

Annual meeting of the Florida State Horticultural Society.

Florida State Horticultural Society.
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Transactions
OF THE
FLORIDA STATE
Horticultural Society
FOR
1902

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MYRON E. GILLETT,
The Member from Tampa.

PROCEEDINGS

OF THE

FIFTEENTH ANNUAL MEETING

OF THE

Florida State Horticultural Society

HELD AT

TAMPA, FLA., MAY 20, 21 and 22, 1902.

Compiled by the Secretary.

PUBLISHED BY THE SOCIETY.

DeLand, Fla.
E. O. PAINTER & CO.
1902.

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FLORIDA STATE HORTICULTURAL SOCIETY.

OFFICERS-ELECT FOR 1903.

PRESIDENT:

George L. Taber, Glen St. Mary.

VICE-PRESIDENTS:

**Dr. George Kerr, Pierson; G. W. Wilson, Jacksonville;
C. T. McCarty, Ankona.**

SECRETARY:

Stephen Powers, Jacksonville.

TREASURER:

W. S. Hart, Hawks Park.

EXECUTIVE COMMITTEE:

**Lyman Phelps, Chairman, Sanford; E. S. Hubbard, Federal Point;
E. O. Painter, Jacksonville.**

President, Secretary and Treasurer, ex-officio.

STANDING COMMITTEES.

Citrus Fruits: S. H. Gaitskill, McIntosh; Arthur H. Brown, Manavista; T. J. Watkins, Nocatee.
Diseases and Insects of Citrus: E. P. Porcher, Cocoa; T. P. Drake, Yalahha; A. A. Boggs, Cocoanut Grove.
Peaches, Plums and Pears: W. D. Griffing, Jacksonville; B. M. Hampton, Lakemont; Hayes Bigelow, Tarpon Springs.
Grapes, Figs, and Kaki: H. von Lutti-chau, Earleton; Irving Keck, Bowling Green; C. F. Barber, Macclenny.
Pineapples: C. T. McCarty, Ankona; Cyrus W. Butler, Saint Petersburg; C. B. Thornton, Orlando.
Tropical Fruits other than Pineapples: E. V. Blackman, Miami; Dr. F. W. Inman, Winter Haven; W. S. Popple, Estero.
Ornamentals: H. Price Williams, Miami; Geo. P. Woodell, Seven Oaks; W. J. Ellsworth, Jessamine.
Damage from Cold and best Methods of Prevention: E. O. Painter, Jacksonville; J. A. Crosby, San Mateo; M. F. Robinson, Sanford.
Fertilizers and Irrigation: E. S. Hubbard, Federal Point; Prof. H. E. Stockbridge, Lake City; G. A. Danley, Chipley.
Nut Culture: M. E. Gillett, Tampa; Dr. Jos. C. Merritt, Orlando; S. B. Mann, Glenwood.
Transportation: Frederic S. Morse, Miami; Rev. E. V. Backman, Miami; C. T. McCarty, Ankona.

Strawberries and Miscellaneous Fruits other than Tropical: Stephen Powers, Jacksonville; James Leslie, Panasoffkee; W. E. Embry, Dade City.

Entomology: Prof. H. A. Gossard, Lake City; Prof. P. H. Rolfs, Miami; Benj. N. Bradt, Huntington.

Vegetables: C. G. White, Hastings; E. V. Blackman, Miami; A. G. Lyle, Terra Ceia.

Forestry: C. E. Garner, Jacksonville; G. W. Wilson, Jacksonville; W. L. Palmer, Orlando.

New Fruits: Rev. Lyman Phelps, Sanford; E. N. Reasoner, Oneco; Walter Cooper, Sorrento.

Legislation: Prof. H. E. Stockbridge, Lake City; W. S. Hart, Hawks Park; Dr. Wm. C. Richardson, Tampa; Geo. W. Wilson, Jacksonville; C. T. McCarty, Ankona.

Note—The last three members of the Committee constitute a Special Committee to secure Legislative appropriation for World's Fair in 1904.

Special Committee on Promotion of Society's Interests, Increased Membership, etc: Mrs. C. T. McCarty, Ankona, Chairwoman, and all the other ladies of the Society.

Special Committee on Nomenclature and Revision of Catalogue: G. L. Taber, Glen Saint Mary; H. Harold Hume, Lake City; E. N. Reasoner, Oneco.

LIST OF MEMBERS.

HONORARY.

Berckmans, P. J., Augusta, Ga.,

Redmond, D., St. Nicholas.

LIFE.

- Alderman, A. D., Bartow.
Allen, Wm., 90 White St., New York City.
Andrews, Clement W., John Crerar Library, Chicago, Ill.
Armstrong, L. H., St. Nicholas.
Barber, C. F., Macclenny.
Francisco, Beltran, Monterey, N. L., Mexico.
Chidester, D. D., 2321 Madison Square, Philadelphia, Pa.
Conner, W. E., 532 Madison Ave., New York City.
Cunliff, L. H., Garden City, N. Y.
Ellsworth, W. J., Jessamine.
Francis, Jr., Chas., Interlachen.
Frink, Aubrey, Glen St. Mary.
Gaitskill, S. H., McIntosh.
Haden, Capt. Jno. J., Cocoanut Grove.
Haden, Mrs. Florence P., Cocoanut Grove.
Harris, E. K., East Palatka.
Hart, W. S., Hawks Park.
Hastings, H. G., Atlanta, Ga.
Harvey, S. S., Havana, Cuba.
Healy, G. P., Jaffery.
Hentz, W. B., D. D. S., City Point.
Hempel, H. A., Gotha.
Herff, B. von, 93-99 Nassau St., New York City.
Hopper, Isaac A., Orlando.
- Kerr, Dr. Geo., Pierson.
Lauman, G. N., Ithaca, N. Y.
Leonard, Geo. W., Hastings.
Lewis, Dr. Fred D., 188 Franklin St., Buffalo, N. Y.
Loehr, F. C., Fort Ogden.
Merritt, Dr. Jos. C., Orlando.
Milligan, John W., Apopka.
Painter, E. O., Jacksonville.
Painter, Mrs. E. O., Jacksonville.
Phelps, Rev. Lyman, Sanford.
Price, F. N., Orlando.
Racey, Chas. H., Waveland.
Richards, Thos. E., Eden.
Robinson, M. F., Sanford.
Rolfs, Prof. P. H., Miami.
Sneden, W. C., Waveland.
Smith, Chas. E., Bogwalk, Jamaica.
Strauss, J. E., Lealman.
Stuart, Leon N., Montemorelos, N. L., Mexico.
Taber, Geo. L., Glen St. Mary.
Temple, Wm. C., 1090 Shady Ave., Pittsburg, Pa.
Temple, Mrs. Wm. C., Winter Park.
Tiffin, H. J., Courtenay.
Wilson, Lorenzo A., Jacksonville.
Woodroffe, Alfred, Auckland, New Zealand.
Worcester, C. H., Pomona.
Wyeth, J. H., Winter Park.

ANNUAL.

- Abdill, L. B., Ankona.
 Abdill, Mrs. L. B., Ankona.
 Adams, C. G., Sorrento.
 Adams, F. H., Dunedin.
 Adams, Geo. W., Thonotosassa.
 Adams, Mrs. G. W., Thonotosassa.
 Alden, B. H., Stetson.
 Allen, Hugh C., Maitland.
 Allred, N. M., Citra.
 Amsden, E. W., Ormond.
 Anderson, Robert, Lansdowne, Penna.
 Arnold, R. A., Orlando.
 Arnold, H. H., Fairbanks.
 Bachman, I. J., Braidentown.
 Bacon, J. Earle, Ormond.
 Bain, Lewis, Kenosha, Wis.
 Baker, R. D., Buffalo Bluff.
 Balcom, Mrs. Luke, Paola.
 Bass, Mrs. S. H., Palatka.
 Bearss, W. A., Magdalene.
 Bean, C. L., Jacksonville.
 Bell, J. D., Saint Petersburg.
 Bently, Miss M. E., Massena Springs,
 N. Y., care of A. B. Cooke.
 Berry, A. E., Wauchula.
 Bieley, H. C., Lake City.
 Bigelow, Hayes, Tarpon Springs.
 Blackman, E. V., Miami.
 Blake, Ellis G., Lake Helen.
 Blanchard, E. B., Altamonte Springs.
 Blount, Benj. F., Bartow.
 Boggs, A. A., Cocoanut Grove.
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 Borland, J. B., Citra.
 Bours, W. A., Jacksonville.
 Boyd, Mrs. M. E., Palatka.
 Bradt, Benj. N., Huntington.
 Bradt, Mrs. Benj. N., Huntington.
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 Brown, C. H., Altamonte Springs.
 Brown, G. N., Palmetto.
 Browning, E. J., Bowling Green.
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 Buffum, E. H., Tampa.
 Bumby, Chas. E., Orlando.
 Bumby, Jos., Orlando.
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 Burr, Lafayette, Box 2235, Boston
 Mass.
 Butler, Cyrus W., Saint Petersburg.
 Caldwell, D. J., Higley.
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 Campbell, W. B., Crescent City.
 Campbell, A. E., Roseland.
 Campbell, F. M., Largo.
 Campbell, Mrs. F. M., Largo.
 Carey, A. H., Orlando.
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 Carnes, W. W., Tampa.
 Carroll, T. A., Jacksonville.
 Carter, J. C., Dade City.
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 Chapman, J. T., Plymouth.
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 Chappel, Jay, Palmetto.
 Chilton, B. F., New Smyrna.
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 Clarkson, H. C., Palmetto.
 Clawson, J. M., Tarpon Springs.
 Coachman, S. S., Clearwater Harbor.
 Cobb, T. M., Corsicana, Texas.
 Coe, Burton E., Tampa.
 Coe, Perry E., Limona.
 Cole, F. E., Saint Petersburg.
 Conant, Dr. Edward E., Bartow.
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 Conrad, Thos. W., Palmetto.
 Conroy, F. P., Jacksonville.
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 Cooper, W. A., Orlando.

- Corbett, D. D., St. Augustine.
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 Dickinson, Melissa, Orange City.
 Dickinson, J. M., The Quay, Bideford,
 England.
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 Dorr, William L., Federal Point.
 Dorr, Mrs. Wm. L., Federal Point.
 Drake, T. P., Yalahala.
 Earle, A. G., Tangerine.
 Earle, Wm. H., Tangerine.
 Edwards, Wm., Plymouth.
 Eliot, L. H., Thonotosassa.
 Embry, W. E., Dade City.
 Erwin, W. H., Hastings.
 Erwin, W. W., Hastings.
 Evans, W. A., Phosphoria.
 Everton, Charles, Avon Park.
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 Fairchild, H. C., Bridgeport, Conn.
 Felt, J. P., Emporia.
 Fiehe, Antone, Tampa.
 Fitts, C. R., Port Tampa City.
 Fleming, H., Kissimmee.
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 Frey, John, Bonaventure.
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 Gossard, Prof. H. A., Lake City.
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 Graham, Mrs. W. D., care of Southern
 Express Company, Tampa.
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 Graves, H. S., Gainesville.
 Greene, Samuel Ward, Micco.
 Griffing, C. M., Jacksonville.
 Hodler, John, Braidentown.
 Hampton, B. M., Lakemont.
 Hampton, Mrs. B. M., Lakemont.
 Harllee, P., Palmetto.
 Harrington, A. B., Winter Haven.
 Harrington, Mrs. A. B., Winter Haven.
 Harris, Mrs. E. K., East Palatka.
 Harrison, H. D., Dade City.
 Harrison, M. C., Palmetto.
 Harevy, H. H., Seffner.
 Harvey, Mrs. H. H., Seffner.
 Hayward, E. H., DeLand.
 Helm, Johnson, Oneco.
 Henderson, W. B., Tampa.
 Henry, B. W., Hennen Bldg., New Or-
 leans, La.
 Henry, Jas., Saint Petersburg.
 Hepburn, H. S., Davenport, Iowa.
 Higgins, John W., 38 Willow St., Provi-
 dence, R. I.
 Higgins, P. M., Astor.
 Hill, Henry F., Astor.
 Hills, T. Morton, M. D., Willimantic,
 Conn.
 Hine, D. N., Nashua.
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 Holt, Edward, West Easton, Pa.
 Hoyt, R. D., Seven Oaks.
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 Hudson, J. W., Dade City.
 Hume, Prof. H. Harold, Lake City.
 Hume, Mrs. H. Harold, Lake City.
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- Inman, Dr. F. W., Winter Haven.
 Inman, Mrs. F. W., Winter Haven.
 Irwin, Allen, River View.
 Jackson, John W., Palmetto.
 Jacocks, Mrs. C. W., Formosa.
 Jansen, Carl, Avon Park.
 Jennings, Harry, Tibbals.
 Jones, Cyrus, Bowling Green.
 Jones, Rev. C. E., Bartow.
 Jones, Rev. C. J. K., Los Angeles, California.
 Jones, Dr. D. I., Palmetto.
 Jones, W. H., Orange Bend.
 Keck, Irving, Bowling Green.
 Keck, Mrs. A. W., Bowling Green.
 Kelsey, O. H., Tampa.
 Kempe, Dr. J. J., 14 Grove St., Rochester, N. Y.
 Kenney, W. K., Seffner.
 Kerr, Mrs. Carrie L., Pierson.
 Kirkhuff, W. I., Braidentown.
 Klemm, Richard, Winter Haven.
 Knox, L. B., Bulow.
 Kraemer, John F., Miami.
 Lamb, J. A., Palmetto.
 Leovy, Henry J., box 1294, New Orleans, La.
 Leslie, James, Panasoffkee.
 Lewis, C. H., Saint Petersburg.
 Lewis, W. J., Limona.
 Lindsay, J. E., Davenport, Iowa.
 Linebaugh, H. T., Tampa.
 Lipsey, L. W., Blanton.
 Little, J. S., Keystone Park.
 Lockwood, Stephen, Zelienople, Penna.
 Lord, J. H., Venice.
 Lubrecht, F., Island Grove.
 Lubrecht, H., Island Grove.
 Lyle, A. G., Terra Ceia.
 Lyman, F. W., Kenosha, Wis.
 Lyman, J. Rudolph, Melbourne.
 McCarty, C. T., Ankona.
 McCarty, Mrs. C. T., Ankona.
 McClung, C. B., Dunedin.
 McClung, J. M., Dunedin.
 MacIlvaine, C. M., Tampa.
 McLean, J. N., Palmetto.
 Mace, J. P., Lake Helen.
 Mallary, E. Y., Macon, Ga.
 Mann, S. B., Glenwood.
 Mann, W. H., Mannville.
 Martin, George, Warehouse, 9th Ave. and 16th St., New York City.
 Marzahn, Mrs. F. F., Waterville, Minn.
 Mason, J. A., Bowling Green.
 Matheny, C. Woodburn, Sarasota.
 Mattison, W. W., Ridgway, Penna.
 May, J. S., DeLand.
 Meares, G. W., Saint Petersburg.
 Meislahn, H., Clarcona.
 Miller, Prof. H. K., Lake City.
 Miller, Mrs. H. K., Lake City.
 Miller, Minos, Orange Bend.
 Mitchell, A. J., Jacksonville.
 Moore, Rt. Rev. Chas. H., O. S. B., St. Leo.
 Moore, Capt. W. R., Buda.
 Morris, Prof. Geo. L., Fort Reed.
 Morris, Joshua, Thonotosassa.
 Morse, Frederick S., Miami.
 Moses, Wallace R., West Palm Beach.
 Mote, E. H., Leesburg.
 Mowers, W. H., DeLand.
 Munson, F. W., Georgiana.
 Nash, R. L., Palmetto.
 Nesbit, Thomas, Astor.
 Nordmann, Ferd, New Smyrna.
 O'Brien, Mrs. W. S., Thonotosassa.
 Ormond, Wm. L., Panasoffkee.
 Palen, Peter E., Haines City.
 Palmer, R. A., Braidentown.
 Palmer, W. L., Orlando.
 Perry, D. W., Pomona.
 Pettigrew, A. J., Manatee.
 Phillips, F. V., Winter Park.
 Pierson, D. L., Monticello.
 Pike, Walter N., Floral Park, N. Y.
 Pinkham, A. M., West Tampa.

- Phelps, Mrs. Mary L., Sanford.
 Player, Harry, Tampa.
 Popple, W. S., Estero.
 Porcher, E. P., Cocoa.
 Porcher, Mrs. E. P., Cocoa.
 Pound, Orange, Bartow.
 Powers, Stephen, Jacksonville.
 Pratt, Dr. E. E., Limona.
 Pugsley, Chas., Interlachen.
 Ray, Prof. L. C., Palmetto.
 Reasoner, E. N., Oneco.
 Rice, M. A., Citra.
 Richardson, Capt. John, Saint Marys,
 Ga.
 Richardson, Dr. Wm. C., 115 Hyde Park
 Ave., Tampa.
 Ricker, B. B., South Lake Weir.
 Roberts, Mrs. J. F., Dade City.
 Rollins, C. E., Thonotosassa.
 Rose, Capt. R. E., Tallahassee.
 Rowlett, Prof. W. M., Palmetto.
 Russell, J. M., Dade City.
 Saeger, A. E., Ankona.
 Sample, J. W., Bartow.
 Sampson, F. G., Boardman.
 Sands, W. A., Auburndale.
 Sanders, G. W., Jacksonville.
 Sartorius, H. G., Seminole.
 Sartorius, L. G., Seminole.
 Sartorius, Mrs. L. G., Seminole.
 Saylor, Mrs. E. M., Ankona.
 Schneider, Chas. F., Ocala.
 Sellmer, Chas., Zellwood.
 Shepherd, S. P., Winter Park.
 Shooter, C. C., Earleton.
 Shooter, H., Earleton.
 Sikes, H. S., Island Grove.
 Simmons, Adelaide L., Kenosha, Wis.
 Skinner, L. B., Dunedin.
 Smith, Julius, Eustis.
 Smith, R. D., Ormond.
 Snow, George E., Eastlake.
 Snyder, A. S., Saint Petersburg.
 Sorensen, John, Jensen.
 Spencer, Will, Palmetto.
 Sperry, E. F., Orlando.
 Stall, B. E., Magdalene.
 Starke, Thos. R., Bowling Green.
 Steinmetz, J. B., Clay Springs.
 Sterling, Henry J., Delray.
 Stevens, H. B., Stetson.
 Stevens, J. A., Citra.
 Stewart, I. A., DeLand.
 Stiles, E. W., Sanford.
 Stockbridge, Prof. H. E., Lake City.
 Stone, Geo. W., 1018 Benson Ave.,
 Evanston, Ill.
 Street, A. W., Ormond.
 Strunk, W. P., Roodhouse, Ill.
 Stryker, T. H., Rome, N. Y.,
 Sunnaberry, Axel, Astor.
 Suttie, D. A., Belfast, Ireland, Morton's
 Waverly Hotel.
 Sutton, J. B., Palm View.
 Taber, Mrs. Geo. L., Glen Saint Mary.
 Taliaferro, Dr. T. H., Lake City.
 Taliaferro, Mrs. T. H., Lake City.
 Taylor, Theo. G., Hastings.
 Thomson, John, Clearwater Harbor.
 Thornton, C. B., Orlando.
 Tischler, P., Jacksonville.
 Tousey, B. C., Cocoanut Grove.
 Townsend, C. W., 34 Penn Ave., Pitts-
 burg, Penna.
 Tufts, C. E., Harney.
 Tysen, C. R., Jacksonville.
 Tysen, J. R., Jacksonville.
 Vallerchamp, K. D., Astor.
 Van Wyck, Miss Mary, New Hamburg,
 N. Y.
 Luttichau, H. von, Earleton.
 Waite, Rev. C. L., care of W. J. Lewis,
 Limona, Fla., and Brunswick, Me.
 Wakelin, Amos, Bullitt Building, Phila-
 delphia, Penna.
 Wakelin, Miss Grace V., Lane Park.
 Wakelin, Guilford M., Lane Park.
 Warner, S. C., Palatka.

- Watkins, T. J., Nocatee.
Weeden, L. W., Tampa.
Weidman, Jacob, 319 Lexington Ave.,
Pittsburg, Penna.
Weiland, Chas. 2319 Indiana Ave., St.
Louis, Mo.
Welborn, Judge J. F., Sanford,
Westphal, A. M., Island Grove.
White, Clarence G., Hastings.
White, J. M., Orange City.
White, Miss L. M., Hastings.
Whitfield, W. B., Bowling Green.
Whitner, J. N., Sanford.
Whitten, W. M., Punta Gorda.
Whittle, J. C., Largo.
Whittle, Mrs. J. C., Largo.
Wightman, L., box 256, Tampa.
Williams, H. Price, Miami.
Willis, Robert F., Palmetto.
Willis, S. R., Palmetto.
Wilson, Geo. W., Jacksonville.
Witherington, H. H., Apopka.
Woodell, Geo. P., Seven Oaks.
Woods, Dr. S. R., Bowling Green.
Woods, Mrs. M. L., Bowling Green.
Wurts, Geo. E., Seffner.
Wyckoff, John, Citra.
Wyeth, Mrs. J. H., Winter Park.
Wylie, J. H., Interlachen.
Wyman, A. F., Braidentown.
Young, E. D., Palmetto.

Constitution.

Article 1. This organization shall be known as the Florida State Horticultural Society, and its object shall be the advancement of horticulture.

Art. 2. Any person may become Member of the Society by subscribing to the Constitution, and paying one dollar. Any person may become a Life Member of the Society by subscribing to the Constitution and paying ten dollars.

Art. 3 Its officers shall consist of a President, three Vice-Presidents, Secretary, Treasurer and Executive Committee of three, who shall be elected by ballot at each annual meeting. After the first election, their term of office shall begin on the first day of January, following their election.

Art. 4. The regular meeting of this Society shall be on the second Tuesday in April, except when otherwise ordered by the Executive Committee.

Art. 5. The duties of the President, Vice-President, Secretary and Treasurer shall be such as usually devolve on those officers. The President, Secretary, and Treasurer shall be ex officio advisory members of the Executive Committee.

Art. 6. The Executive Committee shall have authority to act for the Society between annual meetings.

Art. 7. Sec. 1. The Constitution may be amended by a vote of two-thirds of the members present.

Art. 7. Sec. 2. An amendment to the Constitution and By-Laws shall be proposed at one annual meeting and voted on at the next annual meeting unless unanimous consent is given to its immediate consideration.

BY-LAWS

1. The Society year shall be co-extensive with the calendar year, and the annual dues of Members shall be one dollar.

2. All bills authorized by the Society or its Executive Committee, for its legitimate expenses, shall be paid by the Secretary's draft on the Treasurer, O. K'd by the President.

3. The meetings of the Society shall be devoted only to Horticultural topics from scientific and practical stand-points, and the Presiding Officer shall rule out of order all motions, resolutions and discussions tending to commit the Society to partisan politics or mercantile ventures.

PROCEEDINGS
OF THE
FIFTEENTH ANNUAL MEETING
OF THE
Florida State Horticultural Society.

The fifteenth annual meeting of the Society was held at Tampa upon the invitation of the authorities of that city. The Society convened in the casino of the Tampa Bay Hotel, tendered by the Plant System, on Tuesday, May 20, 1902, at 8:00 p. m. and adjourned sine die on the following Thursday at 10:00

p. m. About 150 members were present, including several native Floridians who expressed a pleased surprise at the instructiveness of the proceedings. It was the general sentiment of the old members that none of the former meeting places had surpassed Tampa in her hearty hospitality.

Minutes.

FIRST DAY.

OPENING SESSION.

Tuesday, 8:00 p. m.

1. Call to order by President Taber.
2. Opening invocation by Rev. J. A. Howland, Hyde Park M. E. church.
3. Address of Welcome by Mayor F. L. Wing.
4. Response on behalf of the Society by E. O. Painter. (See page 17.)
5. Report of Local Committee on

Arrangements, made by M. E. Gillett, of Tampa, stating that a moonlight excursion down the bay and various trips about the city and suburbs had been provided. All teams and boats were so busy shipping vegetables that none could be spared.

6. President Taber's Annual Address. (See page 20.)
7. Dr. T. H. Taliaferro's address, Agricultural College Education with Reference to Horticulture. (See page 28.)

Opening Exercises.

The Society convened at 8 p. m. on Tuesday, May 20, in the casino of the Tampa Bay hotel, and the opening invocation was made by Rev. J. A. Howland, of Hyde Park M. E. church. Mayor F. L. Wing, of Tampa, in a few modest remarks, laudatory of the horticul-

turists, extended the cordial greeting and welcoming of the city. In response to the mayor's welcome, E. O. Painter, on behalf of the Society, of which he has been a member from its earliest inception, made a humorous response which provoked no little laughter. He said:

E. O PAINTER'S RESPONSE.

Mr. President, Ladies and Gentlemen:

It gives me great pleasure to respond to this hearty address of welcome. It gives me pleasure, not because some one is expected to do this formally, but because I love the Florida State Horticultural Society, as it has done more for the horticultural and agricultural interests of the State than all the other societies put together. In this respect I am a good deal like the Dutchman and his dog: Hans had a very fine dog. One day a neighbor said to him:

"Hans that is a fine dog you have."

"Yah, das ist ein fine dog. Dot ist de best dog dat efer vas. You pet dat dog on de cop und you pet me. You kick dat dog once und I kick you twice already."

So I respond heartily because I feel that what ever Tampa does for the Hor-

ticultural Society, she does for me personally.

When President Taber requested me to perform this duty, I thought there were others that could more fittingly respond than myself. I knew that Tampa people would leave no stone unturned to make the meeting pleasant and profitable, but I was reminded of a story told on the president of a theological seminary. He was visiting Philadelphia and while walking down the street one evening, heard the beating of the Salvation Army drum. Arriving at the corner where the meeting was being held, he stopped and listened. He had been there but a moment when one of the Salvation Army girls approached him and begged him to turn from his evil ways and give his heart to the Lord.

"My dear madam," said the presi-

dent, "I am the president of a theological seminary, and—"

"My dear sir," said the girl, "I hope you won't let an infirmity of that kind keep you from coming to the Lord."

So, ladies and gentlemen, I am not going to let my infirmity as a public speaker keep me from telling the good people of Tampa how we appreciate this welcome. We know that you wanted us to come here, for a year ago you sent a delegate strong (if you do not think he is strong just feel the muscles of Mr. Gillett.) He worked night and day. He imbued the members with the idea that there were people in Tampa, who were in hearty accord with the Society and its work and that if we would go to Tampa we would see a new Florida, and meet people who were as hospitable and open-hearted as any upon the face of the globe. We have come and find all he claimed is true, and more too. We find it very pleasant to be under the "Wing" of Tampa's mayor.

A long time ago Tampa was the mecca of orange growers as far up the country as Bartow. When their fruit was ripe they would load up their carts, carry provisions and fodder for man and beast for the trip, and start on their journey for Tampa. About half way there, they would go in camp, the provisions and fodder would be divided and a portion of it left on the camp ground to be picked up on the return trip. When the oranges were sold, they would start back with a load of provisions, a few yards of "kali-ker" and a few boxes of snuff for the "old woman," a few plugs of tobacco and a jug of whiskey for Christmas, happy in the fact that they had no freight to pay and no commission merchants to share their profits.

The real commercial interests of Tampa did not begin until the year 1881 when the railroad was completed from Sanford to Tampa. On the completion of this road, new industries of all kinds were developed. Steamboat lines were established between Tampa, Key West and Havana. With this the cigar business developed rapidly. Factories were built on every side and thousands of people came here to secure labor and a home, until now, Tampa has 151 cigar factories, giving employment to over 7,000 people, with a pay-roll of about \$100,000 per month.

And now, Mr. President, I want to ask you a conundrum.

What is the difference between Jacksonville and Tampa?

"Give it up," said the president.

Why, a year ago Jacksonville went up in smoke and Tampa is now going up by the smoker.

While the making of cigars is a large business it is by no means Tampa's only industry. Large quantities of phosphate rock, lumber, naval stores and cattle are sent in from the surrounding country for shipment. Train load after train load of vegetables and oranges are annually sent out, that bring back the grease that lubricates the wheels of commerce.

I have so far said nothing about the fishing industry, which annually amounts to over \$2,000,000 a year and gives employment to over 1,000 men. While talking about fishing I want to tell you a little fish story that happened before the railroad reached Tampa. One time there was a tremendous storm and the waters on the gulf were lashed in seething foam by the mad winds. Many boats were capsized and lives lost. One widow was inconsolable in her grief. She mourned

night and day for her lost husband. At last the body was found but the neighbors feared to tell its condition; but finally they broke the news to her, and said the neighbor, "Its condition is awful, terrible! Why it is covered with eels."

"Covered with eels!" said the widow, "My, did you say 'covered with eels?' Why just go and set him again!"

So you see Tampa's business proclivities date away back. What the future has in store for Tampa, the Key of the Gulf, the mecca of the cigar maker, the home of countless industries is hard to say, but that she has a bright future can be judged by her achievements of the past. Tampa's fame is known far and wide, not only for her cigars, her shipping facilities and her fishing industries, but many other things.

Not long ago the baseball team of Stetson University was figuring on a match game with a team of another college. The DeLand team's battery was rather weak and the captain of the DeLand team was one day heard to remark:

"I wish we had some Tampa boys in our club!"

"Why do you want Tampa boys in your club?" he was asked.

"Why," said the captain, "you know that the Tampa boys are good on the strike."

Some time ago I came across this latin epigram, "What is sweeter than wine? The dew of heaven. What is sweeter than the dew of heaven? Honey. And what is sweeter than honey? Nectar. And what is sweeter than nectar? A kiss."

Now, I want to ask what is sweeter than staying at home hoeing orange trees, digging potatoes, pulling pineapple suckers, etc? Why, thinking about attending a meeting of a Florida State Horticultural Society. What is sweeter than thinking about attending the Horticultural Society? Actually attending one of the annual meetings at Jacksonville. And what is sweeter than attending the annual meeting at Jacksonville? Coming to Tampa and meeting her progressive men and lovely women, and having our cheeks kissed by the gulf's zephyr laden with the perfume of fruit and flowers and seeing on every hand the evidences of peace, prosperity and plenty.

LOCAL ARRANGEMENTS.

The committee on this subject, through M. E. Gillett, of Tampa, reported, a partial change in the original program:

The steamboat people do not care to charter a boat for the day as they are already crowded in handling vegetable shipments from sections down the bay.

And again, at this season it is almost impossible to get teams at the places where we intend to stop with which to carry the members out into the country and back. Everything that could walk on four feet is engaged in handling the tomato crop. We have had a very dry spell in South Florida, which makes it

imperative that the vegetable crop be shipped at just the proper time or it will be ruined. Under these circumstances it is very hard to get up any enthusiasm for an excursion of any kind.

We have, therefore, thought best to arrange for a moonlight trip down the bay on the steamer "Margaret." This will take place tomorrow night and the boat will leave the wharf at eight o'clock and return at about twelve or any time that the Society may see fit. If the Society wishes to obviate paying hotel bills, we can stay out all night. It will be cool and pleasant on the water at night and I think on the whole will be enjoyed more than a day trip could possibly have been. During the day it gets very hot in this section and I am free to say that I think it would have been rather unpleasant to

have been dragged about over the country in wagons.

The ladies of the city have very cheerfully arranged to entertain the ladies of the Horticultural Society. A reception will be given Thursday afternoon at 3:30 in the ante-rooms of the Casino, which will be followed by a trolley ride over the city and out to Port Tampa, stopping at the pavillion where refreshments will be served.

The cigar factories can be visited, and members of the committee will take pleasure in personally conducting any parties who wish to go out there.

We will do the very best we can and hope you will go away satisfied, and think that you will find that Tampa is not a very bad place after all.

President's Annual Address.

G. L. TABER.

Members of the Florida State Horticultural Society, Ladies and Gentlemen:

I am sure we are all agreed even thus early in the meeting that our decision to come to Tampa this year was a wise one. Those of us who were at St. Augustine last year thought so then for the vote to accept Tampa's invitation was unanimous. This is our second meeting on the Gulf side; the previous one having been at Pensacola in 1893. Twice also we have

met on the Atlantic side; last year at St. Augustine, and in 1892, at Ormond. The Ormond meeting was more largely attended than any previous to that time. Its printed proceedings constitute our first published volume. At that meeting our lamented brother, the genial C. A. Bacon, of historical "Number Nine" extended to us, on behalf of Ormond and the east side, a welcome worthy of either coast.

In glancing back over fourteen years

of Society existence one can but be impressed with the losses we have suffered by death. An honored president, an able secretary, other devoted officers and many members no less esteemed have worked for and with us and been mustered out of the ranks. This year, as in those gone by, our Committee on Necrology has its task to perform. It is to my mind an inspiring thought, applicable equally to those whose loss we deplore and those of us who remain, that the work we have done and are doing, the knowledge gained and are gaining, has not been, and is not, each for himself alone but for each other and for posterity. In our calling we plant flowers and shrubs and quick-fruiting trees for our own pleasure and profit; and this is right and proper; but who of us has not experienced the thrill of a loftier sentiment, realized a nearer relationship to the Infinite, felt himself a closer, specific, integral part in nature's beneficent plan of continuity, when he has planted a long-lived tree, in the full knowledge that its greatest grandeur and fullest fruition will be enjoyed by others a half century after he has obeyed the final summons. What more fitting monuments do any of us want than the century-living trees that our hands have planted—the emblem at once of our profession and our faith?

HORTICULTURAL ADVANCE.

In dealing with Florida horticulture it is impossible to put one's fingers on a certain date and place and say then and there was laid a well thought out horticultural scheme, complete in all its details, which, followed constantly and consistently has resulted in the present day standard. Horticultural advance-

ment, in its broadest sense, viewed as we are now viewing it from state rather than from individual standpoint, cannot be formulated in this way. In fact, paradoxical as it may sound, advancement in horticultural pursuits, as in many others, often means departure from consistency; throwing previously conceived opinions to the winds if need be and striking off at a tangent, a right angle, or even doubling completely on the original track. No large success is possible to the man who allows earlier convictions to stand as a stumbling block between himself and the truth as he sees it in the light of riper experience. Some years ago the earth was flat, and stood stationary in the heavens, and not a man living dared dispute either proposition. But later Thales claimed it to be round and still later Galileo asserted that it moved, and both—each in his proper time—stood at the head of the splendid procession of cranks, who, between their time and ours, have blazed paths of enlightenment and progress.

It is true that in horticultural pursuits, the world over, changes are apt to be more in the nature of evolution than for revolution; and yet, within the memory of some still living, Florida horticulture has undergone changes rapid enough and radical enough to seem revolutionary at the time they were occurring, even if they do not to us now. Common usage does not always mean the most advanced methods. If it did there would now be no Florida Horticultural Society, no Florida, no western continent and no explorer to discover it. And this is what I wish to impress upon us; we should dare to have opinions of our own.

BUDDED TREES AND LOW PRUNING.

It was not so many years ago—although, perhaps proper enough to say, before this Society came into existence—that the number of orange growers who recommended planting budded trees were in a very small minority. By far the larger number claimed that the Florida sweet seedling was good enough for anybody; that the mere suggestion of budded trees possessing any advantages was rank heresy, calculated to cast reproach upon the entire orange industry of the state. The few thought otherwise and persisted in thinking so; improved varieties were introduced, truth won in the long run as it always does and today, out of the large number of orange trees that are annually planted not one in a thousand is a sweet seedling.

Neither has it been so long since the custom prevailed of training orange trees with long bare stems in defiance of one of nature's chiefest fundamental laws. Instead of allowing the protective limbs and twigs and foliage, with which nature zealously encircles the trunk of the young trees, to remain, men ruthlessly and barbarously cut away this screen of living green and left the thin barked tender stem open to the intense, direct and reflected heat of a semi-tropical summer sun and to rapid freezing and thawing during winters of unusual severity. Not only was that desirable quality known as stockiness sacrificed—for a stocky tree can only be produced by leaving these lower twigs and branches—but the larger amount of foliage removed rendered more slow and difficult the proper elaboration of the sap, without which no rapid development of any part of the tree can take place. Nature was not only required to do her pumping

with diminished leaf area, which means reduced motive power, but this pumping had to be through feet of sun-baked channels. It was against man's law that a single leaf or twig should be allowed to develop midway on the stem, to exert its ameliorating influence, to add its quota of pumping power and to assist in the elaboration of the sap. It is no wonder that the professional orange pruner of days gone by often had to contend with a condition of the trees known as "hide bound." It is a source of wonderment that the professional pruner for so many years failed to discover that the hide bound condition of the trees was but a natural result of his own hide-bound, antiquated practices. That so many of the orange trees survived the treatment accorded them merely proves their constitutional strength; the same as in the human family a large proportion survived the custom of letting of blood, which used to be a panacea for all ills to which the flesh was heir.

