10, best. Season: a, autumn. Use: d, dessert. Abb reviation of name of place of origin: Am., America.]

Name.	Description.							Districts and starring.																		
	Size.	Form.	Color.	Quality.	Season.	Use.	Origin.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Acid	10	ov	ry	5–6	a	d	Am	....	....	....	....	*	*	**	....	....	....	....	....	....	....	....	....	....	....	....
Dwarf	3–4	r	r	7–8	a	d	Am?	....	....	....	....	*	*	**	....	....	....	....	....	....	....	....	....	....	....	....
Purple	8–9	ov	ry	10	a	d	Am	....	....	....	....	....	**	....	....	....	....	....	....	....	....	....	....	....	....	....
Sweet	8–9	r	r	10	a	d	Am	....	....	....	....	*	**	**	....	....	....	....	....	....	....	....	....	....	....	....
Violet	10	r	v	10	a	d	Am?	....	....	....	....	*	*	**	....	....	....	....	....	....	....	....	....	....	....	....

Division III.—NATIVE AND INTRODUCED FRUITS AND NUTS GROWN IN THE OPEN AIR.

This division includes such species of native and introduced fruits and nuts grown under cultivation in the open air in the United States and Canada as are not included in Divisions I and II.

Section 1.—FRUITS.

Botanical name.	Common name.	Origin.	Districts and starring.																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Achras Sapota, Linn	Sapodilla	West Indies						*s													
Adansonia digitata, Linn	Baobab, Monkey Bread, Sour Bread.	Africa						†s													
Aegle marmelos, Correa	Bengal Quince	India						†s													
Akebia quinata, Decaisne		Japan		†	*			—													
Amelanchier alnifolia, Nutt	Western Dwarf Juneberry	Native													*	**	*				
Botryapium, D. C	Dwarf Juneberry	Native		*	*	**	**	*	*	*	*										
Canadensis, T. and G	Serviceberry, Shadberry, Juneberry.	Native	*	*	*	*	*	*		*		*	*	*							
Anona cherimolia, Mill	Cherimoya, Cherimolia, Jamaica Apple.	S. America						*s												*	*
glabra, Linn	Pond Apple	Florida						*s													
muricata, Linn	Soursop	West Indies						*s													
reticulata, Linn	Custard Apple, Bullock's Heart.	Trop. America						*s													
squamosa, Linn	Sugar Apple, Sweetsop	West Indies						*s													
Antidesma Bunius, Spreng		Malaysia						†s													
Arbutus unedo, Linn	Strawberry Tree	Europe																		*	
Artocarpus incisa, Linn	Breadfruit	Polynesia						†s													
integrifolia, Linn	Jackfruit, Jaca	India						*s													
Asimina grandiflora, Dunal	Papaw	Native						*													
triloba, Dunal	Papaw, Pawpaw	Native		*	*	**			*	*											
Atalantia trimera, Oliv	Limeberry	East India						*													
Averrhoa Bilimbi, Linn	Bilimbi	Ins. India						†s													
Carambola, Linn	Carambola	India						†s													
Berberis Aquifolium, Pursh		Native																		*	*
trifoliolata, Moric	Aljarita	Texas											*								
vulgaris, Linn	Barberry, Berberry	Europe	**	*	*	*	*		*	*	*	*	*								
Blighia Sapida, Kon	Akee	West Indies						*s													
Carica Papaya, Linn	Papaw, Melon Papaw	Trop. America						*s													
Carissa Arduina, Lam	Amatungula	Africa						*s													
Carandas, Linn	Caraunda, Christ Thorn	India						*s													
Casimiroa edulis, Le Clare	White Sapota, Zapote Blanco	Mexico						†s												*	*
Ceratonia Siliqua, Linn	Carob, Karoub, Algaroba, St. John's Bread.	Asia, Africa						*												*	*
Cereus triangularis, Mill	Strawberry Pear	Trop. America						*s													
Chrysobalanus Icaco, Linn	Cocoa Plum	Florida						*s													

Section 1.—**FRUITS**—Continued.

Botanical name.	Common name,	Origin.	Districts and starring.																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Chrysophyllum Cainito, Linn	Star Apple	West Indies						*s													
Citrus bergamium, Risso	Bergamot Orange	Asia						*													
trifoliata, Linn	Trifoliate Orange, Hardy Orange.	Japan		*	*	†	*	**	**	—			*	*	*						
Coccoloba uvifera, Linn	Sea Grape, Shore Grape	Europe, Asia						*s													
Cornus Mas, Linn	Carnelian Cherry	Europe, Asia		*	*					*											
Crataegus coccinea, Linn	Haw, Thornapple	Native	**	*	*	*				*	*										
var. mollis. T. and G	Haw	Texas							*	*						*					
Cydonia sinensis, Thouin	Chinese Quince	China			*	*	**	**	**	*											
Cyphomandra betacea, Sendt	Tree Tomato	Trop. America						*s													
Diospyros texana, Scheele	Black Persimmon	Native							*				*								
virginiana, Linn	Persimmon	Native		*	**	**	**	*	**	**	*										
Elaeagnus multiflora, Thunb	Goumi	Japan		*	*	*	*	*	*	*	*										
umbellata, Thunb		Asia			*																
Eriobotrya japonica, Lindl	Loquat, Japanese Medlar	Japan						**												*	*
Erythea edulis, S. Watson		Guad. Island																		*	*
Eugenia brasiliensis, Lam	Brazil Cherry	S. America						†s													
jambos, Linn	Rose Apple	E. Indies						*s												*	
uniflora, Linn	Surinam Cherry	S. America						*s													
Feronia elephantum, Corr	Elephant Apple	E. Indies						*													
Ficus glomerata, Roxb	Cluster Fig	India						†s												†	†
Fragaria californica, Cham. and Sch	California Strawberry	California																*		*	*
chiloensis, Duchesne	Chile Strawberry	S. America		†	†	†												*		*	
collina, Ehr	Green Strawberry, Hill Strawberry.	Europe		*	*	*															
elatior, Ehr	Hautbois Strawberry	Europe	*	*	*	*	*			*											
vesca, Linn	English Wild Strawberry, Alpine.	Europe, native (?)	*	*	*								*	*							
virginiana, Duchesne	Wild Strawberry	Native	*	**	*	*	*														
virginiana var illinoesis, Gray	Western Wild Strawberry	Native		*	*	*			*	*	*		*								
Garcinia mangostana, Linn	Mangosteen	Java						†s													
Glycosmis citrifolia, Lindl		China						*s													
Garuga pinnata, Roxb		E. Indies						*s													
Hibiscus sabdariffa, Linn	Jamaica Sorrel, Rosella	E. Indies						*													
Hovenia dulcis, Thunb		Japan			†															†	†
Lucuma mammosa, Gaert	Mammee Sapota							*s													
rivicoa var. angustifolia, Gaert	Egg Fruit, Tiess, Canistel							*s													
Mammea americana, Linn	Mammee Apple	Jamaica						*s													
Mangifera indica, Linn	Mango	India						*s													
Melicocca bijuga, Linn	Ginep, Spanish Lime	Trop. America						*s													
Monstera deliciosa, Liebm	Ceriman	Mexico						*s												*	*
Morus celtidifolia, H. B. and K	Mexican Mulberry	Texas						*	*				*								
japonica, Aud	Japanese Mulberry	Japan																*	*		
nigra, Linn	Black Mulberry	Asia		—	*	*		*	*	*											