PLANTING PINES COMMERCIALLY.

It has been comparatively few years since pineapples came into prominence in Florida and the temerity of him who first tried to push them to the front commercially was only equalled by that of him, who, later, advanced the proposition of covering them with a shed. The men who some twenty years ago suggested that some time in the future it might be possible to grow peaches commercially in Florida were deemed erratic. I remember this distinctly because I happened to be one of the men who advocated extensive experiments with peaches. Today pineapples rank very prominently amongst our horticultural products and

many acres of them are under shed. Peaches also are coming rapidly to the front and their cultivation has, in widely separated sections, reached the point of carload shipments.

A few years ago the San Jose scale was the most talked about and dreaded of all the insect enemies with which the peach grower had to deal. This was the case not only in Florida but in nearly every Eastern and Southern State. Infested orchards were deemed a public nuisance and many states passed laws making it compulsory on the growers to destroy such orchards or suffer fine or imprisonment. Today the San Jose is scattered over a wider territory than ever before but experienced growers do not hesitate to plant peach orchards, even in the midst of infested districts. This scale is easily controlled and at small expense, by the use of crude petroleum in winter and kerosene in summer, applied with a pump that mixes these ingredients with water, automatically, in the proper proportions. We have also authority that the natural parasitic enemy of San Jose has recently been introduced from China by the United States Department of Agriculture, and the belief is strong that where this parasite becomes well established it will take care of the scale without spraying.

MEDIUM CULTURE BEST.

Not many years ago people talked of the danger of "killing the soil" by the use of "guano," this being the term commonly used for any fertilizer applied out of a bag. Today our increasing knowledge of the specific virtues of certain chemicals admits of their use in definitely apportioned mixtures with due re-

gards for the demand of trees or plants of different species, and also as to whether the immediate result in view is growth or fruitfulness. We have also learned that there is, or need be, no such thing as worn out land; that, however impoverished and lacking in humus, it can be brought back into good fertility and proper mechanical condition by the growing and turning under of legumes. We have learned that neither clean cultivation nor entire non-cultivation is best for all orchards the year round, but that each of the theories upon which these extremes were founded is possessed of a modicum of truth and that by dividing the year and giving comparatively clean cultivation during the earlier part and growing leguminous plants during the latter part—to be turned under after growth has ripened; never in a green state—we get the best general combination of results.

Within the past decade we have had some heavy freezes and our attention has been turned toward the best methods of protection. It is probable that the records of our Society now contain more of value in this connection than those of any other that has ever existed. When the subject of open-air fires was first broached it was generally conceded that while they might prove effective in still freezes, windy weather would do away with their efficiency; and yet some of us have carried our groves through severe freezes, accompanied by high winds, without injury to the trees from either cold or fire. The source of heat for open-air firing has, so far, been mostly wood, but this is not our only resource. In California coal is burnt instead of wood; coal is as available here as there. There is also another source of heat supply

which is now being utilized by some of the most extensive transportation systems and largest manufactories throughout the country, as being cheaper than either coal or wood. This is the natural oil, with an asphalt basis, that is gushing from the earth in almost river proportions at Beaumont, Texas, right across the gulf from where we are now convened. This oil can be bought at forty to fifty cents per barrel. It can be cheaply transported to Port Tampa by water. Who knows but what this comparatively new fuel, cheap and easy of access, will some day play an important part in supplying the few extra degrees of heat occasionally needed in Florida orange groves and pineries.

It is possible that the prophecies of a succession of warmer winters in the near future may come true and that our Committee on Frost Protection may have to be thrown overboard on account of lack of current data from which to work. While we all hope that this may be the case yet it will probably be the part of wisdom for such of us as have suffered in the past to continue to use precautions against a recurrence of our losses.

OUR VAST RANGE CALLS FOR MANY SYSTEMS.

Between our southeastern and northwestern borders lies a vast area of country, subject to large variations in climatic conditions and differing radically in soil formation. Even if it were possible to formulate hard and fast rules for a certain section it would be manifestly impossible that these rules could apply equally to all sections. The worker in wood and iron, the artisan who has only

dead matter to manipulate, can learn his trade in any portion of the State, or for that matter in any Northern State or Territory, and find the rules that apply in one section of the country apply equally to all. Not so, however the man who is dealing with inanimate life. The very first thing the would be horticulturist must learn is that nature differentiates decidedly in the species that she encourages in the different sections and she also differentiates almost if not quite as markedly in the soil conditions that she prefers for species that are isothermally adapted. And, still again, within the limits of a certain species may be found a large number of varieties, the proper or improper choosing from which may mean the basis of commercial success or commercial failure.

But supposing one has made no mistake thus far and has planted the very best varieties for a given locality, he stands now upon the very threshold of horticulture. He has still to consider methods and extent of cultivation; character, amount and frequency of fertilization. He must be prepared to wage war with his insect enemies and, in doing this, must decide whether he will use deadly sprays that will exterminate friend and foe alike, or whether he will find out and foster the insects and fungi that are working for his good and pit these against the insects that are working harm. He must be possessed of quickness of perception to see whether the various methods he has adopted are working to his betterment or detriment, and have his ideas sufficiently mobile that he can marshall his brain forces promptly to meet emergencies or unlooked for contingencies. That untoward circumstances will arise in horticulture, as in any

other calling, is as certain as that without them neither horticulture nor any other calling would offer permanent inducements to men of brains and resource. Any calling that could hold out inducements so flattering as to be apparently free from all militating circumstances would soon become weighted to the breaking point by over-production. It does not take the American public a great while to bury a "sure thing" under a sufficiently large pile of dollars to bring it down to or below, the proper dividend-paying basis.

Viewed from a purely capitalistic standpoint there is no "sure thing" in horticulture. Successful commercial horticulture is, and necessarily must be, backed by brains as well as capital. Of the two, brains are the most important. Many a man has commenced with no resource other than his own hands and brains and achieved pronounced horticultural success. Many others have invested large amounts of capital without aptitude to learn from either their own or other people's experience and have met with disaster.

THE ELUSIVE ART OF PLANT BREEDING.

But supposing one has through years of daily contact and close study, become acquainted with the varying phenomena of plant life and, by painstaking application, has mastered cause and effect until he is recognized as an artist in his chosen profession, there yet looms up ahead of him an horticultural horizon, that broadens as he approaches it, the full scope of which no one man can ever hope to compass. I refer more particularly to the amelioration of our fruits—whether wild or cultivated and the almost limitless varietal changes that can be brought about by selection and planting through

successive plant generations, such as differ from the typical; and the still more wonderful results attainable by artificial pollination, crossing, hybridization; in short, plant breeding.

Across the continent, on the Pacific slope, that "Wizard of Horticulture" Luther Burbank, has, for some years past, been quietly and unostentatiously shattering scientific horticultural dogmas; not that he wishes to shatter but that he wishes to more clearly define the truth. To him science is but a synonym for the most advanced knowledge and his work now lies so far in advance of recorded horticultural dicta that he has discarded all precedent. Not only has he produced thousands of wonderful crosses between varieties of the same or closely allied species but species so distantly related as to belong to different genera, and which had been deemed outside the pale of successful hybridization, have been made parental to progeny so distinct in character as to require the coinage of absolutely new specific names. Dr. W. J. V. Westerhout, of the University of California, says:

"A botanist, who is known for his researches on plant hybridization carried on during the last twenty years, was quite incredulous when told of Mr. Burbank's methods of work. After a visit to Santa Rosa, he confessed that Mr. Burbank's skill was well nigh incomprehensible, and that he had learned enough during a brief visit to compensate him for the journey from Europe!"

Of course in such extensive experimentation a large proportion of the seedlings are comparatively worthless and have to be destroyed; and, in contrast to the opinion of the noted scientist just quoted and as illustrating that the differ-

ence between a crank and a public benefactor may depend only on the viewpoint, it is related that Mr. Burbank is known by some of his wondering neighbors as "the man who used to have a big nursery but now raises acres and acres of stuff and every summer has it all dug up and burned."

I have alluded thus freely to Mr. Burbank for two reasons: The first of which is; the subject is worthy of it—the records of his achievements are an inspiration to the progressive horticulturist. The second reason is; I believe more should be done in Florida in this line of work that is being so extensively carried on in California. The first impression might be that many of these new California creations would be adapted to Florida. Some of them undoubtedly will, but by no means all. The greatest good in this line of work for a given state is only to be attained by commencing with species which are naturalized to that state and building up from a parentage that, on one side at least, has proven adaptability. Whether the species of fruit be one that is already in cultivation, or whether it is a wild production that has never been deemed worthy of propagation, the foundation is there for scientific amelioration that may evolve from it varieties possessed of economic and commercial importance.

STATE AND GOVERNMENT WORK.

No recommendation of increased efforts toward the amelioration of our fruits could be properly made before this Society without calling attention to the splendid work now being carried on by the United States Department of Agriculture through one of our members,

Prof. H. J. Webber, who is in charge of the Laboratory of Plant Breeding at Washington. This work was commenced at the Sub-Tropical Laboratory at Eustis some years ago, at which time Prof. Webber had as his co-laborer Prof. W. T. Swingle, now acting as horticultural explorer. Since then the Sub-Tropical Laboratory at Eustis has been discontinued and one established in its stead at Miami. Prof. P. H. Rolfs, who is in charge will present a paper at this meeting showing the present status of this work at Miami. I will therefore not refer to it further except to emphasize its value and importance, and to call attention to the fact that many of the citrus trifoliata and sweet orange hybrids are proving entirely hardy in north Florida, and that at least two of these hybrids will mature fruit in that section this year. Of course nothing can be known of their quality until fall.

Seconding the work of the United States Department of Agriculture at Washington stand the agricultural colleges and state experiment stations throughout the country, and it affords me pleasure to call attention to the fact that ours will be ably represented at this meeting by Doctor T. H. Taliaferro, President and Director; Hon. Geo. W. Wilson, President of Board of Trustees of the Experiment Station, and the professors who, as chairmen of committees or through papers will present specific lines of work. These institutions are of vast importance to the country. Their work is to assist to the utmost in demonstrating and placing before the individual citizens, the paths—agricultural and horticultural—that should be followed or shunned. To accomplish the greatest amount of good, effort must be

reciprocal—on their part and ours. As loyal citizens we should co-operate with them to the fullest extent possible and aid them in every way in our power.

LET EVERY MAN EXPERIMENT.

And this brings me to the statement, which I believe should be brought home to each one of us, that each of us should have an experiment station of his own. It need not necessarily be large. It is not absolutely necessary that it should be scientifically equipped. It may be but an emulation in a small way of our larger state institution, but the aggregate value to the state of these private experiment stations—if we wish to designate them thus—would be immense. Not only would their value be immense in the aggregate but of particular, specific importance to the individual. No one can take a species of tree or vegetable and carry on a line of experiments with a given end in view without learning something of benefit, even if the information gained is not in the direction expected. The close attention to every detail that an experiment implies brings the experimenter in closer touch with his subject than could otherwise be possible, and he soon becomes surprised at the truths revealed. Many of the most valuable scientific discoveries have come about as side issues

to the points for which the experiments were started. If, in carrying on these experiments, we display an individuality bordering on what our neighbors may be pleased to term crankiness, don't let that deter us. Cranks are the men who do things; who invent machinery that makes the wheels go round. The history of this country—of any country—would be barren reading without them. Without them we should have to look centuries ahead for scientific achievements already accomplished.

Ladies and gentlemen, we are now met at a point farther south than any State Horticultural Society in America has ever held a meeting. In pursuance of his quest for the fountain of youth Ponce de Leon at one time sailed down the eastern coast of Florida, rounded Cape Sable, and ran up the west side to within thirty miles of this point. It is possible he did not come quite far enough and that we are now in the immediate vicinity of this undiscovered fountain. Let us search for it in the hope that it is potent to convey wisdom as well as youth. If we find it, fill your glasses with its sparkling waters and, if the toast suits you, drink with me to this: The Majority, without which no Minority can be possible. And then to this: The Minority; the men who blaze the way.

Agricultural College Education in Its Relation to Agriculture.

BY DR. T. H. TALIAFERRO, LAKE CITY.

In the age in which Cicero lived, according to his own statement it was considered ignoble and the part of a serf rather than of a gentleman to toil with the hands. Unfortunately, that same view held for many centuries after the Roman orator had left this sphere to commune with his gods upon Olympus, but now, thank God, we look at matters from a different point of view and we think a correct one for we feel certain that all honest labor, whether of the hands or brain or both, is ennobling and raises a man not only in his own estimation but wins for him the regard and esteem of every true man and woman. When a man is taught, as is the intention of every agricultural college throughout the United States, to combine the labor of hand and brain intelligently, then he becomes a power in his own community and a force in the world. Through the combined efforts of such men nothing seems impossible and as a result of their labors we have throughout this broad land not only industries greater than have been seen in any previous age of the world, but a general culture second to none on earth. Why is a nation so young as ours able to produce such results? Because it learned early in

life that the intelligent use of brain and brawn is in no sense degrading but is rather an approach toward the ideal.

In discussing the subject "Agricultural College Education in its Relation to Horticulture" as it was presented to me by your honored President, I am at a loss as to just what phase he wishes me to consider; but before discussing the subject at all let us look into the matter and try to discover of what use horticulture is to anyone who pursues it as a study and as a life work. Following in the main the divisions made by Mr. Card, of Rhode Island, I may state that I consider horticulture useful from three points of view. First, from the view point of a professional career; second, from the view point of a tired worker in other lines who seeks a means of recreation; and third, from the view point of a person who follows horticultural pursuits for the profit derived from it as a profession and as a recreation.

No matter from what standpoint we consider horticulture, one thing is certain and that is that it paves the way for a life with nature in one of her best phases, for it is the sesame opening nature's treasure house at the portal which allows the observer to enter upon many

of the brightest and best as well as the most congenial and health producing things of life.

From the sordid point of view, that of making a livelihood, professional horticulture has many advantages. In the first place, there are many scions springing from the horticultural stock, as olericulture, pomology, floriculture, etc., any and all of which afford an opportunity for a profitable business career; and further a man or woman may enter upon most branches of horticulture with very little capital and build up an excellent source of income provided that close attention is paid to details. But one should not fall into the error of thinking that, because most people try a little amateur gardening, horticulture does not require brain; for there never was a greater mistake as any one familiar with nature and its many moods can certify. It further requires brawn, but as many men and women have discovered to their cost, it is in most cases better to hire the cheapest of all labor, manual, and to give personal time and strength to the management of the enterprise. To return to the necessity for brain power in horticultural pursuits let me ask a few questions. What business enterprise requires better judgment or greater powers of observation than the growing of the orange or the pineapple, olericulture and general horticulture in Florida where there are so many different climatic conditions with which to contend and of which to take advantage, and so many insects and diseases to combat? Who, if a profit is to be made, has to be a better business man than the horticulturist who sends his vegetables, fruits, etc., to the market? Is it customary to stumble on new and splendid varieties of fruits, etc., or does it take a

careful, methodical and thoughtful man with keen powers of observation, to know where, when and how to improve old varieties and introduce valuable new ones? I think that each of you will agree with me when I say that the man or woman who would succeed in horticulture must be well trained and able to look at nature in many different lights and take advantage of each of its phases. Further what sense of power must come to one, who, even after many failures, is by dint of striving, experimenting and observing able to place before the public a new or improved product in the way of a plant, a fruit or a vegetable and thus become cognizant of the fact that he is a source of benefit to the world at large as well as to himself. Truly the professional horticulturist has much in his power and many ways in which to be a benefactor to mankind.

Now, let us consider the one who follows horticulture as a source of recreation. After toil in an office, behind the counter, etc., and after many of the strenuous methods of life which we follow, what is more restful and soothing to the tired brain than to be where the air is pure, where a sense of repose and quietude steals over one and where nature presents herself in many enticing forms. Again, what health-producing results follow labor, manual and mental, among fruits, flowers, etc., and what a broad perception of beauty comes to the one who, for recreation, spends his spare time in gardening, ornamental and otherwise, for he sees that which seldom or never comes to the eyes of the laborer who simply follows the direction of his chief. As a means of culture horticultural pursuits are beneficial, for they broaden our field of view and bring home to us many

beautiful and grand truths as well as fancies, and fulfill in a great measure the companionship and results obtained from access to a good library.

As to the third point of view, since time is precious I have only a few words to say and they are that I do not believe any successful horticulturist ever became so simply from the professional or money-making standpoint; but rather that the main spring was a love of horticulture for its own sake and that if he had been as rich as Croesus the same love of nature would have exhibited itself although it might have taken the form of a patron rather than that of a worker.

Having touched upon the usefulness of horticulture let us consider the subject as its title requires. To discuss the essentials of a horticultural education in general would require too much of your time, therefore while Cornell University, the University of Minnesota, the University of Illinois, the Michigan Agricultural College, the Iowa State College and others are giving strong undergraduate and graduate courses in horticulture from vegetable gardening to experimental horticulture and including forestry, viticulture, plant propagation, nut culture, evolution of plants, floriculture, landscape gardening, etc., it seems to me that it is more pertinent and more interesting to you to know just what your Agricultural College does for horticultural education, and the information you receive as to what is being done in Florida will, in the main, bring to your attention what is being done for horticulture in the more prominent colleges of the United States. Before giving the detailed course in horticulture at the Florida Agricultural College I think it will be agreeable to you to know what a

graduate of one of the above named colleges, who is a horticulturist by profession, said when I asked his opinion of the horticultural course as outlined in our new catalogue. In substance his reply was that, as mapped out, the course was better than the one he had received in the college from which he graduated. Without touching upon the branches in the horticultural course which are given for general information and culture, such as agriculture, zoology, language, mathematics, etc., it is my intention to acquaint you in as few words as possible with the pure horticulture as taught at the college and the subjects intimately connected with it. The prospective horticulturist obtains his first taste of subjects closely allied to horticulture when he studies general botany in the class room and in the laboratory, with and without the aid of the microscope and obtains a knowledge of the general structures, activities, life relations and general classifications of plants in Florida and elsewhere. Plant propagation next attracts his time and attention and he studies the principles underlying plant growth as affected by moisture, light, temperature and food supply; the life history of a plant from the seedling to maturity; and the multiplication of plants by seedage, cuttage, graftage, etc.

Later botany again forces itself upon his attention but at this time it is cryptogamic botany, and under this head the easier groups are considered after which a number of economic fungi are studied in relation to their effects upon plants, closing with a discussion of the means of controlling them.

As one of the branches of pure horticulture, olericulture is studied and the best methods of growing vegetables,

making seed beds, fertilization, irrigation and marketing are presented to the students. After finishing olericulture, horticultural students bid farewell to purely agricultural subjects and spend more and more of their time in lecture rooms and laboratories in the study of horticulture.

Pomology fascinates him with the intimate acquaintance it enables him to form with fruits of all kinds and descriptions but particularly with Florida fruits; he is also taught not to be carried away by fairy tales of fabulous sums made in fruit culture and is made to see that conservatism and hard work are as essential in that as they are in any other line of business.

As a worthy adjunct of fruit growing forestry is studied especially as to its influence upon climate, moisture and health, for we consider that correctly applied knowledge of the preservation of forests, based upon wise forestry laws, produces effects upon climate, upon the conservation of the fertility and moisture in land, upon the development of water power for manufacturing plants, and upon the preservation of public health through a pure water supply, which are more important if anything, than a knowledge of species, habits, sizes, quality of wood, distribution, artificial production, etc.

In order to present the physiology and histology of plants to the student a course is given on the functions of the different plant organs, on nutrition, growth, movement, etc.; histological structure being studied in its relation to physiology. As subjects to be studied in connection with physiology and histology the student applies himself to the study of plant breeding, involving a dis-

cussion of the originating of new varieties, and evolution of plants comprising the investigation of the origin of the different cultivated plants and vegetables and of the means by which plants may be improved.

A great portion of the time during the last year is utilized in making field investigations and experiments and in horticultural reading under the direction of the instructor. Further the student must present, upon some subject in horticulture, an original thesis which must be a creditable literary production as well as a good scientific paper.

As subjects peculiarly allied to horticulture there are economic entomology dealing with insects, and the diseases arising from insects; and bacteriology, considering the nature and development of bacteria, sterilization, preparation of culture—media and pure cultures, etc.

While the student is at college, and afterwards, he is very much benefited by being in close proximity to the experiment station; but I shall not touch upon that subject as my friend, the honored President of the Board of Trustees will discuss horticulture in that connection.

The course in horticulture as outlined to you presents in most respects what is being done for horticulture in the agricultural colleges. Very little, if any, mention has been made of the other subjects in the course although as fair a proportion of time is given to them as to horticulture, the result being a well trained man in both theoretical and practical lines.

Now, the question arises, why have the usefulness of horticulture and the course in horticulture been presented to you? The reasons are: 1, because it is always necessary to explain why any

branch of work is considered useful; 2, because the course as outlined will show you upon closer investigation that our intention is to develop practical as well as theoretical scientific men, for great stress is laid upon practice in every department; and 3, because I wish to be able to say to you who, in spirit at least, have placed horticulture upon the proper plane in this State, that we believe that any man or woman who knows to what use horticulture may be put and who has the practical scientific training given by an up-to-date institution will be able, provided an honest effort is made, to create out of the earth not only an honest livelihood but an honored name.

After the above hasty discussion of the subject I feel it is incumbent upon me to say a few words more, and they are that no matter how fine a course is given in any institution, students and money are necessary to success and particularly so in this age when people are realizing as they have never done before the possibilities in horticulture. Students to encourage the instructor to his best efforts and money to enlarge and amplify the scope. Now if horticulturists, agriculturists and others persist in educating

their children away from the business of their parents, disgusting them with country life, giving them no education at all or sending them out of the State for an education and thus separating them from their contemporaries, there is no use in striving to build up an institution in this or any other State where such conditions exist. My friends, above every thing else give your children an education on lines for which they are adapted by nature, and if possible give them that education within their own State, following it with graduate work elsewhere if you so desire. Finally, assist us in building up your agricultural college by encouragement, by advice, by money and by any legitimate means, and do not trample us under foot with unjust criticism emanating either from people who know nothing about us and our work or from those who wilfully defame us to suit their own purposes.

Now, with all confidence that you will assist us in building up an institution of which Florida may be more than proud, I close with grateful thanks for your courtesy in giving me your attention.

Citrus Fruits.

REPORT OF STANDING COMMITTEE, BY F. D. WAITE, CHAIRMAN.

Mr. President, Ladies and Gentlemen of the State Horticultural Society:

In making a report on citrus, it is very hard to keep from repeating parts

of former reports on citrus culture. Mr. John J. Beers, of Emporia, will probably give you something that will be interesting. Mr. DeForest, of Sanford, the other

member of this committee, I regret to report, died in Chicago, last December.

As Mr. Hubbard gave to this Society a few years ago, a history of the orange, its origin, and development to that date, I shall confine myself to citrus culture in Manatee county. I have only resided in the county a little over two years, yet in that length of time I find the soil conditions are different from what they were in Marion county, also that it requires almost constant attention to prevent the many diseases and insects from devastating the groves.

THE WHITE FLY.

Probably the worst insect we have is the white fly yet it is not considered as dangerous as it was a few years ago. And we find with this, as it has been with all insect pests, there are some of the growers that believe in spraying, and others who do not, and I do not wish to say which is right.

The Manatee Lemon Company's groves have been surrounded with groves that were infested with the fly, and we have been compelled to spray our trees to keep down the pest and protect our fruit from the sooty mold which follows the white fly. We have been very successful in our efforts. We have used the kerosene emulsion and the rosin compound, also the rosin wash, with a result that was in favor of the rosin compound. In making the kerosene emulsion we were compelled to use artesian water and find that it will not make as perfect a spray as soft water. We spray in December and again in January. In the spring of 1901 scarcely a single specimen could be found on the young groves. On the large seedling trees we found a

few in April; whether these escaped the spray or came in from an infested grove adjoining, I am not prepared to say, What few there were did not increase in sufficient numbers to cause a deposit of sooty mold. These groves were again sprayed during the past winter, in December and January, and about the middle of March we found a few adult flies. The first of May we could not find any on the wing, and learning that several parties on Terra Ceia island had been very successful in keeping down this pest during the summer, by using a spray made of 30 pounds of sulphur and 20 pounds of caustic soda which made 20 gallons of stock, using from 3 to 5 quarts of this to 50 gallons of water, we determined to try this, which had a three-fold purpose, viz; to keep our trees free from the red spider, to keep the fruit trees free from the rust mite, and if possible to rid the grove of the white fly. As to the first two mentioned, I feel we have been successful; what it has done to the fly remains to be seen.

We have had in charge one grove of 644 trees that has been infested with the fly for several years. I think this grove was sprayed several years ago under the direction of Prof. Webber, but with poor results, and the fungus was then introduced and spread rapidly over the grove. In 1899 and 1900 the crop was 600 boxes; in 1900 and 1901, about 1900 boxes. At that time it looked as though the fungus had every egg of the white fly covered, and the trees put on a magnificent bloom, setting about ten boxes to the tree. In the spring of 1901 the fly began to increase, and early in the fall the sooty mold began to form on the fruit and it became checked in growth. The fruit was sold for \$5000 on the trees,

with the understanding that we would spray it. This we did in September, but the fruit was in masses that we could do very little toward cleaning it. When picked in December it ran largely to 200 and 250 sizes and was very black; in fact, it never did thoroughly color. We sprayed the grove again in January, 1902, and in March we could find quite a number of fly upon the wing. Had the fruit been picked in December and the grove sprayed in December, and again in January, I think we should have had much better success. I believe in spraying! But I am convinced that our greatest need is more power than can be had with a hand pump. This will do for small trees or trees ten feet high, but on 30-foot trees we need steam power to force the spray up through the leaves like a whirlwind, then we can do more and better work in the same length of time, that would be required in using the hand pump.

We are troubled with rust mite and warts forming upon the lemons, and we use the lime and sulphur solution with fairly good success. The red spider and purple mite made their appearance but by spraying once a month we are comparatively free from them at the present time, and the young groves have made two growths and are now putting on a third.

RED SPIDER.

The red spider and drouth have almost ruined a few groves in our county, and some groves at Oak Hill, Palmetto and Braidentown have shed a greater part of their foliage and nearly all the fruit. One grove I visited last week had scarce-

ly an orange left upon the trees, and I was told that it had been white with bloom and had set full of fruit. The grove had been badly infested with white fly for two years, and whether they had anything to do with the dropping of the fruit or red spider and drouth combined, it is hard to say, but I believe the drouth had a great deal to do with it. In some groves I have visited I found the red spider had nearly defoliated the trees; I should judge that ten per cent of the inside wood would die. I have seen groves, several years ago, when the red spider had killed four feet off the top of the orange trees. The most of the growers in our section are spraying for the pest.

BORDEAUX MIXTURE FOR DIE-BACK.

I would like to mention that during our meeting last year, at St. Augustine, Mr. Porcher convinced me that dieback could be cured quickly by the use of Bordeaux mixture. As soon as I reached home I gave it a thorough trial and was with others surprised to see the results. Almost immediately the trees put on a magnificent growth. We sprayed again in the fall and with a few exceptions the growth remained perfect all winter. This spring we applied it again to those trees that seemed to be the worst last season, and now they too are looking well. We had some large seedling trees that had been subject to this disease for several years, but had some fruit on them. Previously this fruit had cracked and dropped. We sprayed once thoroughly, and not five per cent of this fungus fruit cracked. Suffice it to say that we believe in Bordeaux mixture for dieback. Non-

cultivation and heavy mulching will cure dieback, but it takes from one to two years to do it.

I would say to all those who would use the Bordeaux, go according to instructions, and follow it inside of thirty days with some good insecticide, or you will be in the same fix we were in, by having plenty of long scale to fight in the fall. If you wait to see them before spraying, you are left; but if you spray in about thirty days I believe you will not have any trouble with scale insects.

LEMON CULTURE.

We find that lemon culture on low hammock lands, has several draw backs, the principal one being the gum disease. We find it on all kinds of stocks and budded at all heights from the ground. We have lemon trees budded on sour stock four feet from the ground, that has this bleeding once or twice a year. We have tried ready-mixed fertilizers, also non-cultivation and chemical fertilizers. We have painted the stocks with carbon-lineum eighteen inches to two feet from the ground, and are now using two parts of land plaster and one of sulphur, mixed dry and thrown about the base of the trees and up a portion of the trunks. This last is the cheapest and best remedy I have tried for foot rot, but it does not effectually stop the gum from oozing out on the lemon, and unless we can find something that will stop it, it is only a question of time until the lemon part of our groves will be no more, as this gum seems to poison the inner or cambium bark, and the tree becomes girdled at the point where the gumming takes place. We are trying a few more experiments, one of which is to insert under the bark

and near the base a small sized piece of bluestone about as large as a pea. I have seen this tried on dieback trees, and the bark above this insertion would in a short time be ripped open as with a knife, and the gum would ooze out in great quantities but finally dry up, and there would remain a long scar on the trunk of the tree, which in a short time would heal over. These trees came out of the dieback in about six months, and have had no return of the gum disease. Whether this bluestone cleanses the sap and throws off the impurities in the form of this gum I can not say. Perhaps some of our professors can throw some light on the subject? We believe there is money in lemon culture if this gum disease can be stopped in some way, as fancy Florida lemons will bring from \$3.50 to \$5 per box in the Northern markets during the months of August and September.

Probably the worst disease we have to contend with in the old seedling groves is the blight; this seems to baffle all efforts of government experts. From groves containing twelve hundred of these large seedlings, we have removed about one hundred in the past two years, from two-thirds of which we have removed the tops and reset them on mounds, giving them plenty of mulching and have recently, for the first time, given them an application of chemical fertilizer. About twelve of these we budded last year to grapefruit, lemon and orange. These buds have done very well, and two have some fruit upon them at the present time. I have been told that several have made a similar trial with fair success. The cost of replanting is small, and if we can by budding over the tops to grapefruit or Satsuma or-

ange, produce one or two good crops we are well paid for the experiment, even if the trees eventually take the disease again. One thing very peculiar about these limb blight trees is that in nearly every case the root system is perfect, although the most of them were situated on low flat land, only about two feet above tide water on Terra Ceia bay. A few that showed signs of foot rot and the tops had the appearance of limb blight, we raised about one foot higher than they originally stood and cut away the top four feet from the ground. We shall insert dormant buds this fall and try them again.

GENUINE BLIGHT.

There is no mistaking the limb blight or wilt as it is sometimes called; if one will take the pains to inspect these trees after a heavy rain, they will find the foliage curled as if suffering from drought. The top foliage will become dwarfed as also will the fruit, and before it is ripe, often several feet of the upper portion of the tree will be defoliated, and early in October or November the fruit drops and the wood dies. Sometimes the wilt will only attack one limb the first year, but will usually spread to the entire tree the second year. After this there is scarcely any fruit set. As a rule the first indications are a lot of water sprouts formed about five feet from the ground. We are trying a few other experiments, but not with sanguine expectations of success. It is hard to see a tree die in three years, from which you have picked twenty boxes of fruit at a picking, and not be able to save it. If our government professors could only solve this problem,

thousands of dollars would be saved to the orange growers annually.

On low lands subject to much standing water during the rainy season, we would recommend that all citrus be budded on sour stock, and at least four to six inches from the ground, as I have seen trees with foot rot on the sweet joint, where they have been budded at the surface. Rough lemon stock should be used on high drouthy land, as it will stand more dry weather than any other stock. Grapefruit stock is good, but will take the foot rot. We would recommend the planting of very early and very late varieties, as there are plenty of seedlings to supply the midwinter season. I hope during the discussion that will follow this paper, we may learn to what cause we may lay the dropping of the present crop of fruit.

DISCUSSION.

Mr. Skinner: I would like to ask the gentleman what is his method of cultivation. When does he cultivate and how does he cultivate the soil; that is for the bearing groves? When does he commence cultivation and when refrain?

Mr. Waite: I think that that question perhaps could be answered differently in different localities. There would be a great deal of difference in the time of cultivation and when it should cease. Yet I think all cultivation should cease at the beginning of the rainy season, although on low hammock lands such as at Manatee a little cultivation is best. The reason is that the land is so low that in uncultivated lands the roots become sour and rot. This rotting of the roots causes the leaves to fall which takes the

lungs from the tree. On high pine lands as around Winter Haven, I would practice plowing lightly in the fall and in the spring if the weeds grow in the grove. An Acme harrow is all that is needed to give good cultivation until about the middle of August.

Mr. Skinner: What effect would the cultivation have on the bloom and how soon after the bloom sets should cultivation begin?

Mr. Waite: In Marion county the growers used to commence cultivation just after the bloom set; in our section, as I said, on the Manatee river, we have a grove that hardly needed any cultivation at all, yet we have as nice a show of fruit on that grove as others who have kept the cultivation going constantly.

Mr. Jones: I might say to this gentleman that different localities require different cultivation. In Orange Bend we expect to get through our groves at the end of the month of May. We never put a plow in our groves. We have at Orange Bend very stiff clay soil. You could not plow if you wanted to. We expect to get through at the end of May and then let them go through the rainy season. Then in September we cut the grass with mower. We do not take any of the grass for hay; do not make any hay at all. We find that this is the best plan at Orange Bend with hammock lands. Let everything go back. If you want any hay cut it from somewhere else.

Mr. Gillett: Mr. Waite made a statement in relation to foot rot. This is a very important subject to every horticulturist. We use sour orange, rough lemon, grapefruit and citrus trifoliata, and it has got so that nurserymen have to carry all four kinds. In the Fort Myers section it has gotten to a point where they will not

plant a tree except on grapefruit stock. I have had some experience with it myself in the last twenty years and was quite surprised to hear Mr. Waite say it was subject to foot rot.

Mr. Jones: I have never known it in DeSoto county.

Mr. Gillett: I have never known foot rot on grapefruit stock. You are well aware that especially in the summer the trees will occasionally assume the appearance of foot rot, but I have never seen foot rot on the grapefruit. Grapefruit is not what we would call subject to foot rot. Let us hear from Prof. Hume on this subject.

Prof. Hume: I was going to say, Mr. President, that this matter of foot rot is one to which I have given a considerable amount of attention, but have not yet seen a grapefruit tree affected with it. It is not commonly so. In the Ft. Myers section they are probably using more of this stock than in any other portion of the country. If the pomelo is affected I have not seen it, while the sweet seedling is commonly affected.

Mr. Blackman: I have always felt that in every locality almost, the cultivation varies greatly as to the soil and climatic conditions. Now, with us, as you are aware, we are just beginning almost with citrus culture. Of course it has all been in the last five years, experimenting what, how and when to cultivate. We have some groves that perhaps are about equal in size, in growth and in bearing capacity with those in other sections of the State. With us there has been a wide difference in the cultivation of the groves.

On the grove of S. K. Brown the buds will be four years old this summer. The former method of cultivation was

plowing the ground and keeping up clean cultivation. After experimenting for a year or two he has given that up.

In the Douglas grove which is seven years old from the seed, the cultivation is quite different. Mr. Douglas cultivates thoroughly in the first part of the year; in the latter part, from now on, the grass and weeds will be allowed to grow. The same is true of what was called the Pot-

ter groves. The cultivation there was early in the spring. In our younger groves many of them received little or no cultivation at all. They were left to grow and care for themselves during the summer months. It has been demonstrated beyond a doubt that intelligent cultivation must adapt itself carefully to local conditions.

Diseases and Insects of the Citrus.

BY W. S. HART, CHAIRMAN OF COMMITTEE.

Among the special features of insect life of more than passing interest to the orange grower, noted by this member of your committee during the past year, I would mention the reappearance, in great numbers on our orange trees, of the purple or hairy mite for the third season in succession, and that of a pale yellowish mite, said to be the six-spotted mite, for the first time in twelve or fifteen years. Both of these mites have done serious injury, the former on nearly every tree in nearly every grove, and the latter on scattering trees here and there in many groves.

Probably all are now familiar with the appearance of the purple mite and its work, but a full description should be published in our annual report of both it and the yellow mite so that when, in twelve or fifteen years from now, they may show up in alarming numbers again, there will not be the uncertainty in their

identification that marked their late arrivals.

IDENTITY OF MITES UNSETTLED.

When I first wrote this paper I included such a description of the yellow mite as would enable the average layman to identify it with little probability of error under a common pocket lens of fair power. My reason for doing this was that I had submitted specimens to several well known entomologists and up to that date none had been able to positively identify it, though most of them ventured the opinion that it was the six-spotted mite. This I could hardly accept as there was apparently no more regularity or certainty of the spots than of white spots on a black cat. Again it seemed to me that if it was this mite, commonly known as red spider, back in the eighties, it should have been so thor-

oughly described as to leave no uncertainty as to its identification. Since that writing Prof. Gossard has gotten out Press Bulletin No. 24 of the Florida Agricultural Experiment Station, an "Emergency" Bulletin, in which is the best description I have yet seen of them, but there is yet much to be desired concerning the knowledge of these insects. It seems to me that if the professor can find time to study these mites, their appearance, their eggs, their work, their enemies and the conditions controlling them and then present results in a paper to this Society, it would make a valuable record and one that would mark an advance in his profession.

These mites are likely to disappear almost entirely from our groves within the next few weeks, possibly to reappear again next spring; but if so, probably in less numbers as the purple mite, in all likelihood, has about run its course, been at its worst and will soon be so effectually overcome by its enemies as to no longer vex the soul of the citrus culturist of Florida for a long term of years.

It is to be hoped, and I may say with good reason, that the adverse conditions that are developing to cause the destruction of the purple mite, will also work against the six spotted and pale mite as well and terminate their destructive period in the near future. I have not sprayed for these pests nor am I inclined to do so except experimentally, but those who have done so report their easy control through the use of sulphur solutions. Dry sulphur dusted on the leaves has also proven quite effective. I find several insect enemies of these mites at work upon both them and their eggs and rapidly diminishing their number.

GRASSHOPPER CROP SMALL.

Another noticeable item in this branch of my subject is the failure of small grasshoppers to reappear in such multitudes as have over run our groves for the past three years and especially, last season, when the damage caused by them was at least many thousands of dollars. Besides the serious injury done to my small newly set trees and buds in nursery and elsewhere, they injured my crop of oranges from two to three hundred dollars' worth through scars caused by their eating into the fruit while yet very small. I think a conservative estimate of the grasshopper crop at this time would be about one to two per cent of that of a year ago.

The white fly appeared at a few points on the east coast a little more than a year ago but up to this date it seems not to have spread to any alarming extent.

Though nothing seriously harmful to citrus trees of the East Coast in the way of disease has come to my notice during the past year, many of the old troubles are still with us and of these blight and foot rot, especially the former, deserve all the study that can be given them by the orange growers, our State scientists and the United States Agricultural Department.

OFFICIAL HELP NEEDED.

During our meeting last year I was about to offer a resolution asking that this pressing need be again called to the attention of our friends in Washington and a request sent to the Honorable Secretary of Agriculture that competent

men be sent here to take up this study, where our earnest and able friends, Swingle and Webber laid it down; but, upon being assured that a liberal appropriation had just become available for that purpose I did not press it further. I regret to say, however, that up to this date there seems to have been no action taken in this particular direction, partly because of the lack of the right men for the work who can be spared from other lines, I am told. But with proper urging on the part of this Society, I feel sure such men will be found from those of the strongest corps of scientists ever gotten together, now under the direction of Secretary Wilson. To secure help of this kind we must first make our needs known. Past experience shows that they will be carefully considered and able assistance given when that is possible. Another matter that I would urgently recommend is that this Society ask the authorities at Washington to put that valuable work of Prof. H. G. Hubbard, known as "Insects Affecting the Orange" into competent hands for revision preparatory to its reissue by that department. On page 247 of the Year Book of that department for 1900, Prof. C. L. Marlatt, after a glowing tribute to the abilities of Prof. Hubbard and the value of his work, writes: "Mr. Hubbard was, just prior to his unfortunate illness and death, collecting data for a new edition, to be published by the department. It will be a source of lasting regret that he was not able to accomplish this undertaking." I would add that this is especially true from the fact that it will be exceedingly hard to find another so well equipped for the work, needing as it does, much original study in the groves as well as a thorough knowledge of re-

lated literature. There are good openings for valuable work for our friends of the State Experiment station, not only in the study of mites but in that of the white-headed, or gray fungus and the fungus enemies of the white fly. Prof. Rolfs has done this in a masterly manner with the San Jose scale fungus, for which see Bulletin No. 41 of the Florida Agricultural Experiment Station. All of these matters are of pressing importance at this time and upon the solution of the problems they contain largely depends the future of the State's most valuable fruit crop.

LET ALONE POLICY.

Discussing the matter of the control of injurious insects by natural rather than artificial means. I was once asked, "What will become of our entomologists if your let alone plan was universally followed?" Being in an exceedingly dull mood at the moment I made but a lame reply. I would like now to say, however, that in reply to this question I will offer the following:

One of the brightest lights of the United States Agricultural Department said to me, only a short time since, "I understand that you are quite radical upon this matter of spraying; that you don't believe in it." I replied, "I know that spraying is expensive and often does more harm than good, but there may be occasions when the right kind of spraying may be useful for some of our troubles. What I most desire, however, is to forcibly impress upon horticulturists and others the necessity for close study of natural enemies and conditions that may be brought to bear upon our pests to overcome them more effectually,

more lastingly and at less expense of time and money than can be hoped for in the use of sprays or gassing." Said he, "I am inclined to think that you are about right and that is the line of study that the department is now engaged upon." No, my plan is not a let-alone plan, when broadly viewed. There is plenty of work in it and many of our best scientists are now answering that question for themselves. Recognizing the limitations of profitable spraying and of the gas treatment, their liability to drive away or destroy our minute friends and their imperfect results at best, many are turning their attention more and more to the best means of quarantining against these pests, to the seeking for,

introduction, encouragement and propagation of friendly insects and diseases, the selection of the most resistant plants and trees from among those suffering from native or imported ills. Here is a broad field of labor and research, worthy of the most eminent scientists in many branches as well as for all who till the soil, and that it is a most profitable one is shown by the fact that though a comparatively recent development this country has through this line of work in the United States Agricultural Department, realized profits running up into the hundreds of millions of dollars and the future holds promise of further benefits far beyond what may now be conceived of.

REPORT BY J. C. CARTER, OF THE COMMITTEE.

As it is a part of our policy to deal with facts and not theories, I will be confined to my personal experience and observation.

In my section of this, the grandest country upon the green earth, we have absolutely nothing in the line of diseases, so far as I am informed, except an occasional touch of die-back, which is caused by the great fertility of our soil or by the application of too much nitrogen, which is sometimes placed in the soil by growing legumes for several years in succession. This is generally rectified by clean cultivation for two or three years and moderate applications of chemical fertilizers which contain little or no nitrogen.

As to insects, I am entirely at sea. For several years I have been noticing that the nurserymen in the northern part of the State have said considerable about being "just far enough north so that the

cold killed the insects and that their trees were consequently to be preferred to those grown in South Florida." For the information of those brethren I wish to say that even down here we have occasionally whiffs of chilly winds that seem to be sufficient to render Mr. Insect hors de combat.

I had supposed, however, that down here, around Tampa, one could find, at least, a few survivors of the rapidly disappearing pests; but a short while ago, while in Mr. Gillett's company, I thought I would "pump" him and get some points for this paper; but when I began talking insects he began telling me about his recent trip to Cuba, and said that while down there he saw something they called citrus insects, and that he was almost sure they were a genuine article. So it seems that they are very much like a rainbow—just a little further on.

I was about to omit to mention the

fact that we do sometimes have a few of the common long scale, and at one time I was so thoroughly convinced that they were citrus insects that might be classed as dangerous that I purchased a spraying outfit and a stock of whale oil soap, expecting to wage war on them. I had made but one application when we met at St. Augustine, last year, and there I received the good news and great consolation from Brother Hart (may his shadow never grow less!) that the best treatment was no treatment at all. Well, sir, that kind of argument, coming from one of such long and careful experience, appeals so forcibly to a South Florida man that it required considerable effort not to shout "Amen!" right out in meetin'. I am so thankful to him for his discovery, since it relieves us of our only dreaded enemy, and now instead of the sizzle of the spray pump we have sweet'er music—the song of the ladybird.

If you will excuse me for taking advantage of this occasion to advertise, I will now state that I have a spraying outfit for sale at a bargain. I make this statement because someone might be going to Cuba.

Now, Mr. President, if you have any idea of awarding a prize to the party writing the most and saying the least will you please enter my name as one of the contestants and then we will wait for the discussions that we are to have on this great question.

DISCUSSION.

Mr. Adams: I have not prepared a paper and do not feel that I can say much. This year we have had the red spider which cut our crops off very largely. I do not know what is best to do for

it except sulphur spray. I always found in spraying with sulphur that it killed our friends as well as our enemies, but then I do not know what we would have done without the sulphur spray this year. I was late this year, however, in spraying. Some people say they do not think they go from one grove to another, but they do. I had to spray on the outside a second time as my neighbors would not do anything.

Member: What effect did the spider have on your neighbor's groves?

Mr. Adams: I sprayed mine and finally one of my neighbors sprayed his or rather, I sprayed it for him to protect my own grove. The neighbor on the other side of me did nothing and has nothing.

Dr. Richardson: The main thing that I wanted to say is that remedies for insects are quite numerous. The remedy of sulphur is beneficial for the red spider, and affects fungus diseases and foot rot and is employed in the treatment of the white fly.

Sulphur is a magnificent treatment. It cures all these disorders with which the orange tree is affected and is one of the most deadly enemies to insects, and those who have been on the bench know that it is good for many other purposes. I do not know of any form of life but what will yield to sulphur. We are told by some one here that sulphur in composition with soda will kill almost anything. Sulphur in composition with potash will. The foot rot is cured by sulphate of copper (bluestone).

I want to say that I have been living in Missouri and Florida and do not know whether I am a Pike or a Cracker. I have had much to contend with. I have several groves and am glad of it. I became acquainted with foot rot shortly af-

ter buying my old groves and was told by my neighbors that sulphur and lime would cure it and I thought the action of the two helped it. I am a few miles north of Clearwater. The white cottony cushion scale was down there in great force. It is always my luck to get anything as soon as anybody else does. Now we have been told by those in California that nothing would kill it. I believe in our climate it is best to spray with the sulphur. It sticks better to the trees here, and I believe for that reason it destroyed the insect on my trees. A proposition was made for the importation of the ladybug. I believe that sulphur would have done the work as quickly. The red spider was shut out just in the same way with sulphur. I believe that sulphur is a great remedy and is deadly poison to the insects of the orange tree. I think the insect dreads the sulphur as we do the great sulphurous fire the philosopher tells us about and as I can not say more on the subject, I will close.

Mr. Waite: I wish to find out from different sections where the red spider has been prevalent, if those people have lost their fruit and whether they think it due to the red spider or the drouth. I have heard some say that they did not care how dry it was, the fruit was sticking just the same until the red spider came.

Dr. Inman: I have been growing oranges, in my way, for about eighteen years in South Florida. I think I can, without boasting, claim a certain measure of success. After no little experimenting I have pretty much settled down to a system combining some of the elements of clean culture and some of green manuring; the latter being accomplished by growing a crop of beggarweed oc-

cupying nearly the entire middle between the tree-rows. Spaces directly around the tree are cultivated with a cultivator weaving from side to side around the tree, describing curves like that of the figure eight.

Between the tree rows the beggarweed grows undisturbed and is cut with the mowing machine and left lying to enrich the land. Later on, in the fall after the rainy season is over, when it is easy to cure hay, I cut the second crop and put in into my hay mows. It feeds all my stock; teams sufficient to work 300 acres of grove and three or four cows. This is the best system I have found. It is not altogether original with me, and perhaps many of the members have heard it before; but it may assist some young beginner.

Mr. Butler: As regards this subject of spraying, while I have done more of it than any of my neighbors, have used seven makes of pumps, all of our standard insecticides and a number of my own make, I must admit that it is an interference with the balance of nature, that at times does more harm than good and yet is often necessary and if the proper insecticide is used, is safe and advisable.

So far as scale only are concerned, they can, as a rule, be controlled by conservative culture and avoiding an excess of ammonia in the fertilizer, aided first by parasitic fungi and second by ladybugs and predaceous mites. But, like Mr. Inman, in order to have bright oranges, in a cultivated grove, I have found it necessary to spray for the rust mite and this spring for the yellow mite, commonly called red spider. As to the insecticides, most desirable to use, will say that while kerosene emulsion, resin wash and resin compound are all effective when

applied to our citrus insect pests, that they are also injurious to the trees.

A tree may not show the bad results from a single application, but the two or three successive applications necessary to clean up a bad attack of scale, are injurious, if not more so than a bad attack of scale. However, in case resin compound is used (and it is as effective as resin wash, and cheaper) it can be greatly improved by adding a small percentage of kerosene while making, which causes it to work through the pump freely; otherwise, it gums up even metal valves so as to cause much trouble. Bordeaux mixture may cure die-back, but in my case was followed by such an attack of scale that I used two applications of resin compound to destroy them, by which time my trees were in such a half leafless and devitalized condition that I was ashamed of them.

Acting upon the suggestions of Mr. Porcher, at our last year's meeting, I have tried potash fish oil soap, and find it far better than the caustic soda fish oil soap that I had previously made.

A single application of this potash soap, used at a strength of four pounds per gallon of water, may not be as effective upon adult scale as the kerosene and resin washes, but it will kill in a couple of days young scale and even those that have moulted once; and after four applications made during the spring and summer, I found my trees free from scale and other parasites, the bark showing the grain beautifully and the entire tree in the best condition that they had ever been. Upon 600 boxes of tangerines picked from these trees, I did not see a scale.

I am now making this soap myself,

as it is cheaper than to buy and ship down from the North. In making this soap, care should be taken to avoid getting caustic soda instead of caustic potash, as that which we buy in tins and balls under the name of the latter is in nearly all if not all cases the former. In short, in my opinion, this caustic potash soap is the only known spraying material desirable to use upon the citrus insect pests, unless we except the various so-called sulphur solutions, in case of the mites, which as a rule are so sensitive to sulphur that if used strong, even the fumes will kill them. Dry sulphur blown onto the under side of the leaf, with a Leggett powder gun, will not only destroy the rust mite and so-called red spider then upon the leaf, but the sulphur adheres to the leaf for some time and destroys the young mites as they hatch out. However, this method requires more sulphur than when the sulphur solutions are used. As so much has been said here this morning in favor of sulphur as an insecticide, I must state that my experience with the sulphur and lime wash as used for rust mites, forces me to the conviction that this wash, as we use it for rust mites, is more destructive to the enemies of the scale than to the scale itself and therefore causes the scale to increase. However, we have with us, a member known throughout the orange belt of Florida, who, in spraying his large lemon groves to keep the fruit bright, has probably used more sulphur than any other man in the state. This member combines large experience, acute observation, research, tireless energy and application and yet year after year he sits here absorbing but never evaporating and when our meetings are ended, as silently as the Arab "folds his

tent and steals away." I allude to Mr. Sampson and ask for the result of his experience in spraying for rust mite with sulphur.

Mr. Carroll: Mr. Butler spoke of the potash wash and while I do not want to intrude on the privileges of the Society, I would like to have his formula for spraying.

Mr. Butler: Until lately I have bought the potash soap, but am now making it myself. Get a high test caustic potash, made from wood ashes, in 60 pound drums from New York. Any fish oil will do. Use one pound of the soap to four gallons of the water in spraying. When the scale is bad and only one application is intended, the amount of soap may be doubled.

Mr. Waite: Is it soft and easily dissolved? What injurious effect has the rosin compound on the citrus trees? How can you tell caustic potash from caustic soda?

Mr. Butler: In contradistinction from caustic soda soap, potash soap is soft and mixes readily with water but should be mixed before putting into the spray tank.

In order to distinguish caustic potash from caustic soda, make soap and if it is hard the alkali was caustic soda; but if soft, the alkali was potash. All of our old whale oil soap was made from caustic soda.

The injury done to trees by resin is, I think, due to long continued stopping up of the breathing pores of the leaf. The trees become partially defoliated and it takes them a long time to recover; this I have noticed when the trees have been sprayed two or three times inside of three or four months.

Mr. Carroll: In that mixture is it possible to dissolve sulphur in that caustic potash?

Mr. Butler: By boiling sulphur with this potash soap a small proportion would combine with the free alkali left in the soap, but in the case of the late appearance of the red spider, I just made a combination of caustic potash and sulphur by boiling, by which means I get a fairly stable compound of one pound of sulphur and a little over one pound of potash in one gallon of water. This I added to the potash soap, in the proportions of one-third to one-half as much sulphur solution as soap. We find that the sulphur is apparently held on the tree sometime by the coating of soap and possibly long enough to destroy the young mites as they hatch out. At least we saw no more of the red spider on one grove after making a single application of this sulphur soap wash.

Mr. Whitten: I am a beginner. I have planted a grove at Punta Gorda and shall plant another. I will give a little of my experience in clearing land of the saw-palmetto. I had read that kerosene applied to the bud would kill it. I found it will kill that one bud but others will keep coming, so that it may be a long while before they are all killed and the plant destroyed. I sent and got a powerful plow of a peculiar construction, hitched four horses to it and cut right through the palmetto without being obliged to grub at all.

Member: I would like to ask the orange growers if any of them think that the growing of oranges among vegetables has a tendency to increase the attacks of insects and disease? In reading the Society's publications and the agri-

cultural papers, I get an impression that orange diseases and insects are worse in the vegetable growing districts.

A Member: This is a very broad question; it would require years of comparative study and observation to answer it satisfactorily. There are not many orange insects that also work on vegetables and not many the other way so far as I remember. Still I cannot deny the idea that there is some truth in it. But I think it is rather because vegetables are grown in rich lands and rich lands produce more insects and fungous diseases than poor lands.

Dr. Inman: I have been annoyed in the last six weeks with the red spider. I don't know how many times I have sprayed. The solution of sulphur does the work. I am satisfied that I would not have had more than enough oranges for our own use if we had not pursued the method of spraying.

I listened last year to the non-spray-ers and the plan of fostering the lady-bug. The lady-bug did well; killed an immense amount of them. I could scarcely pick an orange unless I found the insect sucking the substance of the scale. Used kerosene emulsion, thrip juice and kerosene oil and was bene-fited from its use. The last two seasons I have pursued this plan; I have used with the sulphur solution the thrip juice. This is a preparation of arsenic. (It is for sale by parties in Sanford.) I will say that I did not see in my packing house this season any fruit that was affected badly from scale. This result was reached merely by combining sulphur and the thrip juice; this destroyed the scale. Combine the sulphur and the thrip juice equal strength. They send with each package a small measure. Keep the

mixture well stirred in the bottom of your spray barrel. Great care should be taken in the mixing. It should first be mixed thoroughly with kerosene oil; then strain through a strainer.

It has been a question of great difficulty with fruit growers on high pine lands in regard to the rust mite, and the great trouble is to keep our fruit in a marketable condition. I was so successful last year my fruit classed high in the markets. I do not think there was five per cent of rusty grapefruit and of oranges not ten per cent. The last spray-ing should be the last of September. October and November do more to cov-er the fruit with scale and rust mite than all the preceding months.

Member: What time do you com-mence spraying?

Dr. Inman: As soon as the fruit is well formed—size of peas. I think you had better omit the first spraying. Save the first spraying and give it the first of October. We do not know that the red spider will be a pest each year, but I will say that it came so quickly this time that it kept us busy in trying to preserve the crop of fruit.

Mr. Sampson: I have used the sulphur solution since 1888, decreasing the per-cent-age of russets very much, and it has paid me well. The gain is not only from a better price per box but in quantity of boxes, for fruit on mite-infested trees is always smaller and less of it—it could not be otherwise with millions of mites at work on them.

The lemon has to be kept bright to sell at all, but it is an endless job and I think the sulphur tends to increase the scale, which I am satisfied is held in check fully as much by fungus as by lady-birds.

Until this year I have used sulphur in solution. In order to be effective one has to spray again in about a fortnight, which makes it very expensive and it is hard work on both men and team. The motion of the pump settles the wheels into the sand and the constant stops and fresh starts use up the team. This season I am using the Leggett Jumbo air duster, mixing half air slaked lime with the dry sulphur to make it flow better, and so far am very much pleased with results. Where it took seven men and three mules twelve days last year, we now use two men and one mule four days. When used after rain or while the leaves are still wet with dew the work is very satisfactory indeed.

For holding scale in check we use Gould's kerowater pump, using 15 per cent of kerosene. This pump works accurately and saves the cost and trouble of making emulsion. We find it will not do (for us) to let the scale reduce the vitality of our trees. If the weather is at all severe it kills them to the bank every time.

It is a pretty hard job to get good profit out of poor fruit, and I seem to have more enemies than friends in the insect line.

Member: I would like to ask Prof. Rolfs if he is ready to communicate anything yet in reference to the blight.

Prof. Rolfs: I am sorry to say that we are not yet in a position to make any statement of any value. Both Prof. Webber and Prof. Swingle, at Eustis, gave earnest and continuous study to this and other citrus problems; and while they reached satisfactory conclusions on some of the problems, on blight they did not. Nor have I myself. The subject, however, will continue to receive attention as long

as the blight is in the present condition. I do not know that we have anything of technical or practical importance to offer as to the blight. Where the blighted trees are in the greatest abundance, we have not yet located any especial information.

Mr. Waite: Can you give us any hope?

Prof. Rolfs: Hope springeth ever in the human breast.

Mr. Skinner: My friend, Mr. Bigelow, said there were some diseases that are giving him great trouble in his orange grove, and I wanted him to ask some questions.

Mr. Bigelow: This disease in my trees began about four years ago; the trees being very high I quit giving them ammonia. They are very large seedlings and they die back more and more every year. It was not in the trunk but in the branches and where they die back there is an exudation of gum.

Prof. Rolfs: It is probable it is a complicated case of die-back. Might be well to use Bordeaux mixture. Might have scales but Bordeaux mixture is certain to be a remedy for die-back, for where we find a tree that does not yield to it, a thousand do. The Bordeaux mixture almost always cures die-back. The conditions may be a complication of diseases. The best way is to submit specimens so as to find out where the disease is located.

Mr. Hart: I had trouble with one of my orange trees, and I called the attention of Prof. Webber to it a year or so ago. He gave it the name of psoriasis. It is a gumming out on the limbs. It seems that it is often mistaken for foot rot. With foot rot the cambium is killed and turns dark colored for some distance

down the roots under the sore. This dead layer has a peculiar smell. With psoriasis these symptoms are absent. It is possible that psoriasis may have something to do with the condition of this gentleman's trees if the trouble is not blight, which the description rather indicates. It seems to be easily handled on the orange by cutting away the bark and applying some antiseptic, then covering the wound with wax. On the lemon it is more difficult to control.

[The Secretary will here present a letter received by him from Prof. Herbert J. Webber, of the Department of Agriculture, Bureau of Plant Industry, Washington, D. C., bearing on this subject.]

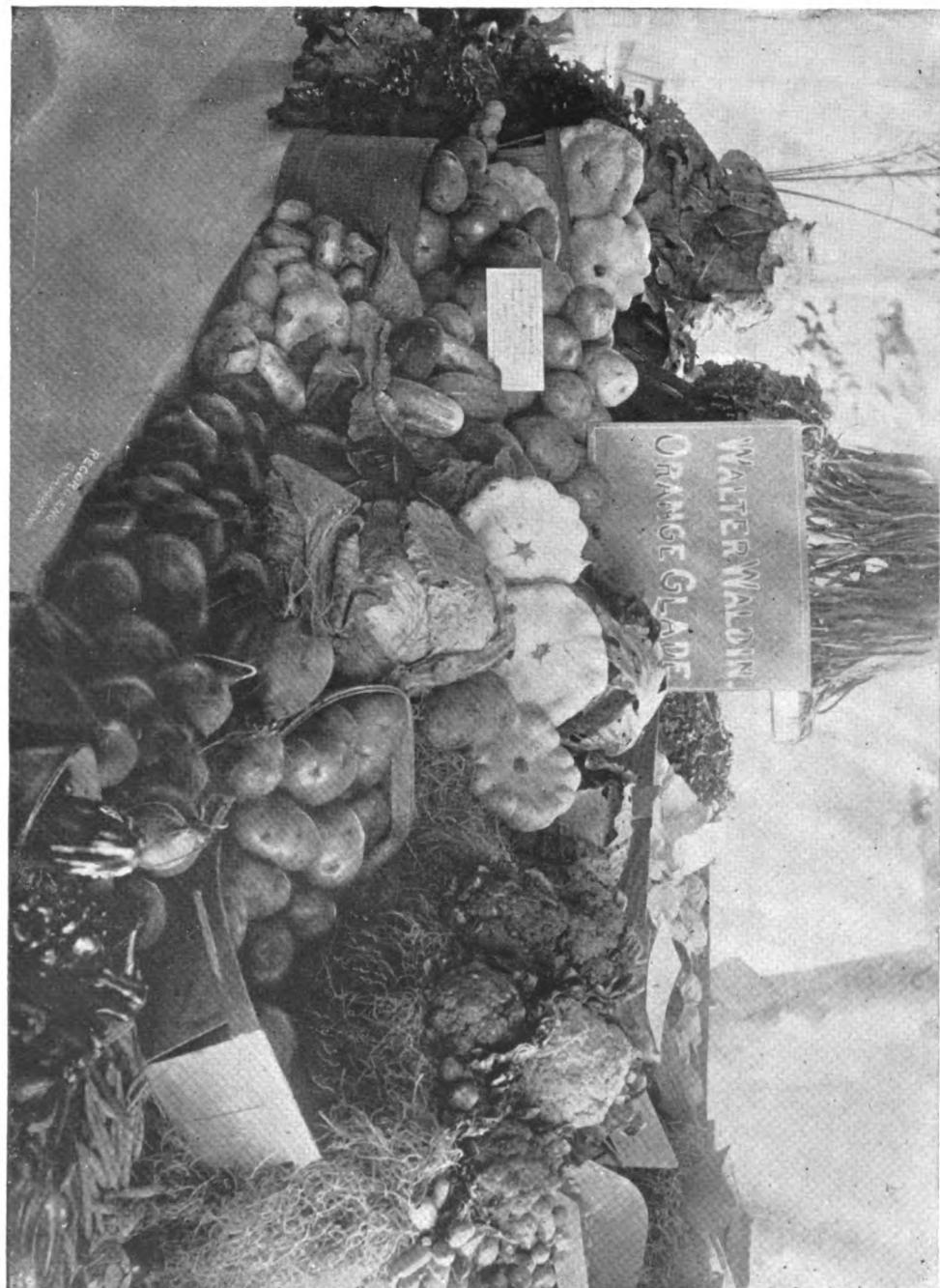
Your letter of June 4 regarding the gum disease of the orange has come to hand. The name which Mr. Swingle and I applied to this disease was "psoriasis" from the Greek word meaning ulcer; it is pronounced "sorosis." This disease occurs in many places in Florida and California, attacking limbs some distance above the ground, causing a scaly, ulcerated appearance followed by an exudation of gum. It is known in Florida as tears or gum disease and is sometimes confounded with foot rot from which it is quite distinct. Foot rot for instance, acts close to the ground near the collar of the tree so that the diseased portion extends into the wood; psoriasis on the contrary does not kill the entire bark, extending only to the middle bark, the

inner and cambium layer remaining healthy.

The only grove which I have seen seriously affected with the malady was one about four miles south of Eustis, Florida, where out of 100 trees twenty were quite seriously affected. The disease caused so little trouble that we did not study it carefully, but from the rather hasty study given it, it would seem to be caused by one of the so-called imperfect fungi.

As to the question of treatment, we have seen it yield to the scraping off of the outside diseased bark, being careful not to injure the uninjured portion, and washing over with crude carbolic acid as in the case of foot rot. This treatment should also be accompanied by thinning out of the foliage on the inner side of the tree in order to allow free circulation of the air. We could not recommend this treatment unhesitatingly as we have not seen it applied often enough to be certain of its action. While we have published nothing particularly relating to this malady, you will find mention of it on page 30 of Bulletin No. 8, of the Division of Vegetable Physiology and Pathology, U. S. Department of Agriculture, on "The Principal Diseases of Citrus Fruits in Florida." With best regards, I remain, very truly yours

H. J. Webber,
In Charge of Plant-Breeding Laboratory.



Tomatoes, Sweet and White Potatoes, Cabbage, Cauliflower, Lettuce, Celery, Okra, Cucumbers, Onions, Radishes, Egg Plant, Pepper, and other vegetables, aggregating thirty varieties, exhibited at the Dade County Fair, Miami, March 19-22, 1902.

The Tropical Laboratory.

BY PROF. P. H. ROLFS, IN CHARGE.

In speaking of this subject I do so with some hesitation for two reasons. The first is that a considerable number of members of the Florida State Horticultural Society are already well acquainted with this institution through the labors of Dr. Webber and Mr. Swingle. The second reason is that it might appear to the new members as a species of advertisement. To the older members who worked and planned for its establishment it must be a source of gratification to know that it is now a permanent institution and that it has accomplished many things that were not contemplated in the petition sent to Washington ten years ago. In short it may be said that the work set in motion at that time has accomplished more than was expected though it may not have accomplished everything that it was hoped it would.

The laboratory while located at Eustis, under the direction of Swingle and Webber, accomplished all that could be expected and would have done much more had not the greater part of the work been swept away by the memorable disaster of '94-'95. While the best labor of two of our ablest men was swept away they were not disheartened but set about to lay a more permanent foundation on a broader plan. The experience

of Swingle and Webber at Eustis has been and still is of most material value to the Tropical Laboratory at Miami.

DESCRIPTION OF THE LABORATORY.

The site of the laboratory is just a mile south of the court house square. The building is located on a lot facing Biscayne Bay within three hundred feet of the bay. It is a one-story building of a bungalow style. It contains a comfortable library room, three laboratory rooms, two photographic rooms and a store room. These are all fitted up in comfortable and neat style and its location on the bay makes it possible to work in comfort at all seasons of the year. The garden proper consists of about four acres of land on the west side of the Cocoanut Grove road across from the laboratory. On this we have a neat and comfortable gardener's house and a fertilizer house. The amount of land, about five acres in all, is too small to admit of extensive farm operations or large botanic garden, but extensive enough to serve our purposes for some time to come. The field experiments must necessarily be conducted in the regions where the particular crop is grown extensively. For example, we cannot expect to introduce pineapple wilts extensively into

a field and then experiment on the wilts but must go to the affected fields and study the disease there.

STATUS.

The instructions from the Secretary, Honorable James Wilson, limit the field of operation to the Southern States and to tropical and sub-tropical crops and plants. This makes the range wide enough to give entire freedom of movement.

At first though it might be considered that we were occupying field similar to that taken up by the State Experiment Station. But ten years of work has demonstrated that there has been no occasion for duplication of work and that if we had double the number of workers the horticulture of Florida would be the richer for it.

PLANT DISEASES.

The primary object for which the Tropical Laboratory was founded was that of studying plant diseases, especially those of the citrus. The devastating effect of some of the orange diseases and the obscurity of their origin gave rise to many diverse and often peculiar theories regarding their nature. It created a demand for knowing their true cause and a remedy for them. In the early days of plant pathology it was thought to be sufficient to send a man into the field to collect specimens and to submit these to the diagnosis made there. This however, did not satisfy the progressive Florida orange grower and soon the demand was made so strong that a "sure enough" live man was sent to Florida in the per-

son of Mr. Swingle. His tireless work soon demonstrated to his chief that the work had not really been begun, the need and the magnitude of the work were so impressed upon our present chief, Dr. Galloway, that a colleague in the person of Prof. Webber was sent to the State.

The work from these two men I find quoted in publications from all parts of the world where citrus culture is carried on. They had before them a stupendous task in clearing up and defining between that which was known and that which was merely fancied. In the matter of plant diseases it is often more difficult to suppress an error than to establish a truth. As an illustration I may cite an error that has crept into literature recently, that is, in some instances our writers for the agricultural press believe firmly that die-back is caused by fungus disease. They reason this way, Bordeaux is a fungicide; Bordeaux cures die-back, therefore, die-back must be a disease caused by fungus. Of course, we see that this reasoning is entirely a mental operation and not necessarily true in fact. In all of our writings we have been most careful to keep from giving any reason for such deduction. We tried in all cases to show clearly that it is a matter of malnutrition, in short a case of "indigestion." The point I want to make is this, that it only requires labor to establish a fact but that when a fact has been well established there is considerable difficulty in keeping fancy down. The philosopher can create more hypotheses in ten minutes than the scientist can prove or disprove in ten years. Fortunately, our scientific literature on diseases is now in such a condition that the boundary line

between the known and that which is not known is pretty clearly blazed out.

We still have "bogies" in the way of progressive workers, but they have taken "to the woods" to such an extent that they do not so materially impede the progress of accurate work.

PLANT BREEDING.

There is probably no phase of the plant industry that is at once so inviting to the scientist and to the practical man as plant breeding. If we were to examine the books of some recently forgotten travel we would find various ideas advanced as to the origin of cultivated plants. We have to go back only 250 years to find illustrations of trees whose fruit when it fell into water produced fish and when it fell on land produced fowl. Apparently the men who wrote these books and drew the pictures told the stories with "straight faces." Some of their hearers actually believed them. We still have the stories of the man-eating trees coming out periodically.

The matter of plant breeding is being brought to a system and the work laid out in definite plans. We are now breeding plants for definite purposes; our oranges not being frost resistant enough we have set about producing one that is.

President Taber told us last night about the most remarkable plant breeder the world has produced. I refer to Luther Burbank. Mr. Taber referred also to Dr. Webber. Dr. Webber is also the most accurate and systematic plant breeder. Here we have two men most strangely contrasted. Mr. Burbank looks entirely to results and pays no attention

as to the method of obtaining these results. There is no other living man who could step in and take up his work were he to step down and out. His work is truly that of a wizard as Mr. Taber called him. Dr. Webber on the other hand lays out his plans so methodically and carefully that you or I or any horticulturist who has the taste for it can go and do likewise. His master work is to show others how the results are obtained. Mr. Burbank shows others what results are obtained.

PLANT ACCLIMATIZATION.

Closely and most intimately connected with plant diseases and plant breeding is the matter of plant acclimatization. The work of plant introduction is now carried forward on a grand scale. We are now introducing plants by men who are experts in plant diseases and plant breeding. The selections are made with the greatest care and for special purposes. Upwards of 8,000 distinct numbers have been introduced. Many of these come from the tropics. Plants have been received from China, Japan, Philippines, South Africa, South America and other remote portions of the earth. To simply care for the plants introduced requires no small amount of labor and expense. Of course, we don't expect every plant that is introduced to succeed. But accurate data are kept of the specific name, the common name and the exact locality from which it was obtained, so that new importation of the identical variety can be made as soon as the variety may prove profitable.

Among the plants introduced that are proving useful may be mentioned,

cadios, a legume from the Philippines, resembling the pigeon pea but smaller in growth and more productive. This will doubtless prove excellent for poultry feed, if for nothing else. Balatong is another Philippine legume that produces its seed much like the cowpea but has a rampant growth, much stronger than the cowpea. The Ceara rubber plant is proving hardy and of a rapid growth. During its growing period of last year it made an average growth of one half inch per day.

HYBRIDS.

Pineapple hybrids growing on the laboratory grounds are proving more successful than was expected. A large number fruited last year and most of the remainder are fruiting this year.

The citrus hybrid seedlings have all been planted out at the laboratory and are growing with varying degrees of rapidity. The trifoliata hybrids have been

budded on trifoliata stock and distributed to several experiment stations. Some of these will fruit this year.

PLANT DISEASES.

The work on the orange blight and other citrus disease is being pushed as rapidly as possible. Previous investigations have demonstrated that we have here a very obscure and difficult disease to handle. While we expect to keep at the investigations without cessation the end of our labors is by no means in sight.

Very gratifying results have been obtained by workers in the Bureau of Plant Industry in securing a cowpea resistant to root-knot.

Another equally valuable discovery has been made in finding a variety of cotton resistant to the wilts.

P. H. Rolfs,
Plant Pathologist, in Charge Tropical
Laboratory U. S. Department of Agri-
culture.

Report of Committee on Peaches, Pears and Plums.

BY WALTER COOPER, OF COMMITTEE.

Mr. President, Ladies and Gentlemen:

No person sufficiently interested in peach culture, yet lacking the degree of experience, wishing to post himself or herself with the best available informa-

tion of the questions of soil best adapted, choice of location, fertilizers best to use, varieties to plant, care and culture, packing and marketing of the crop can well afford to overlook the contents of the an-

nual reports of this association for the last several years. They will find its pages prolific in practical experience, pointers of the safest kind. Every year the ranks of the army of Florida peach growers are increasing in numbers. It is possible there are many attending this meeting of the Association for the first time who would be pleased to have this subject discussed in all its important particulars. I am ready to answer any questions to the best of my ability—but in this paper shall confine my report to matters of more general interest and outlook.