Musa chinensis Sweet, syn. *M. Cavendishii*, Lambert.	Dwarf Banana, Chinese Banana.	China						*s														
corniculata, Lour	Lubang	Ins. India						†s														
paradisiaca, Linn	Plantain	India						*s														
sapientum, Linn	Banana, Horse Banana	India						*s														
Myrica Nagi Thunb. syn. *M. rubra*, Sieb. and Zucc.		Asia						†														
Nephelium Lit-chi, Cambess	Litchi, Lee Chee	China						† s												†	*	† *
Nuttalia cerasiformis, T. and G	Oso Berry	California																				
Opuntia Ficus-Indica, Mill	Indian Fig	Trop. America						*	*			*	*							*	*	*
Tuna, Miller	Prickly Pear	W. Indies					*	*	*													
vulgaris, Miller	Prickly Pear	Native		*	*	*	*	*	*	*		*	*	*								
Passiflora edulis, Sims	Granadilla	S. America					*	*	*											*		*
incarnata, Linn	May Apple, May pop	Native			*	*	*	*	*	*												
laurifolia, Linn	Water Lemon	W. Indies						*												*		*
ligularis, Juss		Trop. America						*												*		*
maliformis, Linn	Sweet Cup, Calabash	W. Indies						*														*
quadrangularis, Linn	Granadilla	Brazil						*												*		*
Pereskia aculeata, Miller	Barbados Gooseberry	W. Indies						* s														
Persea gratissima, Gaert	Aguacate, Avocado, Alligator Pear.	Mexico						* s												*		*
Phœnix dactylifera, Linn	Date Palm	Africa						*												*		*
Phyllanthus distichus, Muell	Otaheite Gooseberry	Ins. India						* s														
emblica, Linn	Myrobolan	E. Indies						* s														
Physalis Alkekengi, Linn	Strawberry Tomato, Winter Cherry.	Persia			*		*	*														
peruviana, Linn	Cape Gooseberry	S. America			*	*	*	*	*													-
Prunus Besseyi, Bailey	Western Dwarf Cherry	Native									*			*	*							
Capollin, Zucc	Capullin, Cupullino	Mexico																		*		*
dasycarpa, Ehr	Purple Apricot, Black Apricot.	Asia		*					*													
demissa, Walp	California Wild Cherry	California								—							*	*				
emarginata, Walp		California																*		*	*	
ilicifolia, Walp	Islay	California																	*	*		
Mahaleb, Linn	Mahaleb Cherry	Eur., Asia		*	*	*	*		*	—												
maritima, Wang	Beach Plum	Native		*	*		*	•														
Mume, Lieb. and Zucc	Chinese, or Japanese Apricot.	Asia		*																*		
pennsylvanica, Linn	Pin Cherry, Bird Cherry	Native	*	*	*	*	*		*			*										
padus, Linn	European Bird Cherry	Europe		*	*																	
paniculata, Thunb	Sakura	Japan																*	*	*		
subcordata, Benth	Wild Plum of California	California																*		*		
tomentosa, Thunb		China		*	*													*	*	*		
virginiana, Linn	Choke Cherry	Native			*																	
Watsoni, Sargent	Sand Plum	Native							**		*											
Pyrus angustifolia, Ait	Southern Crabapple	Native			*		*															
coronaria, Linn	Native Crabapple	Native	*	*	*	*	*	*	**	*	*	*	*									
germanica, J. Hooker	Medlar	Eur., Asia				*			*													
Iœnsis, Bailey	Prairie Crab	Native								*	*											
japonica, Thunb	Japanese Quince	Japan		*	*	*	*		*	*	—											
rivularis, Dougl	Oregon Crab	Native															*	*				
salicifolia, Linn		Asia			*																	
sieboldi, Regel		Japan		*	*				*													

Section 1.—FRUITS—Continued.