EARLY PEACHES.

The growing of first early peaches, while not entirely confined to our State is a matter of the first importance because of the larger demand and better returns. The expense necessary to the scientific culture of the peach on the sandy soil of our peninsula together with the high rates of transportation to market on this perishable fruit, makes it wisdom on our part to plant largely of the earliest and best; so it becomes us to use all possible care in the selection of a desirable location for the orchard. During the last few years of variable climatic conditions it has taught me to seek timber protection; it is becoming necessary on account of the wholesale destruction of our forests following the slashings of the turpentine industry to seek far and wide for an ideal location even at the risk of adding to cost of reaching a station.

A first quality high pine land with or without clay subsoil with gentle southern or eastern slope, is my choice for first early sorts, although I am not so partic-

ular with regard to location for the general crop and later ripening sorts. It is a debatable question whether an orchard planted on a north slope or a western will be retarded in its blooming period sufficient to offset the advantages of timber protection—on north and west sides and early ripening of fruit by ten days or more in favor of the south and eastern exposure. This is very important and represents a great many dollars in a season. The influence of the south and east exposure is appreciable on each variety as it comes into marketable condition. There is usually a dropping off in shipments at the closing out of a variety and to be first in with the newer lot means the best market price.

FLORIDA PEACHES SUPERIOR.

The superiority of a well grown peach of Oriental strain to eat out of hand over the majority of Georgia peaches ripening at the same time, will always make it possible to grow and market the later Florida varieties at a fair profit. It is necessary that they should be of reasonable size, free of noyau, good color and flavor, and, most important of all, arrive in sound condition, to receive satisfactory returns. It don't seem to make much difference whether it is a freestone or a cling, quality being equal, and as a rule the clingstone carries best. I have shipped a twenty crate lot of the Taber peach, a blood cling, to Philadelphia in July, on a glutted market; they arrived in perfect order and sold at \$2 per crate. Size, color and condition sold them. My house reported that \$1 to \$1.50 was top price for very best Georgia stock, same day.

I am an enthusiast on the planting of

later or latest good reliable sorts adapted to our State and locality. Last season every dealer in the State to whom I consigned peaches f. o. b. prices, doubled and then trebled on his orders during the last two weeks of our crop season; but I stood helpless confronting an empty orchard, and a rising market. I found one grain of comfort in the situation; I had discovered a variety prolific and reliable, lasting two weeks later than anything we now have. I resolved to remedy my position just as soon as possible, so this spring have cut the heads off the six-year old non-producers and today have the tops all budded over. Next year I shall be ready for your orders, gentlemen, but don't all come at once.

In the lime, sulphur and salt solution we have a positive cure for the San Jose scale. I have used quassia solution and kerosene emulsion in summer with very good results, cleaned them out of all trees I treated. So we no longer dread this pest but to do nothing is to fall by the wayside.

Our people are waging a vigorous war on the curculio, with bumper and sheet, the only remedy worthy our attention.

THE RENOVATION OF PRUNING.

The unexpected and severe cold snap of November, 1901, we find did considerable damage to the early varieties of peach trees on low lands, a good many limbs being winter killed. A judicious pruning has resulted in a beautiful and healthy growth. I consider this the best remedy that I know of for badly injured tree-tops provided the root system is not affected by any disease. The peach borer is a constant and active enemy. One

season I dug borers from over 1800 trees, 500 of them five-year-olds, the rest two to three years. Afterwards I washed the trunks with a solution I will give to you. I dug from one to seven borers per tree that spring. The following season I again worked over this same orchard—following the one application of the wash, when I took out one borer from every fifth tree for the entire orchard. I consider this as near a success as I ever expect to get.

I am deeply impressed with the advance made in the introduction of new varieties adapted to Florida, particularly the yellow fleshed sorts. What we shall accomplish in this direction within the next few years who will dare to prophecy. The peach canning factory for South Florida fruit is almost here, a couple of years at most and we shall be ready for it.

PLUMS.

I have always wished to grow plums but long ago gave it up. The curculios were so very destructive. However, I now own two large Kelseys, ten or more years old. I myself budded them long ago and sold to a neighbor. Having bought his property I again own these trees. They have often fruited but curculio got the crop and this season they are loaded, one tree must have four or five bushels. I think the cold weather aided them. I have made a practice of trapping the curculio ever since fruit was the size of a green pea. Careful examination shows a large quantity of perfect fruit at this time on both trees.

There are three large Satsuma Bloods on the same tract; these are vigorous but, as usual, failed to set. I've de-

cided to top them next winter and try the Hale plum on them, as I have very favorable reports on its bearing in Pasco county.

I approve of a sod patch around plums; if I were planting I should plant in a Bermuda grass sod and fertilize the surface, giving only a small circle of culture to collar of trees as breathing space, no more.

PEARS.

I have only forty-five large pear trees. Do not cultivate the tree-rows; they are generally healthy and rather attractive to look at. The blight attacked them just sufficient to spoil my prospects of a fine crop of pears. I place no reliance on them but believe a few isolated trees desirable if generously fed on broken iron pots, old stoves and little or no work. They will give occasional heavy crops; but as a money maker I think I know something better. I'll trade my pear trees any day for Japan persimmons, myself to select the varieties.

PEACH TREE WASH.

Randolph Peters' Formula to Prevent Attack of Borers:

Take stone lime, slake and prepare as if for an ordinary whitewash, in an old barrel or box. Take enough at a time to make a bucket two-thirds full of the proper consistency for ordinary whitewashing. Now add one pint of gas tar, one pound of whale oil soap dissolved in hot water, (or one pound of potash or strong lye from wood ashes), then add clay or loam enough to make the bucket full of the proper thickness to be applied with a whitewash brush. Remove earth

from collar of the tree, apply the wash to the body of the tree, from the limbs to the ground or down to the roots. It destroys the bark louse and gives tree a bright color, clean and healthy. This wash will drive off all borers that may be in the tree and the moth will not lay eggs on or about tree same season it is used. Apply in month of May. Thoroughly tested and reliable.

DISCUSSION.

President Taber exhibited some peaches which were presented by J. C. Craver, of Sutherland. Some plums were presented by J. H. Wylie, sent with the compliments of J. B. Howe. Mr. Taber said the variety resembled the "Excelsior" and that it was evidently a seedling of some variety of prunus triflora crossed with some native type.

Prof. Hume: In relation to the plum Mr. Wylie gave you, did he give you any data of it? The fruit is a good one, and I think ought to go on record.

Mr. Wylie: I know very little about this plum as it was introduced by Mr. Howes, of Keuka. Every year it has borne good fruit. The plum blooms well and bears heavily each year. It ripens up the latter part of May and is of very good flavor.

Mr. Taber: Yes, I can testify to that for I have been eating some of them and the quality is good.

Mr. Pettigrew: A week ago tomorrow I gathered my ripe plums. They are a hybrid of the Kelsey plum.

Mr. Taber: If people over the State will bring in new fruit before the New Fruit committee, they will be glad to investigate the subject.

Question: Some plums will bloom

all right but will not bear fruit. What is the matter with them?

Mr. Taber: That is a hard question to answer. There are, however, many varieties of plums, as of other fruits, that are much better adapted to some sections of the country than to other sections. The Japanese plums, *prunus triflora*, have not proven as well adapted to Florida as was at one time hoped, but, although many of these have proved shy bearers thus far south, there are quite a number of seedlings from them, chance crosses with varieties of native types, that are very promising both as to productiveness and quality of the fruit.

Mr. Craver: I would like a list of the varieties of peaches.

Mr. Cooper: The old stand-bys for first early are, the Bidwell Early, if you are so located to grow it; and the Maggie and YumYum; the free-stones are the Waldo, Hall's Yellow, and Imperial. The Colon is a good free-stone, a good shipping fruit; also good to dry.

Mr. Gaitskill: I have been watching plums very closely. I notice that if there is a heavy rain I have no plums. If a long dry spell, I have plenty. The rain knocks all the pollen out of the bloom.

Prof. Hume: I think we discussed this matter at Jacksonville. Whether that is the trouble or not I am unable to say and the point taken by Mr. Gaitskill is well grounded. If a heavy rain comes at the blooming period it will affect the bearing of the fruit.

Mr. Pierce: I have several plum trees in one place and about a quarter of a mile from that another lot and notice that in the last five years they put on two sets of bloom. The first gives little

fruit and is scattering. The second holds more fruit.

KAKI.

Mr. Pierce: I have six or eight varieties of persimmon and one variety especially sheds its fruit badly, and I do not know whether it is caused by an insect or not. This one is very large; the size of a tea-cup. I would like to know some one's views on the matter.

Mr. Phelps: With nearly all of our persimmons, if there is a great deal of rain its sheds its fruit. If it is dry, it holds more. Dry weather helps it hold its fruit. It is the imperfect pollination that causes the fruit to fall. It has been more dry this year than any time since I have been in Florida, in April and May, since 1888; I have kept a careful record. I noticed before I left home some of the ground was covered with the fruit.

Dr. Richardson: I should like to ask Mr. Phelps or any one else if I should cut off part of the sprouts, would it help the fruit?

Mr. Phelps: There is a certain equi-poise between fruit and foliage which should be maintained. The twigs falling from the tree were not cast off by the tree itself; they were cut off by the twig-girdler. Pick these up and burn them and thus destroy the eggs of the girdler.

Member: What are the shipping qualities of the kaki?

Mr. Cooper: Good, fair to excellent on well grown fruit, well fed on mineral fertilizers and grown on trees not too crowded. I have a tree of the kaki which grow exceptionally fine fruit. It stands almost isolated and the fruit is very fine, highly colored, rich and ships well.

Florida Pineapples.

A DISCUSSION.

Mr. Hart: I should like to hear from Mr. Butler.

Mr. Butler: Having made the report on "pines" last year and having nothing new to add I will not take up time farther than to say that at St. Petersburg this year's crop will be about the same as that of last year. However, I have one point of value. The lady-bird is almost if not quite a specific for the pineapple scale, as the conditions of life under a shedded pinery seem to be ideal for the lady-bird. They should be introduced into every shed. Possibly the very small red lady-bird with black head and spots on portion or part of back may do the best work when plants are not much shaded.

Black heart has caused much loss to the grower and this disease is the more objectionable for the reason that it is not detected until the fruit is cut.

Member: What is the cause of black heart?

Mr. Butler: I have never seen a case of black heart excepting during and after cold weather and so connected it with a low temperature; but the Secretary of the Agricultural Society of Jamaica, writes me that this disease occurs there and some one reports its occurrence in Queens, upon the East Coast, during the summer months. So I cannot give the cause, but with us even Abakkas do not have it, excepting during the cold weather.

Prof. Rolfs: I will say in regard to the subject just before us that this disease is not thoroughly understood at the present time. It seems to be induced by a moist atmosphere. It is not confined to any particular variety though some of the finer varieties seem to be a little more in danger of being attacked by it than the coarser and more hardy forms. I did some work on this about five years ago when I got a lot of black-hearted pineapples in the winter time but for the last few years no great demand has been made for work of this kind.

Pineapple growers should be careful in getting the right variety for a particular locality. I doubt whether the people about Orlando would have succeeded with the Red Spanish so well as they have with the varieties planted there.

There is a tendency for pineapples to break out at the heart at the time of cutting. Mr. Wolf, of Jensen, has experimented with this and has found that it can be overcome by selecting suckers from those plants that are free from this tendency. A few years ago we were in great want of pineapple slips and so had to plant everything we could get hold of. As this demand is supplied we can have better opportunities for selecting out better strains of our varieties.

In regard to the diseases of the pineapple; we may look for more trouble from time to time after we cultivate our lands longer. Not that it is a necessary result but that it almost invariably fol-

lows. I think it possible to crop land in pineapples continuously. Some fields have been cropped for twelve to fourteen years without signs of deterioration. It is necessary, however, to see to it that our soil does not become contaminated. I have been studying a disease this year that does not seem to have been reported before.

ROOT-KNOT OF PINEAPPLES.

After studying the matter carefully I find that the trouble was due to the attack of the root-knot worm, *heterodera radicicola*. From time to time word has been passed around that the pineapple was subject to the attack of this pest, but this seems to be the first time that it has been established by laboratory methods.

How the Diseased Plants Look.—Some of the plants examined have a confusing look, as though it was attacked by both the spike and the wilts. Others were simply smaller than the average. As a whole there seemed to be no sharp distinction between the looks of a plant suffering from root-knot and wilts, root-knot and poverty, root-knot and spike.

No mistake need be made, however, since the roots attacked by nematodes are very different in appearance from that of either of the other diseases.

How the Roots Look.—If the plant diseased with root-knot be pulled nothing characteristic will appear since nearly all the diseased portion will have broken off and remained in the ground. Then by taking the portion of the root remaining in the ground and carefully removing the soil the seat of the disease will be found.

The first signs of the trouble may occur in the small lateral feeding roots. On these feeding roots small tubercles the size of mustard seed, were found; in these tubercles nematodes in various stages of development could be made out by the aid of the microscope. Sometimes the sides of one of the main roots was enlarged or swollen and in these the root-knot nematode was also found.

The most important and distinctive character is the tip of the main root. The tip of the main root when attacked often enlarges to twice the normal diameter. The tips are greatly enlarged and may be knobbed, club-shaped, spindle-form, beaded, or irregularly enlarged. The tip of the main root is frequently diverted from its original direction; sometimes it is bent back so as to be growing directly towards the plant, exactly opposite to the direction it ought to take; sometimes it is bent so as to grow at right-angle to the proper direction. In fact, the root may be caused to take any direction by an attack.

The After Effect.—The first effect of the attack of the root-knot nematode is to enlarge that portion of the root; this does no serious damage to the plant, but in about thirty days the nematode has gone through its transformations and the knots produced by it rot, making it necessary for the plant to produce a set of new roots. This process in time exhausts the vitality of the diseased plant. This is the most discouraging condition, since, if the plant were killed outright the pineapple planter would not be wasting his time and fertilizer on it.

Preventive Means.—In attempting to combat this pest we must not forget that we have been fighting it for twenty years or more and no one has yet report-

ed a remedy that is practicable. And those remedies that are partially successful in other fields cannot be applied in the pineapple field. The most important consideration, therefore, will be to keep it from getting into the pineapple field.

The following general rules, if followed, will do much to prevent its general dissemination:

1. Do not use plants of any kind from an infested field.
2. Do not permit vegetables or other crop, such as tomatoes, watermelons, etc., to be transplanted into the pineapple field.
3. Do not permit the laborers to pass from an infested field to one that is not infested.
4. Do not use the tools in an unin-
fested field that have been used in a
diseased field without washing, and otherwise thoroughly cleaning them,

The greatest danger of introducing the root-knot is by permitting vegetables to be planted among the pines. It is possible to render a field valueless for years, as a pineapple field, by permitting a single crop of vegetables to be planted upon it. This does not apply to such vegetables or other crops whose seed is planted directly in the field, but to those that are transplanted to the pineapple field.

In reply to the question about finding some dead roots, I would say that it is only natural for this to be so. The first roots formed support the earliest leaves formed and as soon as these leaves lose

their functions there is a tendency for the roots which supported them to die off. The pineapple plant belongs to a class that does not produce a tap root, but, like Indian corn and sugar cane produces a mass of smaller ones. The older ones of these are apt to become more or less functionless and die off without detriment to the plant.

Mr. Blackman: While we are on the subject, an article in the Times-Union in regard to the shipping of pineapples from Hayana to New York is a very interesting one, but would like to hear something from Mr. McCarty on the subject. They are stencilled as "Floridas."

Mr. McCarty: The subject is such a very large one and has been so thoroughly discussed that I should not like to offer anything. Don't know anything about pineapples anyway.

President: How many acres have you?

Mr. McCarty: About half a million.

President: Acres?

Mr. McCarty: Don't count by acres.

Member: I would like to know if it would depreciate the strength of the plant to try to grow more than one apple on one stalk?

Mr. McCarty: We are content to grow one at a time. I have had two distinct apples come on one stalk, which we named Siamese twins. I think perhaps in two or three years we will have something definite to offer in that line.

Celery at Sanford.

REMARKS BY J. N. WHITNER.

Mr. President, Ladies and Gentlemen:

In discussing this question I beg to say that it is too vast to cover in all its details. The success in growing celery goes to show that there are very few things impossible in Florida. As to my experience, I have never known anything so fascinating or so hazardous, unless it is betting on horse races. After the freeze of '95, up to which time I was a wholesale merchant, I found it necessary to find other employment or leave Florida. The success of Neyland & Sons, of Ybor City, led me to undertake celery growing. When one succeeds in raising good celery the profits are striking. In order to succeed we have found out a few things but there are others yet to learn.

First, it is necessary to have ample irrigation and drainage. The former is obtained at Sanford from flowing wells, and we apply the water under ground, giving us sub-irrigation and drainage with the same system.

In the first instance it is necessary to have imported, Golden Self-blanch-seed. Inferior seed would mean ruin. We sow our seed about September first, and set the plants in the field during December and January. I prefer single rows, three feet apart, plants set three and one-half inches in the row. This makes it possible to fertilize and cultivate at will. Close culture beds,

when they succeed, give a wonderful yield, but of rather inferior quality. I have known as many as 1700 crates cut from one acre of the latter, while an average yield of the former will be 700 to 800 crates. Even this is nearly double the yield in California, our principal competitor.

Now when we talk about the income, which is the most interesting feature, I wish to say that fancy prices cannot be expected if our crop is to reach any considerable volume.

I wish to say to the celery growers, if there are any present, or to the celery growers of Florida, one point is to be considered; I would arrange one thing; that is the size and shape of package to be used in shipping. That is one of the things I undertook when I began packing; we decided with New York people to use a crate 8x20x27 inches. I have been in New York and seen the difference between that and the Manatee crate, and ours is the better of the two. The express companies, railroad men and dealers,—because we do not sell our celery on commission—prefer this crate. For that reason I would like to see all the celery growers in the State come to the same conclusion and use the same crate.

Some years ago we went to dealers and said if they would come here and buy our celery we would protect them

in the sale of it and not consign, and we have succeeded in selling our crops almost wholly at Sanford, and I feel sure all our celery can be sold in car-loads at home and at profitable prices.

Mr. Waite: I would like to know about how near you set your celery?

Mr. Whitner: In single rows, plants set three inches apart. I use a very narrow plow in cultivating.

Mr. Waite: I would like to say, Mr. Whitner, that I have used all the influence in my power to get the use of this celery crate, and would say that fully one-half of Manatee county used the Sanford crate and are greatly pleased with the result. Last year we had a great many grades in the box and thought the air had too poor circulation. The center of the crate seemed to be heated. Therefore I agree with you on the crate. Several of the largest shippers in the North have written for good references as to crates, and I have given them the Sanford crate as the best, and they have written that they were well pleased.

Mr. Carroll: He spoke of the seed: getting imported seed and then having to buy the seed again. He went on to say the plant becomes a little seed stock. Do you consider that to do for seed stock?

Mr. Whitner: In the first place a party there at Sanford wrote to Washington for a reliable house in France from which to procure seed. The first he got did not prove satisfactory. Then we got from the old dealers in Baltimore. Now, as to its going to seed, I think that is attributable entirely to climatic

conditions, the plant being set back again and again. We do not attribute it to the quality of the seed.

Mr. Waite: The seed was planted in December?

Mr. Whitner: Whenever they have a series of cold spells they have the same trouble.

Skinner: What time do you plant your seed?

Mr. Whitner: In August and September.

Mr. Waite: What fertilizer do you use?

Mr. Whitner: Any good fertilizer.

Mr. Waite: Does it need plenty of potash?

Mr. Whitner: I do not know, sir. Think it does.

Mr. Waite: I was told by Mr. Pace that you used three tons to the acre. How much potash was in that?

Mr. Whitner: It was Wilson & Toomer's Peruvian Vegetable fertilizer that we used. You can consult the formula of that.

Mr. Waite: Last year I had about forty per cent that went to seed. I wrote to one or two houses about this, and they said it was perhaps due to too much ammonia or potash. In regard to purchasing seed we perhaps went over the same road you did in trying to order seed from France, but the greatest success is found in buying from home.

Mr. Waite: Do you grade your celery and ship it out?

Mr. Whitner: We grade it before we send it out and then you know what you are getting.

Tropical Fruits, Other Than Pineapples.

BY E. N. REASONER.

To the Florida Horticultural Society,
Ladies and Gentlemen:

The past winter having been so steadily cold, (said to be 6 degrees below normal) was peculiarly trying on tropical growth, and all fruit trees passing through such an ordeal should have our attention.

In the Manatee section generally protection is a necessity for the production of tropical fruits, although there have been in the past many mangoes, tamarinds, avocado pears, sapodillas, etc., produced as far back from the coast as thirty miles without any protection, the trees reaching a large size. Guavas bear more or less almost every year but the past season's cold killed all out in the open.

Shedding is then the only safe method left for us in frosty locations, and after three winters' experience we find such management easy, only requiring ordinary watchfulness and supplies of fuel for emergencies.

The following trees or large shrubs are especially suited for growing in a shed, and have all been found to withstand "cold feet" without damage. The mango in all varieties, avocado pear, sapodilla, leechee, cherimoya, Surinam cherry and other Eugenias, Egg-fruit (or Tiessa), guava in all varieties, Otaheite apple (*Spondias*) and several others not so well known. During severe

cold all that is necessary is to keep such trees from actually freezing, a higher temperature than 35 or 40 degrees being useless. The temperature may be raised in various ways; open fires, stoves which carry out smoke and keep the cloth cover clean, and spraying with clear water; our well water being always warm is an easy source to get warmth into a house of trees or plants. A system of piping and spray nozzles, force pump, etc., is of moderate cost.

We record the blooming and fruiting of the famed Chinese leechee this season; has it ever been known to bear in Florida before?

Bananas are raised in the open air by almost every planter, but the choicest Indian varieties are too tender for our latitude. We depend on the Hart's Choice and Orinoco which stand cold better than any known sorts and fruit through summer and autumn even if severely frosted the previous winter. It would scarcely pay to shed pineapples in our climate, yet we hope that suitable fruit trees will be freely grown all over South Florida either under protection, or in frostless localities in the open air.

Mr. A. A. Boggs, of Dade county, of this committee, has sent in a valuable paper which follows. (We very much regret Mr. Boggs' inability to be with us at this meeting.)

REPORT BY A. A. BOGGS.

Last September, at the meeting of the American Pomological Society, at Buffalo, the writer ventured the assertion that the discovery of a practical means of budding or grafting the mango and the avocado pear would mark an epoch in American horticulture. This epoch seems now to be upon us. It behooves us, perhaps, to triumph with caution until the newly propagated plants shall actually have been fruited, but with the hundreds of vigorous growing examples of the new methods before our eyes it hardly seems possible that there shall yet be a slip 'twixt the cup and the lip.

BUDDING THE MANGO.

It is noteworthy that, as in the case of many other important scientific and industrial puzzles, two independent solutions have been discovered within a very short interval of time. The first we owe to the untiring labors of the venerable Professor Elbridge Gale, of Mangonia. His method is, in brief, to sustain life in the scion during the process of union which is so slow in the mango that ordinary grafts will die before uniting, by leaving a long base of the scion to project into the ground below the point of union which is always about the surface of the ground.

The stock is cut at the surface of the ground and split as for a whip-graft. A face is then cut on side of scion, and a tongue raised within it. This face is then brought against cut surface of stock, cambium layers joining, the

tongue inserted in cleft and the whole bound with waxed cloth, leaving the lower end of scion to project six to twelve inches into the earth and to be kept moist. This method is wholly original with Professor Gale, and is a real contribution to horticulture, for it will unquestionably prove effective in many stubborn cases where ordinary methods fail. It is a great advance over the old method of inarching, upon which mango propagators have hitherto relied, both in point of cheapness and rapidity. Even in the absence of any other practical method we might claim that the problem was fairly solved.

ANOTHER METHOD.

But another method has been brought forward by Mr. G. B. Cellon, of Miami, which simplifies the question still farther. This gentleman has demonstrated that the old method of "patch-budding" can be applied to the mango and avocado with perfect success, at least in hands as expert as his own, and with a speed not greatly inferior to that of the ordinary shield-bud process. I append a short communication from Mr. Cellon himself, descriptive of his operations and results.

There can be no question that the solution of the difficulty in propagating these fruits true to variety has opened to the people of extreme South Florida a new and brilliant field of horticultural endeavor, and offers prospects of the most attractive sort.

The mango is valued as the queen

of fruits where it is known. In its finest development it is far superior to the peach, which is its nearest competitor. There is at present only one of these best varieties in cultivation in the United States. This is the Mulgoba, of which there is an imported inarched tree in the possession of Prof. Gale, and some hundreds of buds, grafts and inarchings from it, scattered from Jensen to Cutler on the East Coast. This fruit is of rather large size, kidney shaped, green in color with a pink cheek, tender and melting in flesh so free from fiber that it can be eaten at table with a spoon, and of a rich and most exquisite flavor, not comparable with that of any other fruit. Commission men and fruit experts who have tested it are enthusiastic and unanimous in their opinion that such fruit will conquer the American market on its merit at first sight. So far the writer has seen no other mango fit to be classed with the Mulgoba. The Number Eleven etc., from Jamaica seed, so far as they have been fruited here have proven worthless. But the Mulgoba is only one of many superior sorts known in India and Ceylon. The Department of Agriculture has recently made several importations of trees and scions of choice varieties from the East but with very moderate success. There is one small tree of the Sundashaw now growing on the grounds of the Experiment Station at Miami which is probably the only survivor of several shipments. It is earnestly hoped that this Society will take action to urge the importance of this matter upon the government authorities. There are several established types of mango in Florida which seem promising subjects of experiment, but our best hopes come from the East.

AVOCADO PEAR.

Of equal promise and of greater present market importance is the avocado pear which is today the most costly fruit on the American market, and is making more friends every season. The importance of budding and grafting as applied to this fruit is not so much the securing of better varieties from abroad, for Florida now produces the best in the world, and in eliminating the inferior sorts which form a large proportion of seedling orchards, and in regulating by selection the season of fruiting. There are now trees in Dade county as early as July 15th and others as late as January 15th. The significance of this fact needs no comment.

Choice avocados retailed last season at from 35 cents to 75 cents each, in the cities, and the demand seems to outgrow the supply. It is urged that this Society in its catalogue should encourage the use of the name avocado, both on the score of correctness and of euphony, in place of the absurd misnomer "alligator pear" which leads to many mistakes.

OTHER TROPICAL FRUITS.

There is little new to say about the other tropical fruits. The culture of the banana does not appear to spread rapidly owing to the scarcity of land of the proper moisture and fertility. It is probable however that the great rich prairies about Cape Sable will some day produce immense quantities of this popular fruit.

The guava maintains and extends its sway as the chief of all jelly-fruits, but beyond some rather vague efforts at

improvement by selection not much effort has been spent upon it in a horticultural way.

The cherimoya is a delicious fruit, and deserves more attention than it receives. Of delicious flavor and not unattractive in appearance, it has the great merit of coming into market in May, when fruit is scarce. The sugar apple is less attractive in quality—at least to strangers. The sour-sop proves too tender for unprotected culture on the mainland.

The sapodilla is, to its friends, a delicious fruit and has managed of late years to extend the circle of its admirers so much that it has a considerable market. It may one day attain considerable economic importance.

There is a wide and promising field for experiment in these and other little known fruits, but the foregoing would seem to comprise all results positive enough to report upon at present.

PROPAGATION OF THE MANGO.

BY G. B. CELLON, OF MIAMI.

This grand fruit has for centuries been cultivated from seedlings, for the following two reasons: first, it was believed to be a sufficiently sure method of propagation to produce the kind desired, which is a great mistake. This fruit is not an exception to the rule, like most other fruits, that each seedling bears different fruit, and generally inferior to the parent. Second, it was not believed possible to apply any reliable method of propagation to this fruit, which was also an erroneous belief, as is clearly shown by my operations, developed and in progress. And I am sorry to say that there are still disciples of each of these beliefs.

To the first let me say that those who plant seedling groves of this fruit will regret it, as they cannot expect to market fruit profitably from a grove where each tree produces different and mostly inferior fruit.

To the second let me say, come and see my trees.

By the continuous cultivation of this fruit from seedlings, nature has done her part by hybridization in producing many varieties of value. Only man has been deficient in not extending their cultivation further than the original trees, and many of them no doubt are now extinct, and many inferior seedlings are bearing the name of good varieties of which they are only a degenerated offspring.

To a limited extent, within the last few years inarching has been practiced as a substitute for a complete method of propagation, by which many of the good varieties have been perpetuated. This method is insufficient for general operations, mainly because trees inarched will seldom stand the shock of transplanting, or even grow off well on account of an imperfect union; and if the

trees were good they can not by inarching be produced fast enough or at a cost to be used in extensive operations.

It affords me pleasure to relate the success that I have had in the propagation of this fruit. I have buds growing on trees of all ages from seven months old stock to large bearing trees, put in during last year; and this, with well formed unions and showing as thrifty conditions as could be had in any other kind of trees.

I have other methods of propagation now in various stages of experiment, but so far I have been most successful with the patch-bud, which is done by removing a section of the bark with an eye from a scion of the variety desired, either square or square at the top and pointed at the bottom; and then remove from the tree to be budded a section of bark corresponding in size and shape, and then fit in the piece of bark of the variety desired closely and bind with waxed cloth.

This method of budding is described by all the standard writers on the sub-

ject of Budding and Grafting, and is among the most ancient methods known, being one of the first to suggest itself as a means of transforming trees to bear the fruit of other varieties; but it had been abandoned and the easier and faster methods are generally practiced.

I have used the patch-bud from time to time in my operations; first when a boy putting into practice what I had read, and since, when the greatest certainty is desired, if the tree to be budded has a thick bark, and under conditions that are not likely to yield successfully to other methods.

This patch-bud had not been applied to the propagation of the mango and reported prior to my publication in the papers in November, 1901.

I adopted the patch-bud in December 1900 as furnishing a means by which we can produce good and reliable mango trees at a cost that will enable us to plant the fruit as extensively as it deserves.

Report of Chairman of Committee on "Protection From Cold."

BY G. R. FAIRBANKS, CHAIRMAN.

The question of how to protect our orange groves from damage by excessively low temperature has occupied our attention for the seven years since the great freeze of 1895. Prior to that ca-

tastrophe we were only concerned with the danger of injury to the bloom by late frosts, or to the fruit by cold waves.

The question of protection from cold, is now presented to us in two aspects,

one, and the lesser one, to protect bloom and fruit, the other and more serious one, the protection of the trees from being killed outright, or all above the ground.

The loss of a crop from a late frost, or from a cold wave while still on the trees, is only a temporary loss for a single year, but to lose the bearing tree itself is a much more serious matter.

We know from experience that a temperature falling below 20 degrees, will injure or destroy the fruit; we also know that when the trees are in bloom, if the temperature falls anywhere near the freezing point, the bloom will be destroyed and the crop partially or wholly destroyed for that year. A moderate protection or the generation of artificial heat will generally avoid both of these injurious effects.

We are not likely to forget that on the 8th of February 1895, and on the 12th of February, 1899, the larger part of the groves in Florida encountered a temperature of 14 degrees above zero in the former year and 10 degrees in some locations in the latter year, resulting in the destruction of the trunks of the trees, at an estimated loss to Florida of over thirty millions of dollars. Such a disaster meant not only a loss of all income from the grove for many years, but a large and continued expenditure of money for years in reestablishing the grove, an expenditure which comparatively few were able to bear, but which most would have undertaken if they could have felt any assurance that such a disaster would not recur.

The greatest source of encouragement was felt when it became evident that the roots of the trees were generally uninjured and would soon send up new

growth, while the vitality and usual hardness of the orange, might be expected at no distant day to bring about a renewal of former conditions. Naturally, however, even the most hopeful, were considering what protection was available against the recurrence of a similar disaster in the future.

MOUNDING.

As most of the bearing trees had been budded on sour stock, rebudding became necessary upon the sprouts which grew rapidly from the roots. To protect the buds which had been inserted in the most promising sour shoots, mounding around the bud was generally resorted to and proved successful at that stage of growth, so far as the mound extended, but of course gave no protection to the exposed portion; yet it was a great gain to have preserved the sweet bud and have it grow larger and more hardy each year, as long as it was thus protected. When the exposed part was frozen back new wood was quickly formed on the protected trunk, until at present the groves which were thus protected by mounds or banks around the bud, have to a considerable extent reached a bearing age.

But this partial protection was not satisfactory to many orange owners, and various schemes for entire protection were brought forward. The most prominent was by firing, that is the building of fires through the grove when a severe cold wave was threatened or made its appearance, so as to raise the temperature in the grove above the danger point. This of course, required the storage of a considerable quantity of fuel with the necessary assistance for starting and

maintaining the fires. Many instances of successful protection in this manner have been reported, but also some failures and disappointments.

SHEDS AND TENTS.

The two most prominent plans for protection, were to envelope the tree with a tent which could be closed and artificial heat produced by lamps. The other and more expensive mode of protection suggested, was the building of sheds over the trees with moveable slat covers and a provision for heating when necessary.

The question of expense was discussed as to the economy of each of these plans of protection. A tent suspended and arranged to be folded back by a mechanical contrivance expeditiously closed, was very favorably considered and is said to have worked satisfactorily. The cost of a good sized tent of this description was understood to be \$6 to \$8 per tent, and to cover 80 trees to the acre would make the cost \$480 to \$640 per acre, but with care the tents would serve for several years, if the trees did not outgrow them.

The building of sheds to cover in several acres, was adopted at DeLand on a large scale, and on a less scale at some other places. Where lumber was to be had at a low price, the cost was given as \$450 to \$600 per acre. In addition to the protection of the sheds, fires were provided for by heaters, or otherwise. These sheds were in a measure permanent and were expected to last a number of years.

Either of these modes of protection by folding tents or sheds, involved so large an expense at the outset, as to be

beyond the means of a large majority of the owners of groves. An outlay of \$5000 or \$6000 to protect a grove of ten acres could only be afforded by very well to do people. A good many persons have made use of a triangular tent placed on three poles, set firmly in the ground at the foot of a mounded tree, closed with safety pins and provided with a good sized lamp with a sheet iron chimney. For tents of this character ten to twelve feet high provided with lamps, the cost is \$1.50 to \$2.00 per tent. When the weather is mild, the tent is folded to one side to allow the sun, dew and rain free access to the tree. This class of tents would be available for protection of fruit and trees against any temperature not below 20 degrees, and perhaps with careful attention to the complete closing of the tent and a sufficiently large lamp, would afford protection against a drop in the temperature as low as 14 degrees or even 12 degrees, but that is yet to be ascertained by actual test. A serious objection to the shape of the triangular tent is the necessity of drawing in the limbs to enable the tent to be closed and entirely cover the tree.

A CALIFORNIA PLAN.

The fruit growers of California, our principal competitors in orange growing, have had this matter of protection under consideration for a number of years. Their fruit does not mature until our midwinter, and hence is exposed to injury from cold waves for a considerable period of time. They are no more exempt from cold waves than we are in Florida, and have neither forest nor water protection, nor pine-knots.

They are probably not subject to such extremes of low temperature as we are, although their day of calamity may yet come, but they seem liable to suffer frequently from cold, severe enough to hurt the fruit. The plan of protection which seems to have met with the most favor in California is the raising of the temperature by artificial heat through the groves.

In an article published by the "California Cultivator" of January 24, 1902, Mr. C. C. Teague, of Santa Paula, describes very minutely, an experimental test of frost protection, by the use of coal baskets in a forty-acre grove containing four thousand trees. The experiment was made on December 12, 1897, when at 7 p. m., the thermometer registered 32 degrees Fahrenheit, at 8 o'clock, 28 degrees, at 9 o'clock, 26 degrees, at 10 o'clock, 24 degrees, at 11 o'clock, 22 degrees, at 12 o'clock, 20 degrees. Thirty-five wire baskets to the acre were supplied with coal and lighted at 11:30 o'clock. No perceptible effect was produced until 1 o'clock when the temperature rose to 22 degrees, at 3 o'clock to 24 degrees, at 4 o'clock to 26 degrees, and did not go below subsequently.

As the coal would not last over five hours, without replenishing, it was important to know when to begin lighting the fires. To ascertain this, Mr. Teague put an inch of water in a shallow pan, and waited until the water began freezing over, which did not occur until 11:30 o'clock, when the thermometer indicated 21 degrees. His thermometers were placed on posts four feet above the ground, but he thought it might have been better to place them ten feet from the ground.

In a private letter to the writer, Mr.

Teague writes, our trees are from eight to twelve feet high and nearly as broad as high. The baskets are made of baling wire and can be obtained either from the Packing House Equipment Co., at North Ontario, California, or from the Riverside Co., California. The cost of the basket is about eight cents each and iron supports of 5-16 iron, four cents each, making the cost twelve cents for the basket and support. He recommended the use of 75 baskets to the acre which would amount to a cost of \$9.37 per acre. The cost of the soft coal is estimated at \$10 per ton, and ten pounds to the basket to burn five hours without replenishing, would cost \$3.50 per acre for each period or five hours. Coal can be probably had on the line of any railroad in Florida at not exceeding \$10 per ton. Kindling has also to be provided for.

There is another item of expense, which will be considerable. Mr. Teague's plan is to have kindling placed in the bottom of the basket under the coal, and when the time for lighting comes send a man along each tree row with a can of coal oil, pour on some of the oil and ignite with a match. To replenish the coal baskets he sends a wagon load of coal along the tree row with a helper to distribute and refill the baskets.

We have now considered most of the plans for cold protection from the simplest to the most expensive.

RECAPITULATION.

First in order, and as an early and universal application the mounding around the base of the tree to the height of two feet or more, from the 10th of December to the 20th of February or thereabouts. In all cases, if well and care-

fully done, the protection is perfect in saving the bud, and whatever annual growth it has had from year to year, whether the exposed portion had been injured and killed down or not.

Secondly—Protection by wood fires kept up during the continuance of very low temperature. This of course implies the ability to procure the necessary quantity of fuel and having it ready for use and the continuance of the firing until the crisis is passed.

Thirdly—The use of coal fires after the California system, which has been mentioned. This requires the procuring of a sufficient quantity of suitable coal, and being ready for the occasion, requiring its use, with labor and help required, and keeping up the fires.

Fourthly—The use of tents of more or less elaborate construction, with coal oil lamps, and the labor to close the tents, light the lamps, etc. In this connection may be mentioned pine straw wraps as practiced at DeLand. Wrapping with bagging, boxing around, etc. etc.

Lastly, the enclosing of the trees with sheds.

The shed is probably the most perfect protection if accompanied with heating appliances of some kind. It is claimed for the shed protection, moreover, that it enables the grove owner to keep

his fruit protected until later in the season, giving him the benefit of higher prices. It is also claimed that the trees under the sheds make as good growth, and fruit as well as those in the open air. This is a fact important to be ascertained by the test of actual experiment, in a number of instances in different locations. The trees in the great Stetson sheds at DeLand, are reported as being this spring in good condition, and to have bloomed well. To persons who desire absolute protection, and are able to expend \$500 to \$800 per acre for building sheds, this mode of protection will commend itself, but if orange growing can be carried on only under such expensive conditions, at least in the central portion of the peninsula, but few persons will feel able or willing to engage in it.

A good deal of protection is afforded by forest growth adjoining or within the grove, and by water protection on the northwestern side.

When the trees attain as large size as they had before the freeze of 1895, they may not need any more protection than they had during the years from 1835 to 1895, and long before 1835, but time alone can tell what the future has in store for us. At all events we have acquired valuable experience and know that we can prevent the loss of our trees by suitable precautions.

REPORT BY C. SHOOTER, OF THE COMMITTEE.

The only form of protection for orange trees which affords complete security is the shed. Other methods are all likely to give out just when protection

is most needed, but the shed offers absolute security, even with the thermometer at zero, if the fires are properly attended to. In the big snowstorm of 1899

with the thermometer at eight degrees I saved three acres of trees.

In the light freeze the shed alone is sufficient to protect the trees and fruit, but in case of very severe weather it is necessary to light sufficient fires to keep up the temperature so that water in shallow vessels will not freeze over. I have several tin pans scattered through the grove with one inch of water in them; when this commences to freeze the fires are lighted.

The shed consists of heavy framework, covered with panels of pine veneer and surrounded by walls. The cost is from \$700 to \$800 per acre. The panels can be easily opened and closed from the ground by a lever with a long wire attached, so as to give the trees as much light as is considered requisite. While the shed affords complete protection, it creates new conditions for the orange tree. We have no previous experience to guide us. It will take a great deal of patience, careful observation and some well planned experiments to find out just how to make these trees that grow in a big house bear as well as those that have to rough it outside. The principal idea up to the present time, has been, to combine the shed protection in the winter with one-half or one-third shade in the summer, for which many advantages are claimed. My experience so far has been that the trees have not borne well. Whether this was caused by the shade in the summer, too much shade in the winter or a wrong system of fertilizing, I am not yet prepared to say. But I believe it was caused to a great extent by too much shade in the spring just at the blooming time.

It has been suggested that too much ammonia is the cause of the trees not bearing. This winter I fertilized with cotton seed meal. The trees did not start blooming well. I was afraid it was the cotton seed meal, but as soon as the cover was removed and the trees given plenty of sunshine, the bloom came—and plenty of it. This appears as if the trees require full light at the blooming time.

This spring I noticed that the trees were commencing to put out the new growth at the ends of the limbs with little bloom, and not all over the tree, as they ought to. I at once had all the cover removed. The trees started then to put out a tremendous growth all over the tree with plenty of bloom. In fact, it was the finest spring growth that I have ever seen. It still remains to be found out how much or how little light to give the trees to obtain the best results. It is a great advantage to keep the trees dormant as long as possible compatible with blooming.

My experience this winter has been: Grove No. 1 had no light at all, bloomed well when full light was given, about March 10th. Grove No. 2 had two panels open for light to each tree. Was the last in starting but had the best bloom. Bloomed very late. Grove No. 3 had four panels open, started growth earlier and had less bloom. I have abandoned the summer shade until we understand the new conditions better and shall only use the shed for winter protection.

Another very important item of frost protection, has not been brought sufficiently forward:

THE RAILROAD SIGNALS.

We don't like to hear them, but they are of great value. A timely warning means the saving of thousands of dollars to us and the railroads. There are many of us who live too far from the postoffice but we hear the freeze signals and know that it is time to prepare for action. We had no freeze signals on the Seaboard Air Line this winter so I hope the Horticultural Society will take this matter up and present it in a proper light to the railroad companies. It is as important to them as to us.

DISCUSSION.

Dr. Richardson: We are getting down now, sir, to what I consider the important part of the meeting. This question of cold is a very important one. The conditions are very different here from what they are out West. Out there the coal is shipped to them. Pine-knot fires are used here. In the latitude of Tampa nothing else is needed. Not myself alone but the growers all over the State have demonstrated satisfactorily that if they should raise the temperature from six to twelve degrees the cold would not injure the trees nor the fruit.

For the fruit itself I believe we should resort to refrigeration. You can produce at a great deal less expense than you can by building these sheds and using these tents; pick and refrigerate the oranges and keep them until sold. If only just that little protection is given they will escape. This perhaps is not apropos to the direct question, but it might add a good suggestion. A cold storage house would be too expensive

for the ordinary grower. But by combination sufficient room could be created to protect the oranges until the price each year would pay for the cost of erecting the plant. Commission merchants follow refrigeration of all fruits; we have seen it illustrated in the keeping of meats. It does seem to me that we might prepare to save our crop by refrigerating or cold storage until we can get more satisfactory prices for them.

In cold attacks pine-knot fires are the best in the groves.

Question: Oranges kept in cold storage, are they any better after taking out of cold storage?

Dr. Richardson: They will keep sufficiently to ship them.

Mr. Waite: Mr. Hart promised to give us something about the preservation of oranges.

Mr. Butler: Ladies and Gentlemen, there is a point brought out in Mr. Shooter's report, namely "the shed causing retardation and diminution of the bloom." We have no experience shedding oranges in our section, but, judging by analogy, the statement is undoubtedly correct. Pines which are shaded will universally bloom later than those which have light.

Mr. Hart: My shed is covered so that it gives one-half shade only and it is warm in there. The difference is very marked as to the time of starting; I should say the trees are ten days to two weeks earlier in starting in the shed. In regard to shedding and keeping one-half shade over the groves, I will say that Mr. and Mrs. Porcher, Senator Hardee and myself inspected the groves on Indian river, covered this way; then

spent a day at my place at Hawks Park. From there we went to Mr. Stetson's groves, at DeLand, as guests of Mr. Stevens who has them in charge. The whole object of the trip was to look into the matter of shedding groves and get the latest points. One grove at Merritt had a shed over it eighteen feet high and the trees were reaching the cover; and yet there was practically no fruit on that grove. On Mr. Porcher's estate there was a fair crop but not a heavy one. I was told since I came here that he was taking some of the cover off from his shed. My own crop under the shed was rather lighter than Mr. Porcher's. After my report a year ago there was some dropping of fruit under the shed.

At the Stetson shedded groves we also found only a light crop of fruit. Here several kinds of cover are in use, some so arranged as to make a nearly tight covering when so desired. There was quite a difference noticed in the amount of crop in the different sheds. I am told that Messrs. Stetson and Stevens have come to the conclusion that the excess of nitrogen evolved under the shade of the sheds is the prime cause for the shy bearing and that when this excess is used up and a proper relative proportion established for a "balanced ration" this shyness will be overcome. I understand they are at present building more sheds.

As stated two years ago, it is my intention to take the top off my shed as soon as the trees interlock so as to shade

the ground. I will then have had the benefits that the cover gives to small trees that cannot well be protected by firing in open grove and have brought them to good bearing size in about half the time usually required. Small trees under half shade grow very rapidly; mine grew too rapidly and developed die-back; but with our present knowledge I think this can be prevented. Unless we can find some method to get trees to put on heavier crops under permanent half shade I do not think it best to keep them covered after they come to a good bearing size. Cloth or wood covers that may be quickly drawn over the trees when desired and then drawn back again may give the needed protection without curtailing the crops, but as Mr. Stevens says—and it is my opinion also—the trees need plenty of light at blooming time.

My shed was built with the hope that it would prove profitable both to myself and others; to others, in the lessons it might teach. I think it has been so to me in quickly bringing the trees to their present size. That my experience may not fail in its lesson to others I will say that with our present knowledge the permanent half shade has served its purpose when the trees have attained a good bearing size, say twelve to fifteen feet high, with a fair spread of limbs; and if kept on longer it will be at an expense in short crops that more than balance its advantages.

Experiment Station Work in Relation to Horticulture.

BY HON. GEO. W. WILSON.

Mr. President and Ladies and Gentlemen of the Society:

In seeking to address the Society upon the subject assigned to me I do so for the purpose of endeavoring to advance the practical usefulness of the Experiment Station, and to place special stress upon the importance of the untiring cooperation and undivided aid of this Society in broadening the scope and advancing the work undertaken from time to time.

Recognizing the power that your body yields and the place that you occupy in our practical horticultural development, I suggested, two years ago, that you create a special committee for the purpose of conferring with the Board of Trustees and strengthening its hands by giving us the benefit of experience by suggesting certain work along practical lines that would result to the greatest good of the work-a-day problems of our horticultural and agricultural interests.

The station's relation to horticulture embraces a range of thought that could not be possibly squeezed into the limits set upon an address of this kind. In fact, one could take up every paper, every comment thereon and every remark made in this meeting and fit them to this subject, and not then exhaust the infinite community between the two.

I regret that I have not had the time

to compile the data that may have been valuable and useful to your files, and the hasty and rough outlines I give for what they are worth, trusting that you will consider my remarks as an appeal for your help more than any effort to make a formal address.

MOST IMPORTANT STATION.

My three years' connection with the Florida station has enabled me to observe its work, and as far as a man could whose working hours are absorbed by the exacting duties of daily journalism, to gather information, along with my observations of the Florida station, the work and policies of other stations throughout the country. Growing out of these observations I have been keenly awakened to the fact that the Florida station is the most important, by being surrounded by the peculiar industries that it is supposed to foster, of any station in the United States. In this connection I have reached another conclusion which is, that stations generally do not break away from the theoretical and devote greater energy to the practical, whereby the farmer and fruit grower obtain a greater direct benefit. Of course, as you know, there must be theory before discovery, and investigation must precede scientific truth, for without theory and subsequent investigation we

should still be living in a dark age, passing from the cradle to the grave on what would seem a flat world, so no one can dispute this fact—but it is the application of theory to station work—theories that would never see the light of day outside of the laboratory, nor jump over the fence of the farm nor pass out of the door of the greenhouse.

What the people want is deduction, and from deduction the truth—truth that comes from a thoroughly tested experiment, well weighed and painstaking to the smallest degree and worked out to the smallest detail—a concentrated research covering a scope that cannot admit of erroneous data or fallacious statement, and then it should be given to the people in plain language avoiding technical terms covering up scientific mystery.

Having this in view and the dissemination of practical work of the Florida station the trustees directed that semi-monthly bulletins be given to the people—a short plainly worded review of investigations in progress and the result of work when completed. This has been done and through the kindness and liberality of the Florida press thousands of people read of the work, where hundreds merely glanced at the technical bulletins carrying with them terms of scientific phrase that passed over the heads of the masses. Coupled with this, the Board has urged and reiterated over and over the cardinal principles of accuracy and truth, feeling that no greater moral crime could be committed than to mislead the people upon questions that affect the struggle for subsistence and the comforts of life.

Another thing I found in this cursory investigation, is that a disposition

prevails in the large number of agricultural colleges to subordinate everything to the academic departments to the sacrifice of the practical station work. Happily, in our college we have finally moved out of this rut, and now the station work receives attention that points to a bright future.

IMPORTANT PLACE ON MAP.

I beg to call your attention to the fact that owing to our climatic characteristics we occupy the most important place on the map in horticultural matters of any state, of course excepting California. Our climate admits of every product under the sun—from the temperate zone, going through six degrees of latitude to that of the tropics—from the sturdy plant life of the chilled areas of northern Florida to the tender and succulent growth of the sun-embraced peninsula. I cite this again to show the vast field for the plant pathologist—the limitless opportunity of revealing the hidden mysteries that lie deep in our semitropic heart and that will bring forth new light, new truth and new industries for the happiness of our people.

No station in this country has so many new problems coming before the able men who conduct it—many new and primary subjects to consider. Many of our horticultural problems are new, without the least past experience to guide the workers in investigation, therefore, the station has to depend upon original research, that, as you know, takes time and patience.

In this country 9,000,000 men are engaged in agricultural and horticultural pursuits. There are over 5,000,000

farms, groves and orchards, with a value of over \$14, 770,000,000.

Every station bears a close and intimate relationship to these millions of men and millions of acres. Five hundred thousand bulletins are issued annually, which, of course, means millions of readers, and the farmers' institutes conduct lectures to disseminate practical information delivered to millions more. Aggregated, this means that a range of scientific research is going on over a wide territory in the laboratory and plant-house and equally as large an amount of practical experimentation on the field, the grove, the orchard, stable and dairy.

I give the above figures and comments to show the vastness of the work and the natural extent of station investigation.

From year to year the Florida station gives greater assurances of increasing strength and efficiency in lines of useful work in the future. While we have met many difficulties, we have in a sense conquered them, and the most important conquest has been to win the confidence of the people, for whose benefit the station exists. The people generally have come to regard our station as a fixed institution, and with the influence and strength of your strong arm back of us I am confident that within a year or two we shall make great strides in many new investigations now in the formative stage.

MORE LAND PURCHASED.

One of the most important missions your special committee has accomplished as it induced the Board to purchase an additional tract of land for the mod-

el farm, consisting of 138 acres, which, I frankly admit, would not have been done, because the Board did not deem it necessary, nor did it appreciate the importance until urged by members of your committee. You doubtless remember that the last Legislature appropriated \$10,000 to be applied to a model farm upon which a certain class of experiments could be carried on, that the station farm would not admit of, under the law.

This work of your committee in calling the attention of the Board to the necessity of more acreage in order to conduct successful investigations, illustrates better than any other argument the importance of your active cooperation and the selection of a committee whose sole aim is to aid, advise, counsel and assist.

While the Board of Trustees occupies a position of trust without compensation, yet this should not relieve it from just and honest criticism, and we court it, provided it is based upon sound reasons. Criticisms by fair and honest men should never be avoided or evaded by any public institution, and I hereby pledge to this Society, when your representatives appear before the Board and suggest reforms or improvements, it shall be met with a hearty and cordial reception.

Speaking as a member of this Society and as president of the Board of Trustees, I beseech that each of you, both as a practical horticulturist and as a citizen, give your aid to this work, and in giving your aid watch it closely and do not hesitate to make known your wishes or your discoveries for in this a bond of unity will come which means broader knowledge, as well as a feeling

of actual fraternity of interest, backed by wider information and influence, that will result to the best interests of every section of our beloved State.

Fertilizers and Irrigation.

BY CYRUS JONES, OF THE COMMITTEE.

I think that we probably have not suffered as much the present season at the hands of the numerous and magnanimous fertilizer men as we have at our own lack of wisdom or possibly more properly speaking from our own financial inability to prepare and put into use irrigating plants that would protect our trees from drouth and at the same time from the ravages of spider and other nefarious pests that our trees seem to be subject to.

The impression appears to be now very prevalent (but possibly a mistake) that more than half of the promised crop of the State has been lost to the growers through the ravages of the several different spiders, they being able to get in their destructive work because of a lack of a vigor in the trees caused from the extremely dry weather and our failure to provide for an artificial supply of water for their nourishment. And now, if this is a fact, the growers have lost sufficient of their present crop to have put into operation an irrigating plant that would in each of these frequently recurring dry seasons save them more than its cost, besides its keeping the trees in a more healthy and vigorous condition, and at the same time saving to us much of our expenditures for the very excel-

lent fertilizers that our fertilizer men are willing to furnish us with—for our money.

Besides insuring us against a loss or even curtailment of our crop and to substantiate the view I would kindly refer you to any one of our few irrigated groves and notably so to that of the Phifer & Watkins, Nocatee grove, at Nocatee, in DeSoto county, which I have quite recently visited with the object of observing its condition and there witnessing the happy smile of Col. Watkins as he views his splendid trees, daily receiving their liquid rations. This enables them to support and carry to perfection the fruit on their heavily laden branches and at the same time resisting the efforts of the spider, while so many of his neighbors are lamenting over the almost total loss of their promised crop, besides the impoverished condition of their trees for next year's crop and the colds of the coming winter.

I take up the irrigating part of the program, supposing the fertilizing portion will, as usually heretofore, be well taken care of, as some of us must not lose sight of the main chance. I am at a loss to know any remedy to suggest, other than that we try to realize the im-

portance of irrigation and going to work and prepare to prevent another early recurrence of this season's destructive catastrophe. And this may again suggest the question that was propounded during our morning session. "Is it the spider or is it the dry weather that is destroying our fruit?" For my part I very much incline to the opinion that it is largely if not wholly due to the want of

moisture in the ground which would be furnished through irrigating plants were we supplied with them.

Now, can't some of our enterprising and generous fertilizer men take hold of the machinery business and see that our orange growers are provided with as good facilities for procuring irrigating plants as we now have for our regular supply of fertilizers?

ELECTION OF OFFICERS.

The report of the Nominating Committee, read by M. E. Gillett, was novel, racy and entertaining. Starting out on the broad proposition that change is written over all human affairs and that the law of constant change is the only law of progress and health he deliberately erected a guillotine upon which he stretched the helpless bodies of the old officers and proceeded to dance around them with savage whoops and yells. Several times his hand grasped the rope to let fall the fatal knife, and then, when, at the last moment, it swiftly descended, he pulled the victims of his torture from under it before it struck the block, and they were saved. The victims were in a fainting condition when rescued, owing to the great length of the scalp dance, but they quickly revived and recovered their usual equanimity. While denouncing the torture to which they had been subjected, they agreed in their admiration of the glittering knife which descended so swiftly toward their necks, but spilled no blood after all.

Speaking of President Taber the report entered into an elaborate and beautiful tribute to his many civic and horti-

cultural virtues, his former constant devotion to the interests of the Society, his unflagging zeal in promotion of its prosperity, and then, with melancholy tone, admitted the necessity of recognizing a slackened devotion now on his part and a falling-off in enthusiasm in its behalf; and then concluded "We have found a man, however, who we are satisfied will please you, whose praises we do not need to sing, a man so well known that our children all call him uncle. A man whom you are proud to honor. Your committee can say no more; we therefore ask this Society to retire our old president, G. L. Taber, and present to you the name of the new man we ask you to support George Lindly Taber." In the case of the other officers they were, in like manner, lashed upon the guillotine and their official heads cut off and then glued on better than they were before.

They all made speeches of greater or less length, couched in the modest and becoming humility of grateful recognition which is characteristic of the re-elected and therefore "vindicated" office-holder.

NEXT PLACE OF MEETING.

Mr. Wilson said Jacksonville lost the Society last year on account of the fire, but is now splendidly rebuilt and would like to entertain it again.

Mr. Blackman, in his usual earnest and straightforward directness, presented the claims of Miami, the beautiful, the tropical, the almost miraculous in growth and development. Hotel accommodations are ample; the people are intensely hospitable.

Prof. Stockbridge put in a hearty invitation to the Society to meet at Lake City and see the college and Experiment Station. There will be a thoroughly modern, beautiful and commodious hotel completed by September.

Mr. Wilson said that personally he did not care whether the Society met at Jacksonville, Lake City or Miami; but he wanted to emphasize the importance of its having a home, a headquarters, a central bureau of information. In his vocation as a journalist he could turn over to them hundreds of volumes which now, for lack of a home, are consigned to the waste basket. He would not oppose any other member, but believes the migrating policy a mistake.

Mr. Robinson thought that the limitation of the meetings to one place would curtail the membership.

Mr. Embry agreed with this view.

Mr. Butler said, "a rolling stone gathers no moss." He thinks we had better make one more move—to Miami —then after that meet permanently in Jacksonville.

Mr. Pettigrew favored Jacksonville as the fixed home.

Mr. Carey said traveling over the

country as he does, he is satisfied we had better make a change every year.

Mr. Carroll agreed with those who favored making Jacksonville the permanent home and headquarters, but we certainly ought to see the phenomenal country about Miami next year. They will entertain us royally.

Mrs. McCarty said vivaciously that two years ago we voted Jacksonville our permanent home; and the ladies all desired a permanent home; but they want to go a-visiting to Miami this once.

Mr. Gillett liberally declared in favor of Jacksonville as a permanent home, but would meet in Miami next year and in Lake City the year following.

Mr. Wilson said he would gracefully yield to the ladies; that if Jacksonville was voted the permanent home, he would concede Miami the ensuing meeting.

Mrs. McCarty said, we voted Jacksonville that honor two years ago; why vote it again?

Mr. Phelps said the ladies expressed themselves more pointedly than the men. All men feel the need of a home in their business. It is nice to go a junketing, but he insisted that we should go to Jacksonville. The Society has lost ground every time it has gone away from Jacksonville. That city has given it more financial help. He was thankful the Society was not in debt. Let us keep it so by pursuing a strictly business policy with regard to the financial outcome.

Mr. Gaitskill strongly seconded Mr. Phelps' line of argument. We have never gained anything by going away from Jacksonville, but the contrary.

Mr. Embry said the financial argument was very important, of course, but he still believed we should acquire more members by meeting in different places.

Mrs. Conant argued earnestly for the enlistment of women to propagandize for the Society; they always succeed better in such matters than men. Set them to work. She wants a permanent home, but does not want to sit there all the while and do nothing. She wants to go a-visiting once in awhile. Go to Miami, put ladies on the recruiting committee, give them an opportunity to show their influence, then the Society will flourish.

Mr. Barber made some lengthy re-

marks, rehearsing and emphasizing the arguments in favor of Jacksonville. The poorer members cannot afford to go to Miami. It cost some of us \$25 and four or five days' time even to come to Tampa. To go to Miami would cost still more. The convention city ought to be the most centrally located one in the State, and that is undoubtedly Jacksonville.

Mr. McCarty moved that we proceed to ballot for a choice. Seconded.

Miami received 93 votes. Jacksonville, 39. Palatka, 1; Lake City, 7.

Vote for Miami, on motion of Prof. Stockbridge, made unanimous.

Reports of Officers.

SECRETARY'S REPORT.

South Florida made liberal promises of accessions of membership in case the annual meeting was appointed for this section, and those promises she has handsomely redeemed. One little town, for instance, the town of Palmetto, furnished a membership of twenty-three, and that too, in the busiest part of their shipping season. Mr. F. D. Waite deserves a vote of thanks for his energy in collecting this handsome reinforcement. It illustrates the possibilities of horticultural propagandism, especially when the work is in the hands of a zealous and competent missionary.

The result seems to prove the wisdom of appointing a meeting, at least

occasionally, in a new place; it serves to awaken and stimulate the faith of the brethren; to demonstrate to them the common interest taken in their pursuit by the members of the profession throughout the State.

Without trespassing on the functions of the committee on final resolutions I wish to convey my personal tribute to a Tampa member of the committee on arrangements, Mr. M. E. Gillett. This gentleman is one of those true-hearted loyal spirits who, when the interests of their friends are involved, never know when they have done enough, never stop to consider lest they should do too much. He has labored

without ceasing to provide the sinews of war and to promote and insure the success of this meeting.

I have to report that up to 8 a. m. I have entered paid up memberships as follows:

Annuals.....	305
Life Members.....	3

At the corresponding date last year we had to our credit 280 annual members paid up and nine life members.

Total receipts the past year.

Back numbers sold.....	\$ 57.00
305 annual memberships.....	305.00
Three life members.....	30.00
Donation from Amos Wakelin	2.00
Donation from Hugh C. Allen	2.00
 Total.....	\$ 396.00
Retained from last annual account.....	18.15
 \$ 414.15	
 Expenses subsequent to adjournment of last convention, as per itemized bill herewith.....	\$ 18.49
Balance due on Secretary's salary.....	46.66
Postage, stationery, addressing envelopes, etc.....	29.30
Printing.....	14.00
 \$ 108.45	
Balance.....	\$ 305.70

Retained for immediate use. 10.70
 Turned over to treasurer.... \$ 295.00
 STEPHEN POWERS,
 Secretary.

TREASURER'S REPORT.

1901	
May 22. To Balance .. .	\$ 332.44
May 23. Relief Fund for Jacksonville .. .	42.25
Aug. 24. Sec. Powers' credit on salary.....	46.66
 1902	
May 22. Cash from Sec. Powers.....	\$ 295.00
 \$ 726.35	
By Cr.	
May 24. By Geo. W. Wilson for Relief Fund..	42.25
Jan. 5. Sec. Powers' draft No. 21.....	40.00
July 28. Sec. Powers' draft No. 22.....	233.10
July 28. Sec. Powers' draft No. 23.....	27.37
Aug. 1. Stamps.....	1.00
Aug. 1. Balance on draft No. 22 .. .	2.50
Aug. 29. Secretary's draft No. 24, covering salary.....	75.00
 \$ 421.22	
May 22. Balance on hand...	295.13
 \$ 726.35	
W. S. HART, Treasurer.	

EXECUTIVE COMMITTEE REPORT.

Rev. Lyman Phelps, chairman, reported briefly that no formal meeting had been held during the year. The only business requiring attention had been the change of meeting place after the Jacksonville fire, and this was arranged by correspondence.

The executive committee of the Florida State Horticultural Society met at 8 p. m., June 18, in the Duval hotel, Jacksonville. Present, Messrs. Geo. L. Taber, E. S. Hubbard, E. O. Painter and S. Powers.

Mr. Phelps sent Mr. Taber an appointment as proxy and Mr. Hart sent a letter regretting his inability to come on account of illness.

The meeting was called for the purpose of taking up the subject of the appointment of standing committees, each of whom has charge of some one department of horticultural research to prepare essays and originate discussion. These committees are appointed, first, on a basis of individual experience and fitness; second, on geographical considerations, in order to parcel out the State to these important committees equitably.

In view of the meeting to be held next year at Miami, which has almost a

new fruit world of its own, an unwonted importance will attach to some committees hitherto having little activity.

The committee on good roads and marketing was discontinued, as it was considered by the members that the matter of making good roads in Florida is simple and elementary, since there are only about two materials, clay and stone, to be used on a level surface.

On the other hand, the committee on forestry will be composed of the strongest men in the Society for it is the universal feeling in the ranks that the country is fast approaching a crisis when all will have to fight for the existence of the forests. The members generally consider it probable that as early as the next meeting, in May, the destruction of the forests will have assumed such an acute stage that the problem of their conservation will have become one of overshadowing importance. The Society is preparing to direct the whole force of its nearly 400 members upon the purpose of securing protective, fostering and reconstructive legislation.

The publication of the catalogue of fruits in this year's report was ordered, and a committee on nomenclature and revision of catalogue appointed, to report next year.

S. Powers, Secretary.

Relation of Bacteria to Plant Food in the Soil.

BY PROF. H. K. MILLER.

Our conception as to the nature of soil has undergone a very material change during recent years. Formerly it was believed to consist of disintegrated rock particles containing many chemical compounds in varying degrees of oxidation, with more or less of the complex mixture of organic substances which we designate as humus. We knew that freshly powdered rock differed from a soil, in that it would not support plant life: that powdered rock upon being weathered for some time acquired the properties of a soil; the weathering being supposed to render certain parts of the material available as plant food, through atmospheric or chemical agencies. This view, to a certain extent, may still be correct, although we now know that there is another influence at work which is perhaps of primary importance in converting disintegrated rock into soil. This influence is a vital force produced through the agency of bacteria. We now view a soil in a wholly different light, for we have not a mass of dead, inert matter to deal with but a material full of life and vitality, more varied in its nature than anything known to us. All soils which sustain plant life are now known to contain bacteria, and the number of species thus found is great. In some soils we find not only the number of species but also the number of individuals limited, while in others, where

the food supply is abundant and conditions are favorable, a hundred million of these little organisms may exist in a single gram of soil. These germs play no insignificant part in the great cosmic economy of nature for we shall see that without these, all higher orders of life would necessarily become extinct.

THE ORIGIN OF SOIL.

The origin of soil has been ascribed to two great agencies, one chemical, the other physical; but we now have reason to believe that the vital force of bacterial life claims equal recognition with these. Plants require both mineral and organic matter as food and we are forced to credit the original accumulation of organic matter in the soil to certain micro-organisms which are capable of development in an entirely mineral environment. This can be said positively of no other order of life. These bacteria not only play an important role in the transformation of mineral matter of the soil into soluble plant food, but they even take part in the disintegration of the living rock itself. Our knowledge of these mineral bacteria is as yet very limited.

One species, *spirillum desulphuricans*, we know to be capable of reducing sulphates to a lower state of oxidation, yielding hydrogen sulphide as one

of the products. This in turn serves as food for the so-called red bacteria and those of the genera *beggiatou* and *thiomicrospira*, being oxidized to sulphuric acid and excreted, so that insoluble bases of the soil are acted upon and rendered soluble. Free sulphur may also be transformed into sulphuric acid or hydrogen sulphide by other bacteria; thus it appears that the sulphur of the soil is in a constant state of transformation, due to vital and chemical agencies, and that the substances formed incidentally bring into solution plant food which otherwise would remain unavailable. There are also bacteria which depend upon iron carbonate for their development. This acts as food and furnishes the energy necessary to the life of the bacteria, the carbonate being reduced to ferric hydroxide during the process. This then acts chemically upon the phosphates and silicates of the soil forming important plant foods. Many species of the three genera, *crenothrix*, *leptothrix*, and *cladothrix* are known to be closely dependent upon iron compounds for their normal growth. There are doubtless other mineral ingredients which are produced or changed, through bacterial life, but little has as yet been done in this field of investigation by bacteriologists; due perhaps to the fact that mineral constituents of the soil have been regarded as the result of chemical and physical agencies alone.

ORGANIC COMPOUNDS IN THE SOIL.

Having briefly considered the relation of bacteria to the formation of the mineral constituents of the soil let us turn our attention to the organic com-

pounds which play such an important part in nourishing plants. It is commonly recognized that the fertility of a soil depends more upon the amount of organic matter present than on any other factor, since a soil may have all the necessary mineral ingredients present and yet its power of supporting vegetation be limited. Supply organic matter and such a soil becomes abundantly fertile. The organic matter in a soil consists chiefly of decaying animal and vegetable matter and a complex mixture of compounds called humus. This humus represents an advanced stage of decomposition of animal and vegetable substances. It consists principally of carbon, hydrogen, oxygen, nitrogen, and a few other elements in combination. Of all these elements nitrogen and carbon are the most important, and since plants can utilize the carbon dioxide of the air and obtain hydrogen and oxygen from water, nitrogen becomes the all important element around which the problem of food supply centers. This is true because plants can live only when certain nitrogen compounds are available and as these are somewhat limited their ultimate exhaustion may be possible, unless we have some means of reforming them from the free nitrogen of the air. These compounds are being constantly removed with the harvesting of crops, by drainage water and by decomposition; so we are naturally solicitous to know by what means they may be returned to the soil. Let us then consider some of the transformations of carbon and nitrogen as they pass from organism and from realm to realm and see if they pass through an unbroken cycle and return eventually to the starting

point. If this can be established we need have no fear concerning the exhaustion of our soils.

A brief consideration of carbon is all that is necessary with this element, as plants under the influence of sunlight can assimilate the carbon dioxide of the air. Starting then with the humus of the soil and the carbon dioxide of the air, the chlorophyl plants build up, with the help of solar energy, the complicated compounds which constitute vegetable proteids, fats, gums, etc. A part of this carbon is returned directly to the atmosphere, as carbon dioxide, by direct oxidation and by plant respiration. Other portions pass into animal life. Here again a part of the carbon is returned to the air by animal respiration; the remainder as the result of metabolism is converted into animal products which eventually reach the atmosphere by oxidation and decomposition. The rest of the carbon compounds are destined to pass into bacterial life and finally reach the atmosphere as carbon dioxide, or the soil as humus. Without going into the more intricate details, we see thus that the carbon may be ever changing from plant life to animal life, to bacterial life, then to the inorganic condition where it is ready to again take up its endless journey.

NITROGEN.

As before stated the conservation of nitrogen as food for plants is of the utmost importance. Indeed it has not been many years since eminent scientists predicted that the time would come when the supply of nitrogenous plant food would become exhausted. These predictions were based upon the belief that

larger quantities of these compounds were being decomposed or placed beyond the reach of plants that were being formed. It was then thought that almost all of the combined nitrogen owed its existence to the action of electrical discharges through the atmosphere. It will be shown, however, that a much more effective influence is at work fabricating these compounds, and that there is every reason to believe that nitrogen compounds will accumulate on the earth.

We are now prepared to follow the changes which this important element undergoes. In the first place we learn that plants are capable of appropriating nitrogen directly only in the form of nitrates, or possibly as ammonia compounds to a limited extent. Starting with such compounds in the soil, the plant absorbs them and for the most part builds up protein. In this form a part of the nitrogen is returned to the soil with the death of the plant. From this point we shall trace it later when animal proteids are considered. The nitrogen from another portion of the plant proteids will reach the air in a free condition, as the result of oxidation. Still other portions of vegetable matter will be appropriated by animals. In the animal body some of these proteids will be converted into animal protein and be stored up in the body, while the rest is metabolized and finally excreted in the form of urea, a comparatively simple compound of nitrogen. Upon the death of the animal that which has been appropriated by the body is returned to the soil.

We thus see that a portion of the nitrogen which left the soil as plant food has reached the atmosphere while the

rest is again returned to the soil as vegetable protein, animal protein and urea. These compounds are complex and cannot in their condition be appropriated by plants. It is here again that the soil bacteria play an essential part in the great life processes of nature. These compounds are food for the bacteria and in maintaining their vitality are broken down into simple substances. The moment organic matter ceases to live it is set upon by these bacteria if the conditions for their growth prevail. It is the province of this form of life to restore the elements of the complicated compounds built up by plants and animals, to the soil in simple combinations which may be used again. Such bacteria may, for convenience, be termed

DECOMPOSITION BACTERIA

and this includes many species; some producing products of one kind, some another. These may be divided into two types; aerobic or those capable of developing in the presence of free oxygen, and anaerobic or those which are active only in the absence of free oxygen. The decomposition products resulting from anaerobic germs, as a rule, are still complex and may be further reduced by the aerobic. The products resulting from bacterial life are numerous and their nature depends upon three factors; the character of the decomposing material, the kind of bacteria and the conditions in force. Those which concern us most, however, are the nitrogenous products. These may be the result of secretion, or they may be by-products given off as the bacteria appropriate what they require of the compound for food.