Botanical name.	Common name.	Origin.	Districts and starring.																		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Pyrus Sorbus, Gaert	Service Tree	Eur., Afr			*																
Rhodomyrtus tomentosa, Wight	Downy Myrtle	China						*													
Ribes Cynosbati, Linn		Native	*	*		*				*	*										
americanum, Mill	Native Black Currant	Native	*	*		*				*	*										
Rubus cratægifolius, Bunge	Siberian Raspberry	Asia																*	*		
cuneifolius, Pursh	Sand Blackberry				†																
deliciosus, Torr		Native													*	*					
ellipticus, Smith	Raspberry	India						*													
invisus, Bailey	Dewberry	Native								*	*										
microphyllus, Linn, syn. *R. palmatus*, Thunb.		Japan																*			
Nutkanus, Mocino	Cloudberry	Native															*	*			
phœnicolasius, Maxim	Japanese Raspberry, Wineberry.	Japan		*	*	*					—										
rosæfolius, Sm., Syn. *R. sorbifolius*	Strawberry Raspberry	Asia		—	†	—															
trivialis, Mich	Southern Dewberry	Native		*				**	**				*								
vitifolius, Cham. and Schlect	Western Dewberry	Native																			
Sambucus canadensis, Linn	Elderberry	Native	*	*	*	*		*	*	**	*						*				
Shepherdia argentea, Nutt	Buffalo Berry	Native	**	*	*	*				*	**						*				
Solanum muricatum, Ait	Pepino	S. America						*												*	*
Tamarindus Indica, Linn	Tamarind	Africa						*s													
Triphasia Aurantiola, Lour	Limeberry	China						*s													
Vaccinium corymbosum, Linn	Swamp Blueberry, Highbush Huckleberry.	Native	*	*	*	*			*	+	**										
macrocarpon, Ait	American Cranberry	Native	*	**	*	†				**											
pennsylvanicum, Lam	Blueberry	Native	**	**	*					**	**										
Vangueria madagascarensis, J. F. Gmel.	Voa-vanga	Madagascar						*s													
Viburnum Opulus, Linn	Highbush Cranberry	Native	**	*	*	—	—			*	*										
Vitis arizonica, Engelm		Arizona																			*
Berlandieri, Planch		Texas							*				*							*	*
californica, Benth		California																		*	*
candicans, Engelm	Mustang Grape of Texas	Texas							*				*								
cinerea, Engelm	Sweet Winter Grape	Native				*			*				*								
cordifolia, Lam	Winter Grape, Frost Grape	Native				*				*											
Champini Planch		Texas		—	*	—	—		*	*			*	*						*	*
Doaniana, Muns	Doan's Grape	Native							*				*							*	
monticola, Buck	Sweet Mountain Grape	Texas							*				*					*	*	*	
rupestris, Scheele	Sand Grape	Native							*				*					*			*
Ximenia americana, Linn	"Alvarillo del Campo"	Mexico						*s													
Zizyphus jujuba, Lamarck	Jujube	India						*					*								
sativa, Gaert	Jujube of Southern Eur	Asia			*		*		*				*								

Botanical name.	Common name.	Origin.	Districts and starring.																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Aleurites triloba, Forst	Candlenut	Asia						*s												*	*
Anacardium occidentale, Linn	Cashew Nut	India						*s												*	
Castanea nana, Muhl	Dwarf Chinquapin	Native					*	*	*												
Castanea pumila, Mill	Chinquapin, Chinkapin, Chincapin.	Native			*	*	*	**	**	*											
Calodendrum capensis, Thunb	Cape Chestnut	S. Africa						†												†	†
Castanopsis chrysophylla, A. De C	Western Chinkapin	Native																*	*	*	*
Castanospermum australe, Cunn	Moreton Bay Chestnut	Australia																		*	*
Cocos nucifera, Linn	Cocoanut	E. Indies						*s													
Cola acuminata, Schott and Endlich	Kola, Bissy, Goora	Africa						†s													
Corylus americana, Walt	American Hazel	Native	**	*	*	*			*	*	**						*				
californica, Rose	California Hazel	Native																	*		
rostrata, Ait	Beaked Hazel	Native	*	*	*	*				*											
Gevuina avellana, Molina	Chilean Nut	Chile																		*	*
Ginkgo biloba, Linn	Ginkgo, Maidenhair Tree, Pa-koo.	Asia		*	*	*				*											
Hicoria glabra, Britt	Pignut	Native		*		*		*													
laciniosa, Sarg	Shellbark, Big Shellbark	Native		*	*	*			*	*											
ovata, Britt	Shagbark, Little Shellbark	Native	*	**	*	*		†		*	*										
Jubæa spectabilis, Humb	Coquito, Small Cocoanut	Chile						†												*	*
Juglans californica, Wats	California Black Walnut	California																*	*		
cinerea, Linn	Butternut, White Walnut, Oilnut.	Native	**	**	*	*				*	*										
cordiformis, Maxim	Japanese Walnut	Japan		†	*	*	*	*	*	*											
mandshurica, Maxim	Japanese Walnut	Asia		*	*													*			
nigra, Linn	Black Walnut	Native		**	*	**	*		*	**	*										
rupestris	Mexican Walnut	Mexico											*							*	*
Sieboldiana, Maxim	Japanese Walnut	Japan		†										*						*	*
Macadamia ternifolia, F. V. Muell	Queensland Nut	Australia						*											*	*	*
Pistacia Terebinthus, Linn	Turpentine Tree	Europe, Afr., Asia						†											†	†	
vera, Linn	Pistachio	Syria						†											†	†	†
Sapium sebiferum, Roxb	Tallow Nut	China						†													
Terminalia Catappa, Linn	Tropical Almond	E. Indies						*s													
Torreya nucifera, Lieb. and Zucc		Japan																		†	†

THE SOCIETY'S RULES FOR EXHIBITING AND NAMING FRUITS.

The rules of the American Pomological Society for exhibiting and naming fruits are as follows:

SECTION I.

NAMING AND DESCRIBING NEW FRUITS.

Rule 1.—The originator or introducer (in the order named) has the prior right to bestow a name upon a new or unnamed fruit.

Rule 2.—The society reserves the right, in case of long, inappropriate, or otherwise objectionable names, to shorten, modify, or wholly change the same, when they shall occur in its discussions or reports; and also to recommend such changes for general adoption.

Rule 3.—The name of a fruit should preferably express, as far as practicable by a single word, a characteristic of the variety, the name of the originator, or the place of its origin. Under no ordinary circumstances should more than a single word be employed.

Rule 4.—Should the question of priority arise between different names for the same variety of fruit, other circumstances being equal, the name first publicly bestowed will be given precedence.

Rule 5.—To entitle a new fruit to the award or commendation of the society it must possess (at least for the locality for which it is recommended) some valuable or desirable quality, or combination of qualities, in a higher degree than any previously known variety of its class and season.

Rule 6.—A variety of fruit having been once exhibited, examined, and reported upon as a new fruit by a committee of the society will not thereafter be recognized as such, so far as subsequent reports are concerned.

SECTION II.

COMPETITIVE EXHIBITS OF FRUITS.

Rule 1.—A plate of fruit must contain six specimens, no more, no less, except in the case of single varieties not included in collections.

Rule 2.—To insure examination by the proper committees all fruits must be correctly and distinctly labeled and placed upon the tables during the first day of the exhibition.

Rule 3.—The duplication of varieties in a collection will not be permitted.

Rule 4.—In all cases of fruits intended to be examined and reported by committees the name of the exhibitor, together with a complete list of the varieties exhibited by him, must be delivered to the secretary of the society on or before the first day of the exhibition.

Rule 5.—The exhibitor will receive from the secretary an entry card, which must be placed with the exhibit, when arranged for exhibition, for the guidance of committees.

Rule 6.—All articles placed upon the tables for exhibition must remain in charge of the society till the close of the exhibition, to be removed sooner only upon express permission of the person or persons in charge.

Rule 7.—Fruits or other articles intended for testing, or to be given away to visitors, spectators, or others, will be assigned a separate hall, room, or tent, in which they may be dispensed, at the pleasure of the exhibitor, who will not, however, be permitted to sell and deliver articles therein, nor to call attention to them in a boisterous or disorderly manner.

SECTION III.

COMMITTEE ON NOMENCLATURE.

Rule 1.—It shall be the duty of the president, at the first session of the society, on the first day of an exhibition of fruits, to appoint a committee of five expert pomologists whose duty it shall be to supervise the nomenclature of the fruits on exhibition, and in case of error to correct the same.

Rule 2.—In making the necessary corrections they shall, for the convenience of the examining and awarding committees, do the same at as early a period as practicable, and in making such corrections they shall use cards readily distinguishable from those used as labels by exhibitors, appending a mark of doubtfulness in case of uncertainty.

SECTION IV.

EXAMINING AND AWARDING COMMITTEES.

Rule 1.—In estimating the comparative values of collections of fruits committees are instructed to base such estimates strictly upon the varieties in such collections which shall have been correctly named by the exhibitor prior to action thereon by the committee on nomenclature.

Rule 2.—In instituting such comparison of values committees are instructed to consider: First, the values of the varieties for the purposes to which they may be adapted; second, the color, size, and evenness of the specimens; third, their freedom from the marks of insects, and other blemishes; fourth, the apparent carefulness in handling, and the taste displayed in the arrangement of the exhibit.