One of the most universal types of

decomposition is that which yields ammonia. Many species have the power to bring about this kind of fermentation and it may be said that all complex nitrogenous compounds may thus be converted into ammonia under proper conditions. There are bacteria, however, which will reduce these compounds completely, setting the nitrogen free, a condition in which it is beyond the reach of plants. Not only is this the case but there are bacteria which may seize upon the ammonia compounds and liberate the nitrogen from them. Such bacteria, so far as we know, are inimical to agriculture and we may well consider the conditions favorable to their growth so as to be in a position to counteract their influence.

1. It has been found that they do not develop well if plenty of air is present. This calls for thorough stirring of our soils.

2. An abundant supply of fresh organic matter stimulates them to great activity. Caution is demanded then in turning under a great mass of vegetable matter, as much of it may be wasted.

In all soils there are organic compounds undergoing decomposition. If the amount of organic matter present is excessive we frequently have a loss of free nitrogen due to the activity of denitrifying bacteria, or there may be a loss of ammonia from the absence of sufficient acid to fix it. Usually, however, acids are formed in sufficient quantity to combine with the ammonia. Humus also results as a product of the decomposition. The nitrogen in the humus and that in the ammonia compounds is at best only slightly utilized by plants, so another change must occur before the nitrogen completes its cycle. This final

change consists in the conversion of the ammonia compounds into nitrates. This is accomplished in at least two stages.

The ammonia is first converted into nitrous acid and this in turn is taken up by bacteria and converted into nitrates.

The honor of first isolating and explaining these bacteria fell to a Russian naturalist. Windogradsky, who accomplished this a little more than ten years ago. These nitro-bacteria are found to a greater or less extent in all soils and under proper conditions they finally bring back the nitrogen to the form best suited to plants.

THE CYCLE OF NITROGEN.

We, therefore, see that nitrogen like carbon may continue in an unbroken cycle. Starting as nitrate in the soil it enters into plant life, converted into protein and passes into animal life only to be returned to the soil as urea, animal proteids and like bodies. The various bacteria of the soil tear down these compounds, a portion of the nitrogen passes into the atmosphere, the rest is converted into ammonia then into nitrous acid and finally into nitric acid, which combines with the soil bases to form the nitrates. It is well worth while to study the action of these nitrifying bacteria so that we may aid them in serving us. It may be well to state that some bacteria will reduce nitrates and liberate the nitrogen when certain conditions prevail. Such takes place when much organic matter is present with these compounds. The nitrifying organisms differ materially, in some respects, from the others which have been considered. In the first place they do not live on organic compounds and in fact

will not develop in the presence of such matter, especially if it has not reached an advanced stage of decomposition. It has been found that these bacteria can assimilate the carbon dioxide of the air and flourish if only mineral matter of the proper form is furnished. The nitric bacteria will become inactive if much more than a trace of ammonia is present, while the nitrous bacteria depend largely upon ammonia compounds for food, converting it into nitrous acid which in turn is food for the nitric organisms. In the second place, these bacteria do not require sunlight, on the other hand, by it their action is retarded. This with the capacity for living without organic food is in striking contrast with other forms of life.

The presence of too much moisture in the soil and the absence of a good supply of air retard the bacteria and may render them entirely inactive.

As before stated the product of these germs is acid, and it is a well established principle that any form of life will become extinct unless its products are removed or changed. So with these bacteria an excess of acid in the soil is fatal to its development. Inasmuch as they constantly yield nitric acid it is important that bases be present in the soil to combine with this acid and keep the soil neutral.

On account of the acid character of forest soils we find them to contain few nitrifying bacteria, a circumstance which helps in making such soils hard to manage the first season.

Having thus briefly touched upon some of the functions of the more important soil bacteria let us now consider how we may cooperate with them in bringing about the best results. Much

light is yet to be thrown upon the subject by future investigations, but the knowledge already gained enables us to act more intelligently in the management of our soils.

THE COOPERATION OF THE FARMER.

If in the first place we have a soil which is not responding to fertilizer or if it is well supplied with plant food and does not perform its functions, we may then expect to find some condition which is adverse to the normal action of bacteria. We may then look to the drainage and see that the soil does not remain too wet. Deep plowing in preparing the land is necessary to insure thorough aeration. If these conditions are all right we may find the soil too acid for proper nitrification. In such an event an application of lime would neutralize the acid present and permit active nitrification to start up. This perhaps is too frequently overlooked in our soils many of which contain more than 99 per cent of silica. Again, as is sometimes the case, the bacteria are either so limited or so feeble that a more active form should be added. This may generally be accomplished by an application of stable manure as it contains many of the more common bacteria.

In the application of fertilizers if we desire immediate results from the nitrogen let it be in the form of nitrate of soda. Should we use sulphate of ammonia we must see that our soil contains sufficient lime to neutralize the acids produced in the nitrifying process which must follow.

If our soil is rich in organic matter, we should avoid the use of nitrate of soda unless in very small quantity, for

the conditions exist for it to be dissipated by denitrifying bacteria. As a rule it is well to avoid mixing organic substances with nitrate of soda for fertilizer.

The practice of allowing land to lie fallow is harmful, as the nitrates formed from the organic matter will be leached out or reduced by bacteria. It is best to have a catch crop for land not in cultivation. Cover crops on our white sandy soils will shade the ground, protect the nitrifying germs from the harmful effect of the sunlight, and prevent direct oxidation of the organic matter present.

SOIL LOSSES.

In considering the cycle through which nitrogen passes it will be recalled that portions of it escaped in the air as free nitrogen where it is beyond the reach of plants. These and similar losses are constantly going on which may be summarized as follows: by oxidation and other chemical means, by denitrifying bacteria, by leaching of soluble compounds from the soil, by sewage and other wastes which reach the sea. This waste in the aggregate is a tremendous loss to agriculture and we see many of our cultivated farms becoming steadily poorer, and in some cases lands which were at one time fertile are abandoned as unprofitable. We see on the other hand that out forest land while suffering some of these losses not only retains its fertility but is actually gaining in this respect. It is highly important that we should familiarize ourselves with the conditions by which the equilibrium of the nitrogen content of our forest soils is maintained and modify them if possible so that the same results may follow in the cultivated field. It has recently

been shown that some bacteria have the power to assimilate nitrogen from the atmosphere and convert it into nitric acid. The best known species, perhaps, is *clostridium pasteurianum*. Efforts have been made to increase the fertility of soil by inoculating it with alinit which contains bacteria (*bellenbachiensis*) having this power, though on the whole no great advance has been made in this direction.

As is well known, certain organisms in symbiotic development with the rootlets of leguminous plants have the pow-

er in a marked degree of assimilating atmospheric nitrogen. This is appropriated by the plant and is thus reclaimed from the inexhaustible supply of air. From one to two hundred pounds of nitrogen may be added to an acre of ground in one season by this process. Sooner or later this method must become very general and it will meet every demand until a simpler process is discovered. In the mean time we may face the problem of maintaining the nitrogen in our soil without fear of defeat.

Report on Nut Culture.

BY PROF. H. HAROLD HUME.

Mr. President, Ladies and Gentlemen:

Last year, if I remember correctly, no report was made by the committee on nut culture, hence in this first report, as a member of the committee, I shall try to bring before you the present status of nut culture in Florida.

At the present time four different kinds of nuts are grown to a greater or less extent in Florida— viz. the pecan, cocoanut, Japan chestnut and Japan walnut. The English walnut and almond have been tried with very indifferent success and it is highly improbable that the culture of these two nuts will ever amount to anything in Florida. For this reason they are not included in the list. Of the four kinds mentioned the pecan

is of the greatest importance and I shall leave the discussion of it until the last.

THE COCOANUT.—*Cocos nucifera Linn.*

The cocoanut is adapted to the coast sections of Florida from about Lake Worth southward on the East Coast and from about Charlotte Harbor, southward on the West Coast. North of these points they may be grown and in certain localities may be successful, but on the whole they eke out a rather precarious existence and are to a very considerable extent at the mercy of climatic conditions. When removed inland the cocoanut is not a success, and proximity to salt water appears to be a requisite portion of its habitat and environment.

The most extensive plantings of cocoanuts within the confines of Florida are in Dade county. In 1896 it was estimated that on the Florida East Coast and largely within the above mentioned county, there were 250,000 trees, and a conservative estimate for the whole state at the present time would be 350,000 trees.

In 1889 and again in 1890, importations of nuts, for planting in Florida, were made from the Philippines. The importations were composed of fourteen varieties and were forwarded to various points on the coast by the Agricultural Department. It was believed that these might be superior to those already growing in Florida. So far as I am aware nothing is known regarding the success of these varieties, though it is probable that they have fruited by this time.

In other portions of the world the various parts of the cocoanut trees are put to a far greater variety of uses than with us. Practically the only part of the tree valued by us is the nut.

At the present time the cocoanut is not of very great importance commercially in the state. Why? Simply because imported nuts of good quality can be secured in our markets at a very low cost. This cost is so small that we can scarcely hope to produce them for less and since ours are in no wise superior to the imported ones, the industry is likely to remain in its present status unless favored by some unexpected good fortune.

JAPAN CHESTNUT.—*Castanea Japonica*
Blume.

Quite a number of trees of Japan Chestnuts have been planted out in Florida and in some cases a considerable

amount of fruit has been obtained, but for some reason or other this nut has not attained much prominence in Florida. What has been at the bottom of the trouble, I have been unable to ascertain. Many large trees are to be found and some bear a considerable amount of fruit.

I believe it would be an excellent idea to cross the Japan chestnut with our native chinquapin. The chinquapin is quite at home with us, it fruits heavily, and there is no good reason why crosses may not be secured. The results of such crosses would, in all probability, give us a chestnut of good quality and size, at the same time suited to our conditions in all respects. The field for experimentation in this direction is open for some horticulturist.

JAPAN WALNUTS.—*Juglans Sieboldiana*
Max and *Juglans cordiformis Max.*

These two species of the genus *Juglans* resemble one another to a very considerable degree and are adapted to practically the same conditions of soil and climate.

The chief point of distinction between the two is in the fruit. The nuts of *J. cordiformis* are quite smooth, pointed and creased down the center from base to apex, giving them a decided heart shaped appearance, while those of *J. Sieboldiana* are large, thick shelled, not quite so pointed and more or less creased and furrowed over the whole surface.

J. Sieboldiana appears to be the one most commonly grown in Florida. The nuts are produced in large clusters. They are difficult to crack but the meat is of very good quality indeed. As an ornamental it makes a picturesque object

in any landscape—the leaves are very large and beautiful. The tree has a symmetrical spreading top and on the whole is an object of beauty.

J. cordiformis should receive more attention than it now does. It is probable that this variety is growing in the State, but I have not yet seen fruit from it. It is said to be quite variable in size and shape and the specimens which I have seen were much thinner shelled than were the nuts of *J. Sieboldiana*.

THE PECAN.—*Carya olivaeformis*, Nutt.

This valuable nut has been cultivated for many years in various portions of the South, but within the last two or three years a much greater interest has been taken in its culture than heretofore. In the Horticultural field it has received a very large share of attention, but no more attention has been bestowed upon it, I believe, than it deserves, for the prospect for the pecan industry is good. Hundreds of trees have been planted and the demand has been much greater than our nurserymen could supply.

I am sorry to say that some unscrupulous and ignorant people have either taken advantage of the situation, or have imposed upon their equally ignorant and unsuspecting patronizers.

Practically the same ground has had to be fought over in relation to pecans as in relation to other fruits. It was long ago proved beyond the shadow of a doubt that the great majority of fruits would not come true from seed. Some one said once that pecans did not vary from the seed and that 75 per cent would be true to the parent plant, and the public believed it then and is believing it now; believing it to such an extent that they are willing to pay from

one to three dollars for a seedling pecan tree. That statement was based either on a theory, and a false one at that, or it was made on a very small amount of evidence—the pecan is as much inclined to vary as is any other tree, and the groves in the country today are the proof. When the seedling groves were planted what kind of nuts were secured? The very best that could be bought. What kind of fruit is being produced? Nuts of variable size, shape and quality—that point is settled once and for all by the data in hand, and one hard cold fact is enough to settle an inconceivable number of ill-founded theories. The pecan cannot be depended upon to come true to seed.

As I have already stated the demand on our nurserymen for budded and grafted trees has been very heavy, the supply has by no means been equal to the demand. Unscrupulous men have taken advantage of this and trees which were neither budded nor grafted have been sold as such and at the price of the genuine article. A considerable number of these have fallen into my hands and a most careful and conscientious examination failed to reveal the insertion of bud or graft.—These trees have been sold in large quantities by tree peddlers both in this and other states and to the would be purchaser I would say, "Beware of the tree peddler"—buy from a reliable nursery firm, it is your only guarantee.

Again it has been stated that the pecan has no enemies and the statement has been vouched for by many, and so it may have seemed. Last year I called attention to the fact that *Cercospora Halstedii* E and E., a fungus, has been found on the pecan and that it did con-

siderable damage to young trees. This year a bud worm or two have been forced upon our notice, wide spread in distribution and destructive in habits. In many particulars they resemble the apple bud-worm. I am firm in my belief that they can be controlled—Prof. Gossard has given a considerable amount of time and study to these insects and they are in good hands. In his report he will deal with them.

I have mentioned these things simply to show that in the pecan industry there are rocks to guard against, there are obstacles to be overcome just as in every other industry. Nothing that does not require effort is worth procuring and if it were not so wherein would lie the profit?

PROPAGATION OF PECANS.

As you are already aware I have declared myself uncompromisingly in favor of the grafted or budded pecan. And this in spite of statements to the effect that it will not live long, that budding or grafting is an unnecessary labor, that it will not bear well, notwithstanding. For all these statements are not borne out by the facts of the case.

The price for grafted pecans (I use the term for both budding and grafting) is high as compared with other trees. Why? It appears in the first place that the pecan is difficult to work, inherently so, and just why it is so it is difficult to say. I am confident that in many cases, however, the insects already referred to play no small part.

The seasons during which the pecan may be worked are in the spring, just before, and up to the time when growth starts and again in summer dur-

ing August and the first week or two in September—the methods which have given the best satisfaction are whip grafting and veneer-shield and annular budding. Whip grafting should be done in spring and only on small trees. The earth should be removed from about the tree and the graft inserted four or five inches below the surface of the ground and the ground then replaced, leaving one or two buds above the surface. The work is performed briefly as follows:

A sloping cut, an inch and a half long is made diagonally across the stock. A corresponding cut is made on the cion, a tongue is raised about the center of each cut by making another cut with the budding knife held almost parallel to the sides of the wood. The tongue is raised a little on both stock and cion and the two are shoved together. They should be securely bound with a strip of waxed cloth and a layer of grafting wax should be spread over the whole, covering up all the cut surfaces to the exclusion of water, air and the germs of decay.

The cion and stock are preferably chosen of nearly the same size, but a cion somewhat smaller than the stock may be used, in which case the cambium layers along one side of the surface in contact should be placed opposite each other, and the projecting portion of the stock trimmed off.

Now this method will likely give much more satisfactory results if the ground be quite moist and I scarcely deem it advisable to use it unless such be the case. Usually, however, if we can get down deep enough, sufficient moisture can be found. In Louisiana and Mississippi this method is the one commonly used.

BUDDING.—Budding is usually performed in August and September though Dr. Curtis has informed me that last year he was quite successful with budding in spring. By this method stocks three-quarters of an inch or less in diameter may be worked. It is preferable that the stock and cion be of the same size. From the stock remove a ring of bark from one inch to one and a half inches long. On the bud stick select a good plump bud and from it remove the bud by taking out a ring which will exactly fit that already made on the stock. To do this it is necessary to make a slit on the side of the ring opposite that on which the bud is. The ring of bark should then be carefully removed and placed upon the stock in the place already prepared for it. Following this the bud should be securely tied in place, using a strip of the waxed cloth. The bandage should be brought around the stock so as to cover the cuts, but the bud should be left exposed.

VENEER SHIELD-BUDDING.—If this method be used it is not essential that the stock and cion be of the same size, and so far as size alone goes almost any stock may be used. A rectangular piece of bark is removed from the side of the stock. From the bud-stick a bud is cut in much the same way as already indicated for the annular method. If the stock is larger than the cion, it will be necessary to flatten out the cylinder of bark, which holds the bud. Having placed the shield of bark in position, it should be firmly tied. It is very essential that the bud be tightly tied in place.

SOILS.—While the pecan will grow on a wide range of soils, still it has its preference and it appears to me that land which bears or has borne a forest

cover of magnolia, holly, hickory and oak, or flatwoods land with a good subsoil is best adapted to the pecan. Considerable moisture should always be at the disposal of the tree.

CULTIVATION.—The pecan grove should be cultivated and fertilized very much as other trees are treated. Crops may be raised to advantage among the trees until the ground becomes too much shaded. If this is not done, I recommend clean culture from March until July and a beggarweed cover crop from that time on. It is necessary on most soils to cut the beggar-weed once or twice during the season else it will become very hard and woody and it is difficult to plow under even after it is dead and partially decayed. Before gathering the crop in autumn a cornstalk breaker should be run over the ground to break down the beggarweed and the ground should be cultivated.

Do not allow Bermuda grass to get possession of the ground as it makes it very difficult to cultivate and it should be borne in mind that while fertilizing may take the place of cultivation, a little cultivation will take the place of a very considerable amount of fertilizer.

FERTILIZING.—Because the pecan is a large vigorous grower it is believed by many that no fertilizer is needed but that is a wrong view to take of the matter. The trees should be fertilized and the amount given should be governed by the bearing capacity of the tree. The fertilizer used should contain about 6 to 7 per cent phosphoric acid, 8 to 10 per cent of potash and 3 per cent nitrogen.

GATHERING AND GRADING.—Usually it is not an easy task to gather a crop of pecans, and this is largely because

the nuts do not fall readily. No attempts should be made to collect the crop until it is completely ripe. In gathering a large sheet should be spread under the tree. This sheet may be square or circular and a piece should be cut out of it from the edge to the center to permit it being placed about the tree. If the nuts are perfectly ripe and the husks open, they may be dislodged by shaking the branches. For this purpose a long light pole with a hook on the end is an excellent tool. The hook may be slipped over the branch which may be then violently shaken without climbing the tree.

After gathering, the nuts should be spread out and allowed to become perfectly dry before packing.

DISCUSSION.

Mr. Robinson: Have you had any experience with the borers? I found saw dust around the tree and in time it was full of borers.

Prof. Gossard: It was one of the "sawyers" as they are called. They are in the habit of entering the ground. The egg laying might be prevented by in-

closing the trunk of a tree near the ground.

Mr. Robinson: They make such holes that in some places I can run a lead pencil into the tree.

Mr. Gillett: I have about two thousand trees under cultivation. I find the same trouble Mr. Robinson speaks of. They did beautifully all last year, but this spring a borer had evidently killed them. I always supposed this was a sort of beetle and could not be killed.

Prof. Gossard: The only practical way is to pick up the limbs which they saw off and burn them. If the limbs are picked from the ground in the fall of the year and burned, they are destroyed very largely.

Mr. Gillett: I have had my men cut the old limbs off and carry them away and burn them, but these insects still stay and I can not understand how to get rid of them.

Mr. Robinson: In this connection I wish to state that I wrote to the Governor of Texas and he replied that the sawyer was a benefit to the pecan tree. I have never had any serious trouble with them and think Mr. Gillett need have no worry over it.

Strawberries and Other Small Fruits.

REPORT BY C. M. GRIFFING, OF THE COMMITTEE

Little can be said by the writer on strawberry culture, and, in fact, I think our worthy president made a mistake in selecting the present committee to report on this subject. As for myself, I have never grown strawberries other than for home consumption, and I have received a letter from Mr. Jones stating he has never grown them in any way; and while I have had no communication from Mr. Graves, yet I believe he is in a like position. When strawberries are eliminated from the list of small fruits other than tropical, that are adapted to Florida, there is practically nothing left to report on. Currants and gooseberries and the cultivated varieties, that are so largely grown in the north, of blackberries, black caps and raspberries, are not a success in Florida.

In view of the above facts little can be said relative to strawberries, that would be of interest to the Society; the general and fundamental rules of strawberry culture having been reported and discussed in previous meetings. The question of varieties best adapted to the several sections, their respective carrying qualities when wanted for shipment, and the quality of fruit when wanted for home market and table purposes, should be and I hope will be thoroughly discussed.

There seems to be no question about the production of a superior quality of

fruit, and in paying quantities, when land adapted to their culture is selected. As the writer understands, the best land adapted to strawberry culture is what is better known as high flatwoods land or that which can be easily drained. Land lying along the border of small streams is usually selected, and if possible, it is better to have it underlaid with a yellow subsoil, similar to that adapted to orange and peach culture.

From conversations with some of the larger strawberry growers who are in attendance at the meeting, we have learned that the mode of planting and cultivation is about as follows:

The land is thoroughly broken and plowed up in beds from 15 to 20 feet in width, leaving the dead furrows for ditches between the beds. On these beds, rows are usually planted lengthwise from 30 to 36 inches apart, which allows for horse cultivation, and the plants are set during the latter part of August and first of September. Clean cultivation is practiced up until the time the plants commence to blossom, when pine straw or wire grass mulch is used to prevent berries from becoming sandy and also does away with future culture during the time when the fruit is setting and ripening.

I find quite a diversity of opinion as to methods of fertilizing, but I believe that the majority of growers use from

eight to fifteen hundred pounds per acre of the standard strawberry fertilizers as manufactured by several of our fertilizer companies in the State, about half of which is applied before plants are set and the remaining half in December or the first of January.

With further reference to blackberries and other small fruits, I would suggest that it would be profitable to the State for members of the Society to experiment by selecting some of a better quality of the common briar berries or blackberries and dewberries, that are found so abundantly in old deserted

fields and around the fence corners, for while none of the blackberries so largely cultivated in the North and East are a success in Florida, yet I confidently believe that varieties adapted to this State can be found that are equally as good as those found in the North. The same might also apply to huckleberries. I can see no reason why Florida should not ship large quantities of huckleberries and blackberries to the market from six to eight weeks in advance of the crop that is grown and so profitably shipped from the Carolinas and Virginias.

Varieties of Strawberries.

The following paper was prepared for the 14th quarterly meeting of the South Texas Truck and Fruit Growers' Association held at Alvin, Tex., and is equally applicable to Florida.

It is seldom that a person contemplates entering the strawberry business that he does not first seek to find the "best all round variety." But after he has grown strawberries for a few years he no longer thinks of growing only one variety.

The Michel is one of the earliest berries grown and the past season has, I understand, made more money for the growers around Alvin than any other variety. This is doubtless one of the best to grow, but notwithstanding its earliness, my first shipment last season was the Lady Thompson, shipped March 18, although it is a much later berry. The reason of this was that the

bloom and unripe fruit of the Michel is much more susceptible to the frost than the Thompson. The cold of the 23rd of last February, running the mercury down to 26 degrees, caught the young berries of the Michel of all sizes, killing them back, while the Thompson escaped injury, hence came on and matured in advance of the Michel. Had this freeze come two weeks later I would have had a fine lot of Michels for the market a week or two earlier than I did and then the Thompson would have come in just as they did.

While the bloom and immature berries of the Michel will not stand freezing like those of the Thompson, the plant is quite as hardy and drouth-resisting as the Thompson. Out of my sixteen varieties the test of last summer's drouth develops the fact that plants of the Hoffman, Michel and Thompson will stand the

drouth better than the other varieties, resisting qualities in the order named. The plants of the Tennessee all died. Those of the Brandywine, Noonan, Excelsior and Klondike are unable to stand the drouth equal to the others; yielding to the drouth in the order named. It can generally be relied upon that the best shippers, like the Hoffman Thompson and Noonan, will stand frost better than the softer berries like the Michel. The reason of this is undoubtedly because the excess of acid they contain, together with their firmness, rendering them better shippers, are also the qualities that enable them to withstand a greater degree of cold.

With me the Brandywine has proved to be virtually worthless. The berries are very large and prolific, but the flesh is exceedingly soft. The skin is very thin and the stem so tough and woody that it is almost impossible to pick a thoroughly ripe berry without injuring it. Besides this, the berry is remarkably ill-shaped and they are generally thoroughly ripe on top while the under side is still very green.

The productive powers of the Klondike are something wonderful, but for the best results they should have plenty of moisture.

Through my limited experience I conclude that if there is a better all around berry than the Thompson it is the Hoffman, although I hardly think it quite as prolific or as constant a bearer as the Thompson.

Unquestionably there is a best variety, but when we seek to find a berry which possesses all the good qualities, now known to exist in the strawberry, it will be a vain hunt. It is not possible for one variety to possess all the qual-

ties required to meet the demands of the growers and consumers, for should such a berry be found it must necessarily be of the most prolific, best colored, best shape, plant must be the most drouth-resisting, most constant bearer, best on old ground, best on new ground, best without fertilizer, best with fertilizer, easiest picked, best to ship, best for home use, earliest, firmest, together with all the various other flavors to please the innumerable fancies of the 10,000 fastidious epicures. And when you get that kind of a strawberry you will have a "peach."

[The Secretary will here introduce two letters concerning the Klondike strawberry, which are instructive; the first from a grower, C. H. Churchill; the second from a commission merchant, P. M. Kiely, of St. Louis.]

You wished me to write you more fully about the Klondike strawberry.

I think now it is the coming plant for Florida, it has so many good points —that is, if it does as well in South Florida as here, and by all reports it does.

I have tried in the past fifteen years every plant I had any idea would do here, and have never yet found its equal.

The plants are vigorous and healthy and make great quantities of strong well-rooted plants; both for early and late setting.

The plants are very productive, even when set as late as the middle of October, as they start quick and grow rapidly.

The bloom is perfect, very free from blight, and is better protected by the foliage of the plant than on any other plant I ever saw. Both the bloom and

fruit are so well protected that it takes a severe frost to damage them.

The fruit averages large, there being few small berries, and the berries are firm and of a rich, bright, attractive red color.

The carrying quality is equal to the best. I shipped most of my fruit to Boston by freight refrigerator cars, and the Klondike berries always sold for 5 cents per quart and nearly always 10 cents per quart more than my Lady Thompson and Cloud berries shipped in the same car. They sold on May 3 for 35 cents per quart when other berries in the same car sold from 18 to 25 cents. Everyone that saw the plants in fruiting time was pleased with them, and there will be a large call for that variety here.

I notice in your last issue a letter from C. H. Churchill, Lawtey, Fla., in praise of the Klondike strawberry. We think from our experience in handling this variety the past season that it merits all the good things said for it by Mr. Churchill. It is true most of those we handled were from Mississippi and Louisiana, but we think it is equally well adapted to cultivation in Florida. It sold for fully 10 per cent more than any other variety coming at the same time. The Lady Thompson, which we regret to say is grown too extensively in your State, should be discarded, especially while such varieties as the Klondike can be had. It is too perishable and can't be relied upon to stand up any length of time. I am not unmindful of the merits of the Cloud and Noonan, which in past years made so much money for Florida shippers, and would keep some of each in sight until the experimental stage is entirely passed with all other sorts.

Mr. Embry: I have met with fine success in marketing these products, have shipped the dewberries in April in refrigerator boxes and obtained as high as forty cents per quart for same in Pittsburg market. Have sent a great many crates of blackberries to Atlanta in May and received 15 cents per quart for same when strawberries brought only 12 1-2 for choice stock.

I knew an old field, the owner of which usually rented it for \$2.00 per acre for corn and a wide awake man near it rented it and kept it for dewberries, from two acres of which he gathered thirty bushels for which I paid him \$90. The productive capacity of the land in corn was only about fifteen bushels per acre with first class cultivation and one can readily see that it was five times as profitable to keep it for berries.

Prof. Hume: We have been planting dewberries on embankments by way of experiment. It has been very successful this season but one of the drawbacks is that the thrips destroy it but that is due to the late blooming season. The fruit is very large, about three-fourths of an inch in diameter. Seventy of the fruits will make a quart. It is a very desirable variety and I will say that I am very anxious to have the thing tested and I want to know if it would not do to plant in other portions of the State, and if any of the members would like to try it I would be glad to send some plants this fall. The fruit is quite firm and dark. There is one tendency on the part of every one of us and that is that we want something to ship, but once in awhile I want something to eat. During the picking season on a bed of sixty feet by six, we picked sixty quarts.

Rhubarb Culture.

REMARKS BY DR. H. E. STOCKBRIDGE.

Dr. Stockbridge introduced his remarks by an anecdote and then continued; it seems to me gentlemen, that we can arrange to make a little change in our conventions. We have standing committees on which every member must have a place. These committees report on the same subjects every year. The result of having the same committees is that the same ground is gone over annually.

Now I make a suggestion perhaps worthy of consideration, is it not possible that the system could be changed so that we can secure a little more specific, healthful, important information, on a limited number of important subjects rather than attempt to go over the whole great field of horticulture at each meeting?

Let me illustrate by the practice of the Georgia Horticultural Society of which I am a member. That society selects a few subjects to discuss. In this way the society covers at each meeting only a limited ground, and its experts bring together in this way authoritative information on limited fields, instead of going over the same subject each year. I make this suggestion partly because of the experience of the Committee on Vegetables on which I was appointed, which comes before you with little to offer. But I will not leave the

floor without offering a few thoughts on the subject to which this committee is supposed to give its attention.

I will report on one vegetable which it has been thought we could not cultivate in Florida. Now, I believe I can tell you how rhubarb can be grown here.

It must be borne in mind that the rhubarb plant possesses certain characteristics of tubers or bulbous plants, namely, that its roots are large, approaching the bulbous form and contain large quantities of starch utilized as the food source of nutriment for supplying the early spring growth and the succulent stemmed leaves with nourishment before the natural process of the assimilation of soil and atmospheric food begins. As is characteristic of such plants, of which the Irish potato is perhaps the best illustration, a period of dormancy is absolutely necessary to the performance of the natural functions of the plant and its normal development. The reason, therefore, why rhubarb has not succeeded in Florida depends upon the fact that our climatic conditions make a continuous growing season with no interval of dormancy, only after which the rapid growth, indispensable to the formation of rhubarb leaves from the stored up food in the roots, is possible. It seems, therefore, that all that is necessary to the propagation of

rhubarb in Florida is the artificial securing of a dormant period.

This fact has been utilized by market gardeners in the North who have for several years made rhubarb production under glass quite an extensive business. The roots utilized for this purpose are allowed to freeze in the early winter and are then transferred to a green-house where the warmth immediately starts leaf development and the rapid assimilation of the stored up food is followed by the production of commercial rhubarb. The thought occurred to me that the transfer of these dormant roots to Florida would result in the same development. Early this spring, therefore, I sent to Vermont to obtain roots or stools of rhubarb which had lain dormant through the entire winter.

These were transferred to the warm garden soil of Florida, the experiment being tried both in the open air and under shade and resulted in the development of rhubarb in every way comparable to that produced by either open spring culture or green-house winter culture in the North. I find, however, that the plant thrives best without direct exposure to the sun and therefore that shaded culture is preferable.

No fertilizer is required for the development of rhubarb in this way, since the growth results entirely from the stored food in the root rather than the assimilation of food from the soil. I believe, however, that later in the season the proper fertilizing of the plants and a year's natural growth would result in the production of roots which, if subjected to artificial cold by transferring to cold storage, or if by other artificial dormancy could be induced, Florida

grown roots would be equal to those brought from the North. However, as suitable roots are offered by Northern gardeners at about \$5 per hundred, there would seem to be no serious obstacle to their use. The amount of rhubarb which can be thus secured in a season would seem to be about equal to the product obtained from Northern field culture as the result of two or three cuttings.

There is certainly in the very early spring, a great demand for rhubarb at profitable prices, which, I believe, could be secured by the Florida grower in the manner outlined. Should the method not prove commercially feasible, it certainly would place many Floridians in a position for satisfying their craving for rhubarb pie. Had the Society accepted my invitation to hold its next meeting in Lake City, it would have been my pleasure to have satisfied this craving myself and to have personally demonstrated the practicability of this method. Under the circumstances however, I am only able to offer the suggestion, that here is the means by which the members of the Society can supply their own pie.

Mr. Painter: I have had some experience in raising rhubarb and there is one thing I have found out that is absolutely necessary and that is to get the roots each year from the North. As far as a place to grow rhubarb is concerned, I find that under the house with plenty of moisture is better than grown in the light.

Dr. Stockbridge: I have thought that the present character of the growth of the rhubarb demonstrates that the plant is thrifty in Florida, if we could only

keep it through the summer. I believe we can keep the roots in cold storage and then transplant them the next year.

Question: Which is the best time for planting, in February or March?

Prof. Stockbridge: Thirty days is sufficient time from putting out the root to maturity.

Mr. Painter: Roots two years old give the best results.

Report of the Committee on Entomology.

BY PROF. H. A. GOSSARD, CHAIRMAN.

I shall first allude to some of the investigations and observations made since our last meeting, and then invite a general exchange of experiences on some of the mooted questions of entomological practice.

Exceptional damage has been inflicted by few species of insects during the past year, only the curculio and the mites being reported by correspondents more frequently than usual.

referred to one of two species, either *Tetranychus mytilaspidis* or possibly *T. bimaculatus*. Specimens not reddish may be the six-spotted mite, *T. sex-maculatus*, with or without its characteristic markings, or they may belong to the species previously mentioned, having dropped their reddish color. These three species are the most common ones on citrus, though others are not excluded.

CURCULIO.

We believe that jarring is the one practical remedy for curculio. It should be remembered that this insect is pioneering in Florida at present, and therefore at its worst, and that its ravages will become less severe as the years pass, though from its habits it is more sheltered from the attacks of natural enemies than most insects.

THE PECAN BUD-WORM.

Considerable study has been made of the pecan bud-worm this season. I find, however, that I am dealing with two species of moths of quite similar habits

and it may take another winter's observation to settle definitely all the questions connected with their life histories and habits. Last October I located the winter state of the bud-worm in a minute silken-lined cocoon close pressed against the bud, precisely as is that of the apple bud-worm of the North. The caterpillars issue from these cocoons in the spring while the buds are opening and at once begin entering both the bloom and leaf buds. I have counted as many as eight caterpillars on a single bud, from which may be inferred how little is the chance that such a bud would have of surviving if used for propagation by budding, or what would happen if a graft with such badly infested buds were used. Fumigation is said to kill the apple bud-worm and while the cocoon of our caterpillar seems very tight, it is possible that hydrocyanic acid gas will destroy it and also that fumigation can be practiced with orchard trees not over ten to twelve feet in height. I believe from present knowledge and experience that the best remedy for large orchards, containing bearing trees, is found in some arsenical spray, as Paris green, arsenate of lead, or arsenate of lime applied just as the buds begin to swell in the spring. If the application is thoroughly made the caterpillar gets a fatal dose of poison with its first meal and if it is not killed at this time it passes to the inside of the bud out of harm's way.

From a chrysalis, taken from a bud May 9th, I obtained a few days later a moth, not identical with but very nearly related to the apple bud-worm and belonging to the same family. About the middle of May the caterpillars of min-

eola juglandis, the walnut case bearer, became very conspicuous working in the pecan buds, boring into the newly grown stems, and tying the leaves together in twos over its compact, straight, grayish cases. According to Le Baron and Riley the winter state of the latter insect is passed within a case which is fastened to the twigs and it will take another winter's observations to determine whether or not they may also hibernate upon the buds in true bud-worm fashion.

The moths of the grapholithid, which are considered for the present as the true bud-worm, appear about ten days earlier than do those of mineola but the second broods of both species are coincident for a time at least, both being abundant during the first week in July as was observed last year. A third brood of each must appear in the fall, probably during the last part of September. Spring growth of the pecan is sometimes interfered with to such a degree by these insects that no foliage is established upon some trees until in late May. A hymenopterous parasite destroys a large percentage of the worms, also a tachina fly assists in reducing them.

HOME OF SAN JOSE SCALE DISCOVERED.

One of the important announcements for the year, and of interest to Florida and the entire country, has been the discovery by Mr. Marlatt, of the United States Department of Agriculture, that China is unquestionably the native habitat of the San Jose scale, and that in that country as well as in Japan it is kept in practical subjection

by a lady bug, *chilocorus similis*, closely related to our well known two-stabbed lady-bug, *chilocorus bivulnerus*.

It is hoped that this lady-bug will find in this country conditions that are as congenial for its multiplication as they are for the development of the scale, and that the end of the long warfare against this most noted pest of all entomological history has been reached at last. The same lady-bug feeds upon the white peach scale, *diaspis pentagoni*, and if it proves equal to the task of reducing San Jose and also of preventing the *diaspis* from repeating San Jose's history, which it now threatens to do, this achievement by the department at Washington will outrank in value any single piece of agricultural work ever accomplished by any single bureau in the history of the world. However, hopes may be too sanguine and it is possible that many years will yet elapse before we can abandon the methods of warfare which years of experience have developed. A colony of these lady-bugs is promised to Florida whenever the department is able to distribute them.

THE WORK OF THE SAN JOSE FUNGUS.

One of the most interesting sights which has come under my eyes during the year is the forty-acre peach orchard of Mr. John Astleford, of DeFuniak Springs. It was in his orchard that Prof. Rolfs first practically tested the merits of *sphaerostilbe coccophila*. San Jose scale had been in this orchard for six or seven years, the trees are now about twelve years old, every one of them has been scaly at one time or another, and yet but few trees are missing, not more than would likely be wanting if the scale

had never found them, and a good paying crop of fruit is promised this year. The fungus was originally established in about a dozen different centers in the orchard and no further attention has ever been given to it. Surrounding this orchard on all sides, some of them not over one-fourth of a mile away, are other orchards, some of them eighty acres in extent, and into which the fungus was either not introduced at all or too late to be of service; every tree of these is dead and over their erstwhile headquarters desolation reigns supreme, the abandoned dwellings and packing houses only furnishing carnival halls for the bats and pole cats. Experimental work with the fungus at Lake City was not so strikingly successful as here, but the results were encouraging and with such experiences as these, with the insect's original lady-bug enemy being incubated for general distribution, with other correspondents writing us that they have practically exterminated the insect from orchards of four thousand trees without perceptible injury to the trees by the use of crude petroleum, it would seem that any intelligent orchardist may confidently plant all the peaches or other deciduous trees he wants and rest assured that if San Jose scale works ruin to him it will be because of his own negligence. However, I again emphasize that, though you may adopt any one of two or three different policies of action with success, a "let alone" policy will never do and "the goblins will surely get you if you don't watch out."

WHITE FLY AND ITS PROBABLE HOME.

It is now almost two years since I commenced work on the white fly and

a large fund of information has accumulated in my hands, including not only my own observations on the insect's life history and habits but those of many intelligent observers scattered all over the State. Likewise the practical experience of many others in fighting it has been drawn upon and I feel that I am now "getting out of the woods" and can speak with a considerable degree of confidence as to the out-look. However, when I first began upon the problem I could hardly have hoped that I would be as near to the end of the inquiry as I now have a substantial hope of being. Nowadays, if the original home of an insect pest can be located there is always a potential possibility of importing the parasites and natural enemies that keep it in subjection in its native land. Among the inquiries sent out was one addressed to Prof. J. D. A. Cockerell of the Arizona Experiment Station, for many years the world's recognized authority on scale insects and also long interested in the family of aleyrodidae. Prof. Cockerell, recognizing at once the importance of the question propounded to him, generously offered to put into use the rich accumulations of his many years collecting from all parts of the world and upon receipt of sufficient material of *Aleyrodes citri* to make a technical comparative study of our noted species for the purpose of determining its nearest relationships in the world's fauna. The results of his studies are summarized as follows and agree well with the conclusions based upon historical data, that the writer has several times expressed privately to some of the members of this Society.

Says Prof. Cockerell: "I believe that *Aleyrodes citri* is a native of China or

some neighboring country for the following reasons: 1. Its affinities seem to be wholly with an Asiatic or Australian group and particularly with a species found on orange in the Himalayas. 2. Orange trees have been brought to Florida from China and the aleyrodes would be very easily carried with them. 3. Florida has had at least as long as the aleyrodes two scale insects of the orange which are almost certainly Asiatic and very likely Chinese. These are *Parlatoria pergandii* and *Mytilaspis gloverii*. These were probably brought over at the same time as the aleyrodes. 4. *Aleyrodes citri* also occurs on the Cape Jasmine (*Gardenia florida*) which is a native of China. 5. *Aleyrodes* multiplies excessively in Florida, indicating that it is probably not American."

Not knowing that Mr. Marlatt had already returned from the East at the time Prof. Cockerell's conclusions were submitted to me, I urged upon Dr. Howard the advisability of instructing him to keep a look-out for white fly and its enemies in China and India. Just a few days ago I received the following from Dr. Howard: "Mr. Marlatt has not forgotten your letter and is merely waiting a chance to go through his notes and look over his material again. He is not able to reply now definitely from recollection, but is of the belief that he has material illustrating the work of the white fly. You may expect to have a report from him in a few days."

Whether or not the home of the insect has been positively and finally located it seems probable that the orange growers of this State will not allow the question to be unsettled very long, but will find some way to answer the inquiry and also to procure any help possible

among eastern parasites and predaceous insects feeding upon it. Possibly our experience with the Australian lady-bug and the cottony cushion scale will cause us to hope for too much in this direction, and it may be well to sober our expectations somewhat, but it is the opinion of the writer that the promise of reward to Florida is substantial enough to warrant the expense of proving to the extremity all possibilities that may be wrapped up in a search of the East.

ORCHARD FUMIGATION.

Fumigation experiments in the field have been continued in a somewhat limited manner but the results have seemed satisfactory. The Orange Growers' Association of Candler, Fla., a cooperative body, last summer procured an outfit of about twenty-five tents made of painted 6 1-2 cent muslin. About 98 per cent of the white fly larvae and pupae were killed by treatment under such tents and we believe that with a little additional experience the Candler people will obtain results amounting almost to extermination. These tents are hooped with gas pipe, the cost of a tent twelve feet high and twelve feet in diameter being approximately \$9.00, not including the sewing. By using cheaper piping and fewer pipe unions the cost can be reduced \$1.00 or \$2.00 per tent. The outfit of twenty-five tents does not keep four men quite busy. About thirty-five tents could be

used more profitably for the greatest saving of labor and the rate of work would then be approximately one tree per minute. The cost of treating a tree twelve to fourteen feet high, labor included, is less than twenty cents and with perfect economy of labor ought not to exceed sixteen cents. This would just about pay for giving the tree three sprayings of resin wash. Fungous friends are not destroyed or injured by fumigation and hence this treatment recommends itself to some growers as better than spraying, especially where the trees are not large. During the past year the fungous diseases of the fly have probably more nearly proved their ability to cope with the insect on a large scale than ever before.

SHALL WE SPRAY OR SHALL WE NOT?

Much reference has been made in this paper to natural agents for the express purpose of furnishing a basis for discussion between those who may, perhaps, be designated as natural agency advocates to the exclusion of all methods outside of nature's providing for the control of insect pests, and those who are unwilling to lay aside their insecticidal machinery. I shall be especially thankful for specific suggestions from the nature advocates as to ways and means by which I can render the greatest assistance to the State in harmony with the policy they advocate. No inferences should be made from this request that I find no use for insecticides or artificial remedies.

Lettuce Growing as Practiced in the Sanford Section.

BY H. H. CHAPPELL.

The first and most essential requisite is good seed, seed that is fresh and true to name. The variety generally grown in this section is California Cream Butter, though a few are beginning to plant Big Boston.

The next step is the seed beds. The land for this purpose should be well tilled; the fertilizer well worked into the soil, at least ten days before sowing the seed. The beds are usually elevated about two or three inches above the general level, and for convenience in cultivating are made from three to four feet wide. Would recommend at the rate of about five tons per acre of a high grade fertilizer. The writer has found that the richer the seed beds the healthier the plants. They will also stand heat and cold better than poorly fertilized plants. The addition of a small quantity of castor pomace put on as a top dressing, and raked into the soil before the seed is put in will, to a great extent, prevent cut worms. Another troublesome pest we have is ants; they carry the seed off. This is prevented to a considerable extent by hunting their beds out, and saturating them with kerosene oil. The writer has also used old lettuce seed scattered along the sides and over the beds in order to give the ants employment while the good seed is germinating.

For laying off the rows which are

crosswise of the bed a revolving marker is used. This implement is easily made, and certainly is a great time and labor saver. It requires two 1x12 inch wheels with seven laths 1x1 inch, four feet long, nailed around these wheels equal distances apart, and a U shaped frame made of 1x3 stuff, to fit the roller. A handle in the shape of a T made of 1x3 inch stuff about 3x5 feet to pull the marker, the operator walking along the side of the beds. For planting the seed we use a small hand seeder. This is also a time saver. The time for sowing the seed should be governed by the time the lettuce is wanted for market. From seventy to ninety days is the usual time required for maturing good hard heads. Before putting the plant in the field the soil should be put in the best possible condition.

As to fertilizer there is a great diversity of opinion, but a fertilizer analyzing about four to five per cent ammonia, eight to ten per cent potash, and six to eight per cent phosphoric acid, is about right. From two and a half to three tons per acre is about the quantity required for the average Florida land. A quantity of good rotten compost in addition to the commercial fertilizer is always beneficial. This fertilizer should be put on in two applications, one-half of it should be harrowed in or plowed in shallow, and then well har-

rowed, about ten days before setting plants in the field. The other half about three weeks after plants are set in the field.

When the seedlings are about three or four weeks old they are ready for the field. Setting the plants in the field is quite a tedious job, but if properly done there should be very little resetting. In setting the plants the hole is made with a small trowel, the roots inserted, and a back pressure of the trowel firms the soil around the roots, and leaves a slight depression for the water. About a gill to each plant should be poured on from a dipper. The waterer should have a two or three gallon bucket and a dipper.

The number of plants to the acre is governed by the quality of the land, and the amount of fertilizer used. The largest growers in this section plant in fifteen inch checks, which requires about 27,000 plants per acre. After the plants

have been set about a week, cultivation should begin. Running a hand plow between the rows both ways is all that is necessary, but this should be done every week until the plants are too large to get between them with the plow.

Now we have arrived at the harvesting. The field should be gone over and only hard heads selected, old decayed leaves carefully trimmed off, large outer leaves folded over the head forming a rather compact ball. The standard lettuce basket is used. The first layer is put in the baskets tops up, the next tops down, etc., until the basket is snugly filled. The last layer however should be put in bottom up. The packing is very important.

The cash yield from an acre depends entirely on the demand in the Northern markets. Sometimes from \$800 to \$1000 per acre is realized, but in other instances it is "please remit to cover express charges."

Good Roads.

BY A. J. PETTIGREW, OF THE COMMITTEE.

Mr. President, Ladies and Gentlemen:

At first thought it appeared to be an easy matter to prepare a paper on good roads because I had been road overseer several times and thought I was somewhat posted, but a close examination quickly showed what little knowledge I possessed was uncertain and unsatisfactory.

I applied to the Agricultural Depart-

ment of the United States, Section of Road Enquiry, and received a number of their publications which are for free distribution and are really very valuable. A careful study of said publications shows among other things that all necessary experimenting has been done and we need not lose money and time doing any independent experimenting because we can quite certainly know the

results of using clay on sand, of using shells, gravel or various kinds of stone. Also one of the most important things not contained in any of them but which they show very plainly is that good roads do not depend on hills or level land, on sand, clay or stone, on nearness to good road making material, on freezing and thawing or any other such material things; but that they depend entirely upon the people. When the people of any place want good roads earnestly enough to go to work and build them, they have them in spite of all obstacles. If the desire of the people is not strong enough any and all favorable conditions count for naught. Bulletin No. 20 is a record of traction tests and shows on page 13 that it requires twice as much force to move a load on a dirt road where various tires were used as it does on a portion of the same road where four and five inch tires were used, and on page 22 it shows that to move 1000 pounds of load on best macadam road requires a force of thirty-eight pounds, on best gravel fifty-one, on best clay road ninety-eight pounds and on loose sand 320 pounds, and it also shows that a ten per cent grade is as great as should be allowed.

[Mr. Pettigrew here enters upon an analysis of a number of these road bulletins, showing the practical value of many of them; but as they are available to the members of this Society and were written for conditions generally different from those of Florida, the secretary has thought best to omit them.]

Now as to roads in general. Asphalt pavement has proved to be the very best; macadam next best, or possibly not really better than pavement of large

flat dressed stones; next come good gravel roads; next poor gravel and shell after which is sand on clay or clay on sand, sawdust, pine straw, fine marsh grass, sand and mud.

When one man lives a mile or more from any other man he cannot have very good roads, but he had better cut and grub out the palmettoes and worst pine roots than to try and wear them out with his wagon or cart wheels. Two men living close together can do some better, five or more men interested in one or two miles of road can have a very good earth road and only use the time in making it that would otherwise be lost or wasted. The greater the number the better roads they can have and where there are two hundred or more they can in a few years from the start have fifteen miles of first-class macadam road such as they have at Darlington, N. J., and not be in debt for it either.

It takes labor to build roads and nothing else will build them; 100,000 silver dollars could not build a mile of road, 10,000 five dollar bank notes could not, and a thousand 100-dollar bonds could do no better. But in the division of labor as now practiced lumber, nails, and some other things needed in road building can better be bought than made by road laborers. Of the total cost of many roads seventy-five to ninety per cent is labor direct. In most communities there are the labor and material, and experience has proved that it is possible to get the materials in place and the labor done without using much money and I feel sure it could be done in most instances and would cost very much less than for us to borrow money to pay ourselves for building our own road. I wish everyone could read a little book called

the Guernsey Market House. It shows plainly that quite large undertakings can be accomplished with very little money and it is a record of facts.

We of Manatee county are getting along bravely; we have two and a half miles of shell road on the south side of the river, shells laid twelve inches deep and costing approximately \$1,200 per mile. Two miles of it has been in use five years and from repairs made and indications for the future it will cost about \$1200 for the first ten years, which gives \$240 per mile per year for the first ten years, then \$120 per mile per annum thereafter, which proves it to be a very costly road. Eighteen hundred feet of shell road, live shell, six inches deep were laid in Manatee, costing at the rate of \$700 per mile, and it had to be renewed in four years, thus costing \$175 per annum per mile. This is also a costly road. Now we will try some marl or clay which will not be as good and will cost almost as much. After we have spent \$2000 to \$5000 per mile going through the same experiments that have been gone over so many times and have always failed or proved unsatisfactory, we

will build some good macadam roads costing \$900 to \$1200 per mile to construct and only \$10 to \$25 per year to keep in repair and then we will have some good and cheap roads. Also I have some good reason to hope that we will not have to make any very costly experiment with the marl before deserting it.

The construction of good roads is altogether a good business. It is social, brotherly, cooperative; in it, if we help ourselves, we help others. If we benefit ourselves we benefit others. If a whole neighborhood, town or city is benefited by good roads so is the whole county and to some extent the whole State. In the construction of good roads Florida has some disadvantages as well as advantages, but the single advantage of freedom from severe freezing outranks all the disadvantages; and we ought to have the best roads and the most of them according to population of all States in the Union. And now let us all act together, get all the good practical information extant on the subject of good roads, act wisely and sensibly and with never-failing persistence and energy until we shall achieve complete success.

Marketing.

REPORT BY A. J. PETTIGREW.

Mr. President, Ladies, and Gentlemen:

As one of the Committee on Marketing and Good Roads I have prepared this brief paper on Marketing. Last March I wrote to each of the other two members of the committee in regard to making a concentrated effort, but received no reply. I hope they have individually prepared valuable reports.

I am not very hopeful of much improvement over the present manner of marketing our fruits and other produce and have no valuable suggestions to offer. If one man owned all the Florida oranges I am sure they would not be marketed as now. If one or a few men handled, shipped and directed the selling of all our oranges there would be a great improvement at once. But such will never be the case and most likely we will continue as now to send too much fruit at one time to one place and too little to another, and unknowingly compete one with another, greatly to our own loss; and thus continue to prove that anarchy and doing business in a planless manner are unprofitable. While we all know that cooperation and business conducted on some sensible plan for the mutual benefit of all concerned would be profitable.

A limited amount of green and sour oranges early in the season are wanted by consumers and will sell for a good price. Therefore green oranges will continue to be marketed and generally in

excess of the amount wanted and greatly damage the reputation of our good ripe fruit. But later in the season there is no excuse for sending forward Tardiff, King and other late varieties so unripe as to be unfit for eating and by this damage the reputation of these really good varieties. I know of the sale of some King oranges, crop of 1890, at \$12 per box, so early that they were unfit to eat, and some of the same crop sold in March for \$6 per box when perfectly ripe and about as good as an orange can be. An enquiry among the retailers brought out the fact that they had lost money on the immature Kings and that they were not good oranges, but they did not know that the oranges were unripe and probably do not know that all oranges when green are not very good or that any oranges could be immature after Christmas.

And here I will mention an idea to be thought about. Would not the horticulturists of Florida and the consumers of our fruits both be benefited by having it made part of the duty of the Committee on Citrus Fruits of this Society to furnish during the marketing season a weekly letter, mentioning varieties of oranges and grapefruit that are fully mature and varieties that are partly mature and the time when they and other varieties will be at their best, and send copies of said letter to papers in the larger cities for publication?

How Can We Save Our Forests.

REMARKS BY HON. GEO. W. WILSON, OF THE COMMITTEE.

I intended to go into the subject of forestry quite extensively this afternoon but owing to your limited time, I shall just briefly outline the work that has been taken up in the last six months.

Within the last six or eight months the question has become one of great importance to Florida, more important than a vast number of us realize until we go into the subject and more especially the question of protecting the forests which is a great one with our lumber people. Secretary Wilson was in Florida several weeks ago and I spent several hours with him, and he said to me that he had given the question of forestry considerable attention, not from a commercial standpoint, but for the horticultural and agricultural interests of Florida. He has given a great deal of attention to the life of forests and the effect of the forests upon climate and he told me that if our leading men are not aroused to the preservation of the forests, it will be very disastrous to our State.

Capt. Garner, president of the Jacksonville Board of Trade, took up the question very vigorously and growing out of the agitation of the Times-Union and Citizen and the Industrial Record, he prepared a very interesting paper and read it to the Board of Trade and I would suggest that every member of

this Society should get a copy of this paper.

The turpentine people who probably realize more than any one else the danger, came to me and asked that the Industrial Record actively take up the question of protection to our forests. The question concerns the leading men of the industry and something must be done in order to protect it. The forests must be guarded in some way so as to protect young trees from the fires.

My purpose now is to awaken the interest and to appeal to the members of the Society individually and to the Society collectively in this cause.

It is of the most vital importance to the climatic influence upon the State that something should be done in the direction of the protection of our forests. All the information that we can possibly gather by next meeting should be collected together.

Secretary Wilson told me he had a number of experts employed for the purpose of awakening an interest toward the protection of the forests and a number of States had been so awakened that they had done the same thing. European countries are taking it up. Frederick the Great protected the forests of Germany 150 years ago. The subject is being taken up in Australia. This country has been behind in the science

of forest protection as we have been inclined to yield everything to commercial interests. We are prone to look at dollars and cents in the commercial field, but each time we see the ships sail away with this production of rosin, turpentine and lumber it is diminishing our forests and bringing ruin upon us.

Mr. Barber: This is one of the most important questions I think that has been put before the convention. A law should be passed in regard to burning the forests.

Prof. Stockbridge: This is only one of several matters which relies on legislation. A committee of five should be appointed on legislation in connection with the standing committee on Forestry.

Mr. Phelps: This spring we have had acres and acres during the drought absolutely ruined. They have been set on fire and yet there is no one prosecuted.

Mr. Hart: I think the difficulty is largely with the law for this reason that the law as it now reads makes it exceedingly difficult to fix the crime on any one. Now, in my neighborhood I have known a fire to start and run over acres and acres and even burn dwelling houses, and residents saw beyond all question the parties who did it but they could not swear that the parties had lit the match. It seems to me there could be some measure enacted to bring the parties before the courts. Some remedy must be considered.

New Fruits.

REPORT OF COMMITTEE BY E. S. HUBBARD.

Mr. President, Ladies and Gentlemen:

By request of Mr. Phelps, chairman of the committee on new fruits, I submit notes on the specimens sent me. June 19th received specimens of two varieties peaches of Rev. Lyman Phelps.

Cardinal, freestone: Specimens said to be last of crop, first setting having been killed. Average equatorial circumference 6 3-8 inches. Resembles Waldo but with larger and longer point. Shows more Honey characteristics, small pit, pulp tender and melting, sweeter and higher flavored than Waldo.

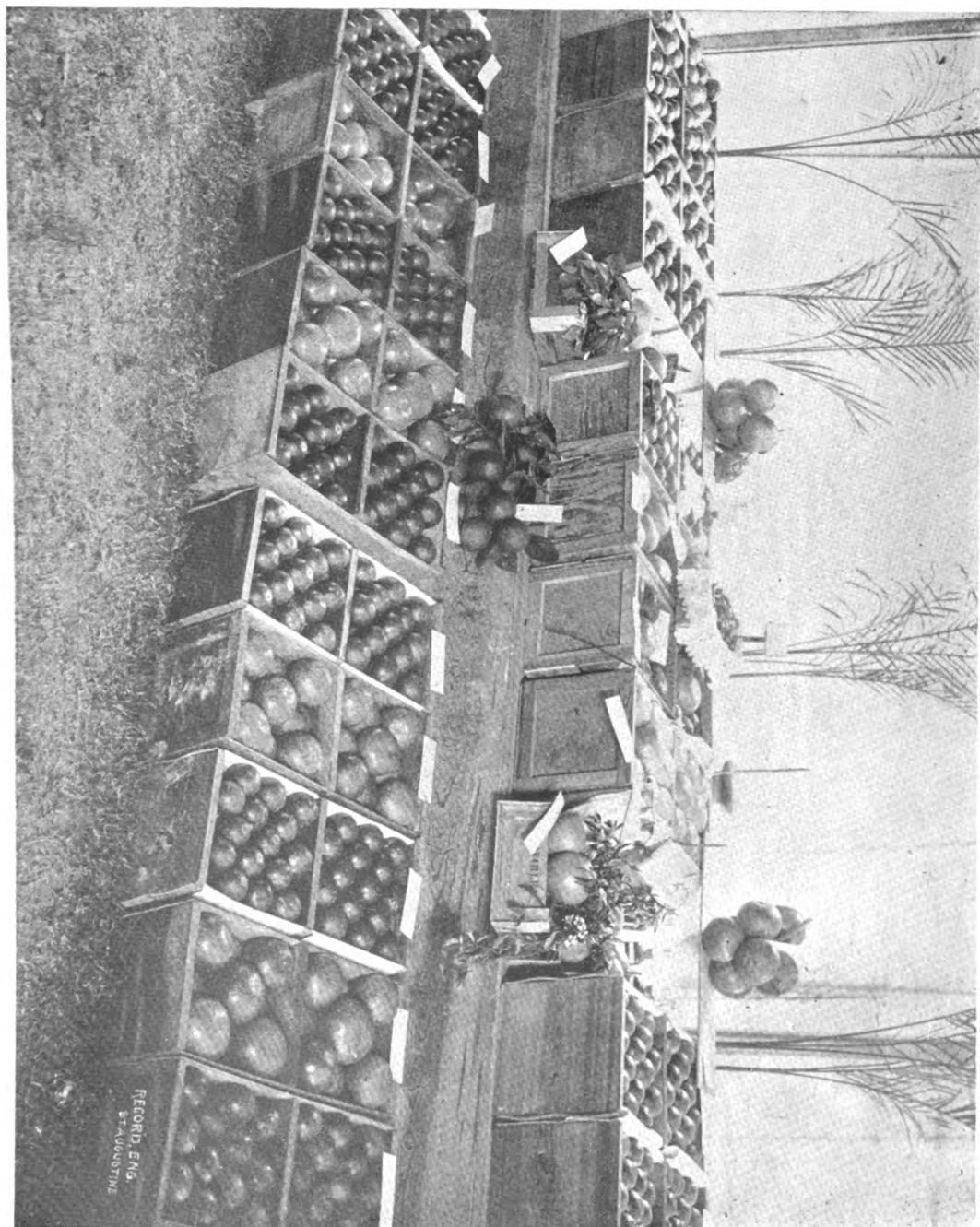
Globe, clingstone: Average equa-

torial circumference 7 3-8 inches, nearly round, blunt point only slightly elevated, dark blush on cheek, white pulp, reddish next to pit, juicy and tender yet firmly bound with radial tissues from pit. Pit medium size, flavor rich, and sprightly, reminds one of Crawford's Late. Good table or preserving peach. Both varieties are recommended for trial.

July 13 received the following peaches from Rev. Lyman Phelps:

Acme: Nearly round, seven inches circumference, slight suture and point, purple blush, freestone, pit medium, pulp

King Orange, Hart's Late, Tangerine, Pomelos, Lemons; exhibited at the Dade County Fair, Miami, March 10-22, 1902.



white, red about pit, firm, melting, flavor rich, sweet, sprightly, well balanced.

Alpha: Nearly round, medium suture and protuberance, slight point set on one side, seven inches circumference, dark red mottled blush, freestone, pit medium, pulp white, melting, rich, mild acid flavor.

July: Round, somewhat pointed, no suture, 6 3-4 inches circumference, crimson blush, freestone, pit large, pulp light yellow, melting, rich, acid flavor, resembling Crawford, slight noyau.

July 25 received peaches sent by Rev. Lyman Phelps, July 22.

August: Seven inches in circumference, somewhat oblong, medium suture, and protuberance, slight point, full dark crimson blush, cling, medium pit, pulp white, firm, good flavor, excellent preserving peach.

August 12 received of Walter Cooper, Sorrento.

Messina Golden Cling: 7 1-4 inches circumference, nearly round, small suture at stem, slight protuberance, yellow skin with deep blush, pulp yellow, firm, red about pit, cling, pit small, flavor high, rich, intense blending of acid and sweet, quality of the best. Highly recommended as a table and cooking peach.

Messina Golden Free: 6 3-4 inches in circumference, oblong shape, very slight suture and point, yellow skin with deep crimson blush, pulp yellow, free stone, pit small, pulp smooth, melting, flavor delicate, smooth, acid well blended with sweet, good quality, recommended as table peach.

In January I received a sample of Oneco orange from Reasoner Bros., Oneco, Fla. This orange is supposed to be a cross of Mandarin and Tangerine and shows about an equal blending of the characteristics of the two varieties in color, appearance and flavor. Is thin-skinned with tender pulp and small seeds. Is a very pleasant-flavored orange. Said to be later than Dancy's Tangerine and is worthy of propagation and trial.

I have not yet seen Hall's Yellow peach which is said to resemble Elberta and to be a promising variety to ship before the Georgia crop.

There still seems to be room for a large showy peach of the blooming and ripening seasons of Waldo for an early standard shipping variety.

The State Agricultural College.

REPORT OF COMMITTEE ON CONFERENCE.

Mr. President, Ladies and Gentlemen:

Your committee appointed to confer with the Board of Trustees of the State Agricultural College, beg leave to report as follows:

We found when first appointed, among the trustees, what we felt was a feeling of distrust. It appeared as if they thought we were meddling with matters outside of the province of this Society. We are glad to report an entire absence of any such feeling now, as they have fully realized that your committee was really and truly a conference or advisory committee, with no desire to pick flaws and make unfavorable or unfriendly criticism, but had an ardent desire to aid them in their work.

In March, 1902, your committee was invited by the Board of Trustees to attend a meeting of the Board at Lake City. We found this meeting was called for a conference. We were invited there to meet Governor Jennings and the aims and objects of the college were fully discussed. Plans and means to best accomplish these aims were fully considered.

Your committee was asked to take part in this discussion and urged to offer suggestions. You—knowing the personnel of your committee, need not be told that the opportunity was fully utilized.

The sanitary condition of some of

the buildings was condemned, and the bedrooms or living rooms, called barracks, of the cadets were severely criticised.

NEW FARM BOUGHT.

At that meeting we strongly urged the necessity of more attention being paid to agriculture. We found the land owned by the college and the Experiment Station very inadequate to the needs of the institution, both as to quality and quantity—and urged that more land be bought. In this we had several objects: first, that all agricultural tests or experiments might be more complete, and the science of agriculture more fully taught. Another reason was, that all students at the college, that wished, could find employment, at fair wages, any time they wanted to work, thereby giving them an opportunity to get a practical knowledge of agriculture and to make some part, if not all of their expenses while attending college; and that some crops could be grown that could be used in the college mess hall, thereby reducing the living expenses of the students—by giving them an opportunity to earn money, in one instance, also reducing the necessary living expenses. Poor but worthy young men could get an education at little or no outlay. We want to see the day when a

young man of energy and determination can go to Lake City without a dollar, get a good education and go home with money in his pocket, having paid for his education and earned the surplus money, working at odd hours while attending this college. We know this has been done in other States and believe it can be done in Florida.

Another reason for wanting more land. We wanted to see more stock raising and feeding tests made as nearly as possible on natural Florida conditions, some pasture land and some land for growing feed. We urged the purchase of some of the best breeds of beef cattle, and that an effort be made to demonstrate to the people of Florida the advantages of good beef blood, as we felt then and still believe that the production of meat will eventually prove to be one of the most profitable lines of Florida agriculture. Our suggestions were met with the cry, "no money." We answered "Ask the people of Florida to furnish the money." Governor Jennings said he would gladly recommend a sufficient appropriation.

During the last session of the Legislature your committee was asked by the Board of Trustees to meet them in Tallahassee to aid them in an appeal to the appropriation committee. Several members of your committee responded and used their best efforts to aid the trustees in their appeal. The result is history with which you are all familiar.

NEW BUILDINGS.

New buildings are being constructed of which the whole state can be justly proud. Additional land has been bought conveniently located, adjoining the

land of the Experiment Station. This will do for a beginning but it is not enough. The college proper now owns 318 acres but the college farm should consist of not less than 500 acres. A part of this land cost a little high, but when location is considered, nearness, being convenient to the college and adjoining the Experiment Station land, it was decidedly the cheapest land to be had. We now hope to see experiments in corn growing and breeding, to determine the best for Florida. We hope to see an effort made to determine the best pasture grass for Florida. We want to know what grass will make the best permanent pasture, as good grazing is the true foundation of all profitable beef production.

We hope to see several breeds of beef cattle, as well as dairy cattle, several breeds of hogs, and a good sized poultry farm, all used to demonstrate what is best for Florida conditions. We hope to see the increase from the various kinds of stock demanded by the farmers of Florida for breeding purposes, and we will expect the college farm to produce them at such little cost that a Florida farmer can afford to buy them.

We believe the trustees are in earnest in their efforts to accomplish the results we hope for along these lines, without relaxing their efforts or lowering their aims in other college work.

CRAMPED BARRACKS.

We desire to call especial attention to the barracks or living rooms of the cadets. They are a disgrace to the State. We cannot believe that there is a citizen of the State who would be content

to see his boy living in such cramped uninviting quarters. We believe our homes should be made as comfortable and pleasant as possible to make the boy love his home and although this is but a temporary home it should be of such a character that the boy could take some pride in it. Four bare walls, a bare floor and an iron bed, all of these made with a view solely to economy of space, are but little more inviting if called college barracks than if called a cell in a jail. We believe it to be just as essential that a boy's taste for the beautiful and his knowledge of correct proportions should be cultivated in his bedroom, his college home, as in the mechanical department or in his lessons in drawing. We believe Dr. Taliaferro, the president, is striving to make of the college what it should be, the best possible place for a Florida boy to get an education. We

believe the president of the college should not be the director of the Experiment Station. We have striven with the Board of Trustees to get this change made and hope and believe that at no distant date this change will be effected.

We have felt that the military was given too much prominence in the college work and think this should be an incidental and not a leading feature.

We recommend that every member of this Society ask the legislators from their respective counties to render all possible aid to the upbuilding of this college, with a view to making of it a State institution of which we can all be justly proud.

Your committee respectfully ask to be discharged.

S. H. Gaitskill,
Chairman.

Resolutions and Reports.

AMERICAN POMOLOGICAL SOCIETY.

Mr. McCarty: There were present at this meeting Mr. G. L. Taber, Mrs. Florence P. Haden and myself. I think I can truthfully say it was a very pleasant and profitable gathering for all concerned; that the delegates of this State were on hand all of the time; but I want to say now that in my judgment one of the fullest and best reports made there covering the tropical and sub-tropical fruits was made by the president of this

Society. It was a very long, very able and very valuable paper. I do not know that I have anything to communicate to the Society of further value.

We met there some very able men. Personally, I felt that I had derived very much benefit from these men. The personal contact with such able people was very beneficial indeed. I had thought that some member of the committee would submit a written report and of a more formal character.

FINAL RESOLUTIONS.

Your committee beg leave to report as follows:

1. That the thanks of the Society be tendered to the railroads for reduced rates and other favors.

2. Likewise to the hotels for so kindly housing and attending to our bodily needs.

3. To the Plant System for the use of this beautiful and commodious building.

6. To Mayor Wing for his cordial address of welcome, ably seconded by the citizens of Tampa.

5. To the local committee, Messrs. Gillett, Waite, Butler and their associates for a most delightful and enjoyable moonlight trip.

6. To the ladies of Tampa for the reception tendered to the lady members of the Society.

Cordially we have been met and treated with kindness and courtesy; and the people of Tampa have from us, one and all, a most hearty vote of thanks. Our meeting here will be one long to be remembered.

C. T. McCARTY.
H. HAROLD HUME.
R. E. ROSE.

Mr. McCarty read the report and added: It is proper now for me to say that special thanks are due Mr. Gillett for the success of this meeting; he has worked harder than any body else. But no motion is necessary for that, as we all appreciate very highly the attention given us and the entertainment we have had.

WORK ON ORANGE INSECTS.

A resolution was offered by Mr. W. S. Hart, as follows:

Resolved, That the Secretary be instructed to write to Hon. James Wilson, Secretary of Agriculture, and convey to him the earnest wish of this Society that he would, at as early a date as compatible with the interests of the public service, appoint a competent entomologist to take up and complete the work on Insects Affecting the Orange, which the lamented author, Prof. H. G. Hubbard, left uncompleted at his death; and incorporate such additions thereto as shall make it fully equal to the latest requirements of citriculture.

Adopted.

ST. LOUIS EXPOSITION.

The following was offered by Dr. W. C. Richardson:

Whereas, the Florida State Horticultural Society has heard the claims, merits and advantages of the approaching St. Louis World's Fair explained and

Whereas, we recognize in the said World's Fair and Exposition an extraordinary opportunity to display to the peoples of the world the great excellence of our climate and products, therefore be it

Resolved, that we pledge ourselves as a Society and as individuals to do all in our power to procure all necessary legislation and monetary appropriations requisite to have the State of Florida well and creditably represented in every way at the World's Fair and Exposition.

Keeping Oranges Late.

Mr. Hart: Last year I brought to the meeting a few specimens of oranges which had been kept a little longer than usual and still were plump and solid. That fruit certainly had the appearance of having been picked late, except that in some instances the calyx was a little dark. I had, in working groves away long in the late spring or early summer, knocked off with my hoe some fruit in fine shape, and it seemed when working in the hot sun that it was very refreshing and had a delicious flavor. The plan of keeping them had been given me by our worthy president, the same used in keeping potatoes.

I had some that had been in that condition for some months and I had reasoned from this that oranges might keep as potatoes do. I have put oranges in sphagnum moss and they keep perfectly. This year I thought of keeping them on a larger scale and did so. But there are hundreds who come over to see my packing house, and some visitors came in and left the gates open and the hogs got in and ate all the fruit up. Hence I am unable to exhibit any to the Society.

I believe the plan is a good one and that you could keep oranges almost the year round. I ate some plump fine oranges directly off the trees the past week and those which are kept as above stated had almost the same flavor. It costs a good deal less than cold storage.

Along the Mediterranean they keep lemons in sand, but I have never been able to keep them in that way here, on account of too much moisture.

Dr. Richardson: I think that Mr. Hart and myself have both accomplished the same result from practically the same operation. We put our oranges away where they would come in contact with moisture and not in contact with heat to any extent, and they retain their flavor for six months. We had a large shop in one corner of our place; that is, it was a tool shop. Right in the center of the shop we dug a trench to the depth of about six inches; packed the oranges in rows and then put boards over the whole. We opened it up about the middle of September when Mr. Tinney went to Buffalo, and he took a box with him up there. I should think that out of the three boxes there were only ten oranges defective. They had all the flavor and all the freshness as when picked for packing.

Prof. Rolfs: I have known that plan to succeed very well and then again fail. Just why it should fail one year and succeed in others, I do not know. Some I have known to keep well and others were rotten. They were piled several layers deep, and that may be the reason for the test not being a success.

Mr. Phelps: I have packed a great many oranges in May. My method has been to burn the sand to a heat hotter

than I could hold in my hand to sterilize it; make the box tight and after placing the oranges in then pour the sand in; and I could keep oranges perfectly that

way until September. I put them in a perfectly dry cellar with plenty of air in and no moisture, and then pour sand on the ground five or six inches thick.

Necrology.

REPORT OF COMMITTEE BY W. S. HART.

Whereas, it here becomes the sorrowful duty of your Committee on Necrology to record the death of Chauncey A. Bacon, of Ormond, Fla., on November 19, 1901 and Henry L. DeForest, of Sanford, Fla., December 23, 1901 and Whereas by the decease of these our fellow members this Society has sustained a loss that brings sadness to each and every one of us; Therefore be it

Resolved, that while here recording our deep sorrow over the departure from this life of these valued associates and giving testimony as to their sterling worth and works, we also extend condolence to the families of the departed and assure them of our earnest sympathy in this their time of sad bereavement.

Resolved, that these resolutions be spread upon the minutes of this meeting and a copy be sent to the family of each of the deceased.

Chauncey L. Bacon was born in Providence, R. I. in 1842 and died in the city of his birth November 19, 1901.

At the tender age of twelve he was left an orphan and went to live with his

guardian on a farm in Oneida, N. Y. He responded to the first call for volunteers and served with the Seventh Connecticut until the close of the Civil War.

Mr. Bacon received a medal for particular bravery at Wagner, where he was seriously wounded. Letters from his commanding officers attest his bravery at all times. After the close of the war his time was spent in travel and in mercantile business up to his coming to Florida in 1876.

He settled at Ormond, then known as New Britain, on a government home-stead on "The Peninsula," a few miles north of the settlement. Starting without capital sufficient to meet the first month's grocery bill, through careful, systematic planning of his work beforehand, indomitable courage, long hours of assiduous labor lengthening into months and years, through honest dealing and with the enthusiastic assistance of "God's best gift to man," a cultivated, industrious and loving wife, he transformed a jungle into an ideal Southern setting for a lovely home that later replaced the cabin which first gave them shelter. Many of the older members of this Society, who visited "Number

Nine" after the meeting at Ormond in 1892, will well remember his skillful utilization of the natural wealth of the place in live oaks, magnolia, palmetto, etc., as he worked out his plan, ready mapped from the beginning and all starting from a base line running parallel with the river. This plan so blended the beautiful and the useful as to give an ample support while its wealth of ornamentals, of thrifty trees and vines, its few or many varieties of ripe fruits ready to the hand each day of the whole year up to the time of the great freezes of '94 and '95 attracted and gave gratification, encouragement or inspiration to more visitors than any other place on the upper Halifax river.

Here the wealthy tourists from the great "Ormond" came to feast their eyes on its beauties and to leave their orders for cases of jams, jellies, marmalades, etc., all the best of their kind. Here the faint hearted old settler or the anxious but inexperienced newcomer found demonstration of Florida's possibilities worth far more to them than whole volumes of boastful assertion. Ever eager to learn new or more successful ways of perfecting his home and its surroundings he early became an alert and valuable member of this association. Always as ready to impart as to receive information, of a quick, jovial wit and cheerful nature his presence at our meetings did much to make them both profitable and enjoyable. One of his most earnest desires was that this Society should put on perpetual record those experiences and conclusions most likely to be of use to those who take up our work after we lay it down.

Mr. Bacon did much valuable committee work for this Society and its an-

nual report for 1897 contains his portrait as one of its vice-presidents. Though a heavy loser by the big freezes of '94 and '99 his courage did not desert him and he went manfully at work to restore or replace, on safer lines where that was possible, that which he had lost and as one of our State papers truly said, in speaking of him, "Such a man leaves behind him the memory of a career which encourages others to effort and cheers them in days of adversity."

He leaves a loving wife and son to mourn his loss.

Henry L. DeForest, who died in Chicago, December 23, 1901, was born at Riggs Hill, Derby, Connecticut, February 7, 1851. He was descended from the earliest colonists. The home where he spent his boyhood was built in 1765, being the third house built upon a grant purchased from the Indians, and for 225 years never passing out of the name of the original owner. The first house was a "forted house" to which later settlers fled for safety from the attacks of the red-man, and became historic as the hiding place of the regicides Whalley and Goffe.

From these colonial ancestors, and surrounded by the old legends and histories of later patriots Mr. DeForest grew up, but, when yet a lad the shadow of sickness fell over his life and he sought health in the climate of Northern Minnesota, returning to his eastern home in 1871 without being benefited. At that time Gen. H. Sanford, a connection of his, having bought the grant still known by his name, was beginning to develop that part of Florida. It was nat-

ural that the sick boy should seek health here. Upon his arrival he found Gen. Sanford's agent dying and no one to look after these large interests. Forgetting himself, Mr. DeForest took up these responsibilities and successfully carried them out, establishing saw mills, opening the first store, building the first dwelling houses and the Sanford House. The once famous grove, Belair, was just being set out with orange trees. The greater part of it was planted under Mr. DeForest's supervision.

In the meantime a Swedish colony of about seventy-five persons were sent over by Mr. Sanford to carry out his improvements and to establish homes for themselves. No provision had been made for them, and shelter and food were necessary and they must be taught the English language. Notwithstanding all of these responsibilities Mr. DeForest's health improved and he set out a grove for himself. In 1876 he severed his connection with Mr. Sanford and began for himself. Ten years later he retired from active business and devoted his time to his orange groves and other interests. In 1891 his health again failed and for six years he was obliged to spend most of his time out of the State, traveling and at health resorts. After the freeze when able to remain at home he spent a great deal of his time in working about his trees in his grove of sixty-five acres of which at least forty-five acres are now in bearing, thinking no home worth having in Florida without healthy, symmetrical orange trees.

Last September he left Florida expecting to return soon. Reaching Chicago in October he was unable to go further and two months later the end

came. His body was taken back to Derby, there to rest with his kindred.

In addition to the above report the Secretary subjoins the following brief notice of Colonel Walter N. Haldeman, who was for many years a life member of this Society. He was the president of the Louisville Courier-Journal Company and owner of the Evening Times. He died in Louisville May 13, 1902 from the effects of injuries received by being struck by a trolley car. He was very fond of Florida and had a fine estate and orange grove near Naples which he visited every winter and took much pride in developing and improving.

The name of Walter N. Haldeman was inseparably linked with the history of Journalism in the South, and he was one of the oldest active newspaper men in the country. Although over eighty-one years of age, he personally directed the affairs of the Courier-Journal until the time of the accident which caused his death. Mr. Haldeman was born at Maysville, Ky., April 21, 1821, and was educated at Maysville Academy with Gen. U. S. Grant and other men of note. In 1840 he became bookkeeper in the Louisville Journal office, and four years later started the Daily Dime Paper, which was soon converted into the Louisville Courier. This he conducted until 1861, when it was suppressed by military domination, Mr. Haldeman being a Confederate sympathizer. The Courier soon appeared at Bowling Green, Ky., and then at Nashville, and at the close of the Civil War Mr. Haldeman resumed the publication of the Courier in this city until 1868, when in concert with Henry Waterson of the Journal, the two papers were consolidat-

ed and appeared as the Louisville Courier-Journal, which has since continued under the same management. In May, 1884, Mr. Haldeman started the Evening Times.

Mr. Haldeman was a man of considerable wealth, and was connected

with a number of business enterprises in the South as well as in Louisville and the State. His wife, a daughter and two sons, W. B. Haldeman and Bruce Haldeman, both of whom were associated with their father in newspaper work, survive him.

Preservation of the Forests.

AN ADDRESS BY CAPT. C. E. GARNER, OF JACKSONVILLE.

To the Members of the Board of Trade:

Gentlemen—The question of the preservation of the forests in this State is, in my opinion, the most important matter that can engage the attention of our people. So long as the forests were being cut for mill logs of larger diameter comparatively little damage was being done, but with the development of the turpentine industry and the cutting of small trees for crossties the forests are being very rapidly exterminated.

There is no state in the Union which has such interest in the preservation of the forests as Florida; and there has been nothing done, no action, legislative or otherwise, to prevent the devastation.

The total value of all the products of the State for 1899, which is the last report we have, was as follows:

Field crops.....	\$ 8,173,547
Vegetable and garden products..	856,308
Fruit crops.....	1,349,132
Live stock.....	6,503,408

Poultry.....	705,828
Dairy products.....	811,671
Miscellaneous products ...	125,634
Total.....	\$ 18,525,528

The value of all products including those exported in 1899:

Total value of farm products.....	\$18,525,528
Value of mine and forest products.....	\$32,411,149
Total value of State products	\$50,936,677

There was mined and shipped for the same year 807,721 tons of phosphate, estimated at four dollars per ton, which would amount to \$2,830,884, leaving out of the total \$50,936,677, \$29,580,265 for forest products, or considerably over one-half of the value of all.

PROPORTION WILL BE INCREASED.

This proportion, it is reasonable to assume, for the years 1900 and 1901 and

the ensuing year, will be largely increased, as the turpentine and crosstie industry, during the past three years, has been very much in excess of previous years. The records show that fully 85 per cent of all the exports from this port are forest products, consisting of lumber, crossties, naval stores, etc. This is more exclusively a lumber port than any in this State. Phosphate and cotton are shipped largely through other ports. The mills of this city employ thousands in manufacturing and stevedoring lumber. The vessels entering our port come almost exclusively for lumber. Our mills have an annual capacity of about one hundred million feet. Our wholesale trade is sustained very largely from this industry; consequently while the State is interested in the preservation of forest industries this city is probably more interested and more dependent upon the preservation of this, our greatest source of wealth, than any other city in this State; consequently it is a matter of primary importance for this Board of Trade to take action that may prevent the destruction of our forests; provided it can be done legally and without injury to any of its citizens. If anything is to be done it must be done quickly, and in order that the matter may be properly considered a special committee has been appointed, and to the gentlemen of that committee I will offer the following, not asking that they shall adopt any of my views, but simply as a mental suggestion as to what, as it seems to me, should be done, and I trust by the time the next Legislature meets they will have formulated a line of action and be prepared to recommend such remedial legislation as will at least prevent the indiscriminate and wasteful

destruction of what remains of the forests of the State. Some legislation was proposed at the last session of the Legislature, but as it did not have the support of the lumber and turpentine men it was defeated. It is useless to appeal to the individual, as it is especially a fit work to be fostered and undertaken by the State.

LEARN REAL VALUE TOO LATE.

We are only repeating in this State, in respect to the forests, what has everywhere occurred since the earliest historic periods: only when the forests have been consumed have men learned their real value and the office which they were designed to fill in the grand economy of nature.

Singularly enough, the more civilized nations have been the destroyers of forests; sometimes these have been destroyed in order to clear the ground for agricultural use; sometimes as a means of defense or offense in war; sometimes with the simple desire of pecuniary gain, but always with a disregard for ultimate consequences.

European countries have been engaged, some of them for a century or more, to check the evil consequences of deforestation; great expenditures of money have been necessary to even partially reclaim those portions rendered arid by the destruction of the forests. The history of Jutland, which comprises almost the entire continental portion of Denmark, should be a lesson to us; there is a marked similarity between that country and Florida; both are peninsulas and comparatively flat, with long coast lines, and the geological formations are similar.

The peninsula of Jutland was anciently and even comparatively recently covered with forests, but since their wasteful destruction, extensive tracts have been converted into sand heaths, and in some parts it has been found necessary to sow bent grass and plant trees in order to prevent the mischief accruing to the cultivated lands by the clouds of dust raised by the wind. Most of the country has been rendered barren and unfruitful by these causes, but where a few forests still remain the neighboring districts are productive and well cultivated.

REGULATED BY THE GOVERNMENT.

In Prussia, it was Frederick the Great who first ordered a regulated administration of the forests soon after the beginning of his reign. The wisdom of this truly great ruler is manifest in the prosperity of the German people and the laws he established are practically the laws that exist today. The conditions that exist in this country will not of course permit us to adopt the arbitrary methods adopted by the great Frederick, requiring as it did a government permit for a tree to be cut on either private or public property, but we cannot help but admire the forethought and admirable administration that did fit the economic, social and political conditions of the German people, that preserved the forests of Germany for all time, and set an example in forestry that has preserved the agricultural interests of Europe.

The loss of the forests is not all the damage that is being done by their removal and destruction in this State; it has been demonstrated in this country

and in Europe that the forests have meteorological connections of the highest importance; that their extensive removal is the occasion of drouths and floods, of tornadoes and destructive torrents. To what extent the removal of the forest's cover affects climatic conditions has not been ascertained to any degree of certainty, but it is reasonable to suppose that in a State such as ours, where sudden changes from heat to cold lead to such disastrous results, especially to the citrus fruit industry, as well as to garden products, the denuding of the forests must necessarily have a greater or less effect in changing the climate. In Southern Europe, the people who are engaged in these industries systematically plant trees to protect their groves and forests. Their removal has undoubtedly in some sections converted gardens of fertility into desert wastes. Our people are not accustomed to have the use of their property controlled by government restrictions and regulations as are the people of the Old World. Any laws in this country must have due regard for the rights of the individual; hence any legislation regulating the cutting or boxing of trees for turpentine purposes on lands owned by individuals have never been operative, and it would be useless to place them on the statute books, but the lands owned by the State and by the nation can be protected, and in the interest of the people of this State should be protected. The men who buy their stumps or buy their land and are legitimately engaged in the business are interested in having them protected. The forests owned by the State or nation are a trust which the general government and the State hold for the people; it has no right to allow them to be

squandered or suffer their value to be lessened by individual encroachments; it should be as prompt to arrest and punish theft of its timber as to arrest and punish the one who should steal furniture out of your house. It is hardly necessary to use argument to prove the necessity of some action being taken to protect the forests of the State. It is patent to everyone who knows anything of the conditions that something should be done speedily or it will be too late to act.

NO ACTION TAKEN.

In conversation with a citizen of Georgia who is closely identified with the business interests of that State, in reply to an inquiry of mine, if anything had been done in Georgia to prevent the destruction of the forests, he said unfortunately no action had been taken, and that the people of Georgia are now beginning to realize what a great mistake had been made and that it was now too late to lock the door.

As I have said, I have no special hobby as to what should be done, but it seems to me that all State lands that are adapted for forest growth should be held as a forest reserve; that the sale of tax certificates to lands should cease, and that all lands on which taxes are not paid should revert absolutely to the State and become a part of the public domain, and be held as a forest reserve as they are forfeited. The sale of tax titles to lands has been the cause of the destruction of an immense area of forests. As is well known, parties buy these tax titles and strip the land of its timber; not only the large trees, but of everything marketable, and then it again

goes back to the State, as tax title property is seldom, if ever improved. Large bodies of railroad lands are being forfeited to the State, and if the sale of tax certificates is stopped the State would soon own millions of acres of land to make a great forest reserve that would be of inestimable value in the course of twenty or thirty years; provided it is protected from forest fires and theft. To prevent the former, the State should use every effort to prevent the indiscriminate firing of the forests.

MUST ALL WORK TOGETHER.

It is of little use for one person to adopt expensive measures of protection unless the same are adopted by those in his neighborhood. If fire breaks out by accident, or is kindled by design, in a forest near him, it may sweep through and destroy his property, despite all he may have done to protect it. To prevent the latter, severe penalties should be provided for trespassing on State lands, and the public sentiment of the people of the State should be awakened; for without this the law would be a dead letter on the statute books. Both fire and theft are responsible for great devastation, not only in what is destroyed and stolen, but from the fact that the owner of the forest for the most part looks upon them simply from the pecuniary point of view, and in view of the danger of having it stolen or burned he hastens to convert the forests into merchantable timber. If the market is low he will hope that his neighbors will lessen their output, and of course his neighbor will reason in this same way, and as a result the owner of the land receives very little for his forests, and the price

of lumber in the market of the world is much lower than the supply should warrant; whereas, if the danger from theft and fire was lessened owners of forests would feel justified in holding them.

There is another prolific cause of devastation and sacrifice; the problem of private holdings of forests and the conservative logging of such lands is related to the matter of taxes in a very intimate way. Parties who buy large tracts of land in this State generally buy it for the timber, and they reason that they cannot afford to hold it for a second crop, consequently they strip it of every vestige of timber that can be sold; they are influenced to do this through fear of fires or of theft, and possibly the greatest cause of this devastation grows out of having to pay taxes at the same rate of assessment as before cutting the timber. Lands that have been cut over must therefore be held for from ten to thirty years, depending upon the size of the trees left standing, before the owner can expect another crop; under conservative methods lands could be cut even after they have been logged in fifteen or twenty years, but the owner reasons that the risk and expense of paying taxes for that length of time will not warrant him in holding the land, and he, therefore, cuts everything, and after it has been thoroughly denuded, permits it to be sold for taxes, and the State has so much less taxable property on the assessment roll. Look over the lists of lands now being advertised for taxes in almost every county in the State, and it will tell the story of the devastation of our forests.

A REMEDY.

The remedy for this, in my judgment, should be a reduction of taxes on lands held for forestry purposes. Of course very carefully drawn laws would be essential to the adjustment of this class of property in order that private parties would feel justified in holding lands from which the larger timber has been cut, for a second crop.

I feel that this is a matter that should be thoroughly considered by the committee of this board, and if possible remedial legislation should be recommended. It is much more practical to enact laws that will meet with the approval and indorsement of the men engaged in this great industry, tending toward the preservation of his business, than to rail at his supposed vandalism and greed. The work of forestry is one of such a protracted nature that it is especially fit that it should be undertaken and fostered by the State. It requires such a lapse of time to accomplish its results that individuals shrink from undertaking it through fear that they may not live to see the expected or promised results, but the life of the State is unlimited. A State is not discouraged because its work needs a long time for its accomplishment; it is peculiarly the work of the State, and is fully warranted as a source of ultimate revenue that will fully justify the comparatively small expense or loss of revenue that is necessary to the attainment of such great results for the future.

It occurs to me that a forestry commission should be established in this

State, at the head of which there should be a forest commissioner, and with a member from each county in the State to have jurisdiction over the State lands in his county, or possibly it would be more effective to empower the Boards of County Commissioners with this authority, thus giving a more complete system of personal supervision and protection to the State lands. There is hardly any doubt that the general government would assist in every way the work of the commissioner; in fact, the Hon. James Wilson, Secretary of Agriculture, to whom I spoke relative to this matter, pledged the hearty cooperation of the United States Forestry Bureau in preserving the forests and also in introducing trees adapted to our climate and soil that would be useful for lumber and other purposes; they will also assist the turpentine operators in devising an improved method in tapping the trees, as the present method is crude and destructive. I feel sure the members of the Turpentine Operators' Association would welcome any assistance that can be given them, and would undoubtedly adopt a less destructive method even at a sacrifice of a portion of their annual output, provided the system could be uniformly adopted. Secretary Wilson says he will cheerfully send experts in forestry to our State to study the conditions and devise methods to preserve our forests. The general government holds about one and one-half millions of acres of land in our State.

PUBLIC RESERVATIONS.

Under an act of Congress approved March 3, 1891. "The President of the United States is authorized to set apart

and reserve in any State or Territory having public land, bearing forests in any part of the public lands wholly or in part covered with timber or under-growth, whether of commercial value or not, as public reservations, and the President shall, by public proclamation, declare the establishment of such reservations and the limits thereof." Under this act about twenty millions of acres of our public domain has been set aside as forest reservations in various States and Territories, and action should be taken by the committee of this Board of Trade to investigate the matter thoroughly, with the view of having the general government to set aside lands enough to make a large forest reserve in this State.

The railroad companies doing business in this State are vitally interested in the preservation of the forest industries. The transportation of lumber and naval stores and the supplies and machinery for the mill men and operators is one of their greatest sources of revenue. They are owners of large bodies of lands, and their interest in the agricultural development of the State should cause them to assist in this work in every way possible, and their aid should be invoked by your committee. The railroads are the largest consumers of timber and we now have nearly two hundred thousand miles of railroad in the United States equal in length to cover a distance of eight times around the globe; every mile of railroad requires about two thousand two hundred crossties; they have to be renewed about every ten years; the supply of timber for railroad purposes, in view of the fact that the smaller trees are cut for ties, will soon be a pressing one. It can well be urged that the railroads of the State should not only husband what

timber lands they hold and protect the timber, but it would be undoubtedly a most timely thing for them to study forestry, with a view of finding out what trees are more adapted for crossties and have the quickest growth, and engage in planting trees on a large scale along the line of their respective roads to meet the requirements of the future.

It also occurs to me that the establishment of a department of forestry at the Florida Agricultural College would lead to good results; the preservation and the biology of forests could be studied and an interest awakened in the subject, and within a few years a more thorough knowledge of this great subject could be disseminated among our peo-

ple, and young men with a scientific training relative to this matter would be of an inestimable value to this one of our greatest industries.

Not asking for the adoption of any of my views, I trust the members of the forestry committee of this Board of Trade will take up this matter in a vigorous manner and do what they can to arrest the destruction of our remaining forests.

The importance of this matter, as affecting the future prosperity of this State, is so great that it should not only enlist the hearty support and indorsement of this Board of Trade, but of every patriotic citizen of this State.

Florida State Horticultural Society

Catalogue of Fruits.

1902

CATALOGUE OF FRUITS.

**ADOPTED BY THE SOCIETY AT THE TENTH ANNUAL MEETING AND
REVISED UP TO DATE.**

In making a complete Catalogue of the Fruits of Florida, indicating intelligibly, in summarized and tabular form, the relative value of varieties for different sections, the wide-stretching territory, diversity of soil and climate, and the limited range of each of the numerous fruits, render it essential that the State be divided, so that regions allied throughout in their adaptability to fruits may be designated and referred to.

To this end, four districts have been formed, as described below. Geographical lines cannot be made to indicate pomological conditions with accuracy. More than approximate correctness could not be expected from an arbitrary division of this kind, especially where local conditions vary so greatly as in Florida. Working by general averages, some sections are unavoidably left in the wrong districts, judging by the standard of local conditions. The divisions, however, will be found to answer their purpose better, than any that could be made without further sub-divisions, which would be impracticable.

WESTERN NORTH FLORIDA—That part of the State west of the Aucilla river.

EASTERN NORTH FLORIDA—That part of the State 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 part of the State between the line above referred to and the counties constituting South Florida.

SOUTH FLORIDA—The counties of Brevard, Dade, Monroe, Lee, DeSoto and Manatee.

For important contributions to this Catalogue, acknowledgements are due as follows:

To Lyman Phelps, W. S. Hart and E. S. Hubbard, for aid in preparing the lists of Citrus Fruits.

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To H. von Luttichau, for aid in preparing the lists of Grapes.

To J. B. Beach and C. T. McCarty, for aid in preparing the lists of Tropical Fruits.

To C. H. Ward, C. H. Churchill and L. Cameron, for aid in revising the list of Strawberries.

S. POWERS, Secretary.



EXPLANATION OF ABBREVIATIONS.

The abbreviations and signs used in the columns which appear in the ensuing pages signify as follows:

ORIGIN—Of variety or species. (Refers to species, race, or geographical derivation, as best calculated to define.)

- A., American.
- E., English.
- E. I., East Indies.
- F., Foreign.
- H., Hybrid.
- J., Japanese.
- N., Native of Florida.
- O., Oriental.
- S A., South America.
- W I., West Indies.

ORIGIN—(Referring to oranges only)

The origin of oranges is given to conform as nearly as possible to the preponderance of influence evidenced of the particular strain or its probable wild ancestry: *Sev.*, Sweet Seville or Sweet China; *St M.*, St. Michael or Portugal; *Mal.*, Malta Bloods, their progeny and kindred; *Man.*, the Mandarin, or *Citrus Aurantium Nobilis* varieties.

ORIGIN—(Referring to peaches only).

- H., Honey race.
- N. C., North Chinese race.
- N. O. B., New Oriental Bloods.
- Per., Persian race.
- P-to, Peen-to race.
- S., Spanish race.

ORIGIN—(Referring to grapes only).

- A., Aestivalis.
- L., Labrusca.
- R., Riparia.
- V., Vulpina.

SEX—Of variety. (Referring to strawberries only)

- b, bisexual.
- p, pistillate.

USE—Of fruits.

- d, dessert, eaten without culinary preparation.
- c, culinary, including drinks, confections, condiments and domestic and manufactured preparations for gustatory use.
- s, shipping, for general market; good long-distance carrier.
- n, near-by market only. (Because of restricted demand or poor carrying qualities.)
- a, All purposes named above.
- w, Wine (Referring to grapes only.)

SIZE—Of fruit.

- l, large.
- m, medium.
- s, small.
- v, very.

FORM—Of fruit.

- b., blunt obtuse.
- c., conical.
- e., elliptical.
- f., flattened (oblate).
- h., heart-shaped (cordate).
- k., kidney-shaped (reniform).
- l., lemon-shaped.
- o., ovate.
- ob., obovate.
- ol., oblong.
- p., pyriform.
- pt., pointed apex.
- q., quarter-marked.
- r., round.

FORM—Of bunch (applies to grapes only).

- br., broad.
- cl., cylindrical.
- cp., compact.
- sh., shouldered

COLOR—Of fruit, except as to peaches, where it refers to flesh. Use adjective or noun according to application. Thus r. stands for "red" or "reddish"; r y., "reddish-yellow"; r and y., "red and yellow" (as a yellow fruit with red cheek or other red markings).

- b., black.
- bl., blue.
- br., brown.
- bz., bronze.
- c., crimson
- cr., carmine.
- d., dark.
- g., green.
- l., light.
- o., Orange (not a shade of red, but the color of ripe oranges).
- p., purple.
- r., red
- s., salmon
- sc., scarlet
- v., violet.
- w., white.
- y., yellow.

CLASS—Of fruit.

- C., clingstone.
- F., freestone

CATALOGUE OF FRUITS.

V

QUALITY—Of fruit.

b., best.
f., fair.
g., good.
v., very.

FLESH—Of fruit (applies to strawberries only).

f., firm.
m., medium.
s., soft.

SEASON—Of ripening of fruit.

e.. early.
ev., everbearing.
f., fall.
l., late.
m., medium.
s summer
sp., spring.
v., very.
w., winter.
(v. e., "very early"; L. M., "late medium,"
etc.)

VIGOR—Of tree, vine or plant.

g., good grower.
m., moderate grower.
v., vigorous grower.

PROLIFICNESS—Of tree vine or plant.

f., fair bearer
g., good bearer
p., prolific.
s., shy.
v., very.

ADAPTABILITY—Of variety or species to region named.

(*) One star—recommended for region named.

(**) Two stars—especially well adapted and desirable.

(†) A dagger—new, recently introduced, or but little known, and promising.

(—) A dash—not adapted, or found undesirable.

) Blank space—no mark or sign in "Adaptability" column indicates that no report has been made.

CITRUS FRUITS.

ORANGES—Citrus aurantium.

NOTE.—The development of orange culture in this State has given rise to a multiplicity of varieties many of which, while meritorious, have no distinctive qualities, or superiority as compared with others. It is impracticable to avoid this duplication by cutting down the list, which would exclude many desirable kinds that have been extensively planted, or about which there is demand for information. To avoid the confusion of a long list embracing many kinds without distinctive differences, the plan of using two kinds of type has been resorted to.

The names in heavy type are designed to constitute a complete list for the State embracing varieties of the highest excellence in all the desired characteristics of season, quality, distinctiveness, productiveness, etc. The names in light type are those whose characteristics are possessed in an equal or superior degree by other varieties which appear in heavy type. Some varieties in light type equal others in heavy type having the same characteristics but where there is a difference it is in favor of the varieties in heavy type. In cases of equal excellence, the best known has the preference. So that the varieties in heavy type as a whole, and without disparagement to other excellent sorts, may be said to embrace the leading kinds for general culture.

New, or comparatively unknown varieties also appear in light type; but for this distinction see "Adaptability" column.

NOTE.—In referring to the time of ripening in the column headed "Season", "very early" applies to varieties marketed in September and October; "early", to October and November varieties; "early medium", November and December; "medium", December January and February; "late medium", February and March; "late", March and April; "very late", April, May and later.

NOTE.—The region of orange production proper extends southward from Central Florida, overlapping the upper portion of Southern Florida. Therefore under "Adaptability" below the varieties have been starred for "Southern Florida"; here, however, the starring applies more particularly to the upper portion of the district.

(See Explanation of Abbreviation, on page iii.)

NAMES	Origin.	DESCRIPTION.							Adaptability.
		Fruit.			Plant.				
		Use.	Size.	Class.	Color.	Quality.	Season.	Vigor.	Prolificness.
SWEET ORANGES — Citrus aurantium dulcis.									
1 Acapulco	St M	d s	l	r	o	g g g g g	m	p p p	—
2 Acis	St M	d s	l	r	o	g g g g g	l	p p p	** * *
3 Amory Blood.....	Mal	d s	m	r	o r	g g g g g	e m	—	** * *
4 Beach No 5	St M	d s	l	e	o r	g g g g g	l m	—	** * *
5 Bessie.....	St M	d s	—	—	o o	g g g g g	l	—	** * *
6 Boone (Boone's Early)	Mal	d s	—	r	l o	g g g g g	v e	—	** * *
7 Botelha.....	St M	d s	m	r	o o	g g g g g	m	—	** * *
8 Brazilian	St M	d s	m	r	o o	v g b	k	—	** * *
9 Centennial	St M	d s	m	r	o o	v g g g g	e m	—	** * *
10 Charley Brown	St M	d s	l	f	o o	v g g g g	m	—	** * *
11 China (Mandarin).	Man	d s	m	s	l o	v g g g g	m	—	** * *
12 Circassian.....	St M	d s	s m	r	o o	v g g g g	m	—	** * *
13 Colmar (Sanford's Sweet Blood)	Mal	d s	m	r f	o r	v g g g g	e m	—	** * *
14 Cunningham	St M	d s	m	r	o o	v g g g g	m	—	** * *
15 Drake Star	St M	d s	l	r	o o	v g g g g	m	—	** * *
16 Double Imperial Navel	St M	d s	m	e	o o	v g g g g	n	—	** * *
17 Dulcissima	St M	d s	s	r	o o	v g g g g	e	—	** * *
18 Dummit	St M	d s	l	r	o o	v g g g g	m	—	** * *
19 Du Roi	St M	d s	m	r	o o	v g g g g	l m	—	** * *
20 Early Oblong(St. Michael Egg)	St M	d s	m	e	o o	v g g g g	v e	—	** * *
21 Enterprise Seedless (Starke Seedless)	Sev	d s	m	r	o o	v g g g g	g	p p p	** * *
22 Exquisite	Sev	d s	m	r	o o	v g g g g	—	v g	** * *
23 Fortuna.....	St M	d s	m	r f	o o	v g g g g	m	p p v p	** * *
24 Foster	Mal	d s	m	r	o o	v g g g g	e	p	** * *
25 Harts Late (Tardiff, Brown, Excelsior)	St M	d s	m	e	o o	v g g g g	v l	p p	** * *
26 Higley Late	St M	d s	m	r	o o	v g g g g	l	v v	** * *
27 Homosassa	Sev	d s	m	r	o o	v g g g g	m	v v	** * *
28 Imperial Blood	Mal	d s	m	r	o r	v g g g g	e	p	** * *
29 Jaffa	Mal	d s	m	r	o o	b b	m	g	** * *
30 Jaffa Blood	Mal	d s	s	e	o r	b b	m	g	** * *
31 King	Man	d s	m	r	o r	v g	m	p	—
32 Knickerbocker Blood	Mal	d s	m	r	o r	v g	m	—	† *
33 Lamb Summer	St M	d s	m	e	o o	v g	v l	—	—
34 Long (Sanford's Oblong)	Mal	d s	m	o	o o	v g	m	—	† +
35 Madam Vinous	St M	d s	m	r	o o	b b	m	—	** * *
36 Magnum Bonum	St M	d s	l	r	o o	v g	m	—	** * *
37 Majorca	Mal	d s	m	r	o o	b b	l m	—	** * *
38 Maltese Blood	Mal	d s	s	e	o r	b b	m	—	** * *
39 Maltese Egg	Mal	d s	s m	o	o v g	g	—	—	** * *
40 Maltese Oval (Garey Med. Sweet)	Mal	d s	l	e	o v g	g	l	p g	** * *
41 Mays	St M	d s	m	r	o v g	g	m	—	** * *
42 Mediterranean Sweet(Sanford's)	St M	d s	m	e	o v g	g	l	p p	** * *
43 Melitensis Navel	St M	d s	l	r	o v g	g	e	f	** * *
44 Mikado	Man	d s	m	f	o o	v g	v e	p p	** * *
45 Nonpareil	Sev	d s	l	r	o o	b	e m	p p	** * *
46 Old Vini (Beach No. 2)	Sev	d s	m	r	o v g	g	m	v v	** * *
47 Paper Rind.....	St M	d s	s	e	l o	g g	l m	v p	** * *

CATALOGUE OF FRUITS.

VII

ORANGES—Continued.

NAMES.	Origin.	DESCRIPTION.							Adaptability.	
		Fruit.			TREE.					
		Size.	Form.	Color.	Quality.	Season.	Vigor.	Prolifness.		
48 Parson Brown.....	St M	d s	m	e r	o	g	v	p	Western North Fla.	
49 Peerless	St M	d s	m	r	o	v g	v	p	Eastern North Fla.	
50 Pineapple	St M	d s	s	r	v	g g	v	p	Central Florida.	
51 Prata.....	Mal	d s	m	l o	v	g g	m	g	Southern Florida.	
52 Prolific	St M	d s	m	r	v	g g	m	v p		
53 Sanguinea (Ruby, DuRoiBlood)	Mal	d s	m	r	v	g g	e m	p		
54 Satsuma.....	Man	d s	m	f	v	g g	v e	v p		
55 St. Michael	St M	d s	m	r	v	g g	m	p		
56 St. Michael Blood	Mal	d s	m	r	b	g	m	p		
57 Sauls Blood	Mal	d s	m	f	v	g	m	p		
58 Star Calyx	St M	d s	l	r	o	g	m	g		
59 Sweet Seville (Sanford's Sweet Seville)	Sev	d s	s	r	o	g	v e	p		
60 Tangerine (Dancy, Cowgill, Mor- agne)	Man	d s	lm	f	v	g	g	v p		
61 Tangerona.....	Man	d s	s	r	o r	g g	v e	p		
62 Tephi	Mal	d s	m	r	o	v g	m	v p		
63 Thorpe (Trophy)	Sev	d s	m	r	o	g g	v e	p		
64 Valencia Late	Mal	d s	l	e	l o	g g	l	s		
65 Washington Navel	Sev	d s	l	r e	o	b	e m	s		
66 White	Mal	d s	l	r	l o	g	m	p		
67 Whittaker	Sev	d s	m	r	o	v g	v	v p		
BITTER ORANGES — Citrus Aurantium Bigaradia.....										
68 Bitter Sweet	N	d c	l	r f	d o					
69 Dwarf	F	c	l	r f	d o					
70 Italian Sour.....	F	c	l							
71 Navel.....	F	c	l							
72 Phillips Bitter Sweet.....	N	d c	l	r f	d o					
73 Sour	N	c	l	r f	d o					

REMARKS—On varieties as numbered above: Nos. 21 and 48, desirable early sorts; 15, 47, 58 and 63, distinct; 16, native of Louisiana; 19, distinctly corrugated, desirable; 25 and 31, very desirable late sorts; 26, 27, 29, 37, 45 and 51, desirable; 61, a market favorite; 54, a favorite in early market; 63 and 72, very refreshing in summer; 73, refreshing acid; 7, 12, 17, 19, 20, 33, 51, 52, 55, 58 and 66 came from Thomas Rivers, of England, the well-known nurseryman.

OF ORANGES, the leading fruit crop of the State, and great staple of the Central region, over five million boxes were produced in the season of 1894-95.

THE NAVEL VARIETIES are much esteemed on account of the delicate texture and superior quality of their fruit. They are usually shy bearers, although experience indicates that they are much more prolific upon "rough" lemon and trifoliata stocks than, as generally grown, upon orange stocks.

THE BLOOD VARIETIES are sweet, and therefore marketable, early in season, as indicated by the abbreviations in the "Season" column. At this time their distinctive character is not apparent, and they have little advantage in market over other early sorts. As the season advances, their ruby tints develop, until quite apparent on the exterior, and their quality continues to improve until, at full ripeness, they are equaled by few and surpassed by none. In locations sufficiently exempt from frost to permit their being held on the trees until they reach perfection, they bring high prices and are exceptionally profitable.

THE SATSUMA is valued on account of its hardiness, which is increased by being grafted upon the entirely hardy Trifoliata stock. As it is marketed before cold weather (it ripens very early), it is much planted in sections north of the usual range of oranges.

OTHER VARIETIES.—Excluding the Navels, Bloods and Satsuma, noted above, and without disparagement to other sorts of equal merit, the following are suggested as a desirable list for general planting, arranged in order of succession: Very Early, Boone, Sweet Seville; Early, Enterprise Seedless, Parson Brown; Early Medium, Nonpareil, Centennial; Medium, Pineapple, Jaffa, Homosassa; Late Medium, Majorca, Du Roi; Late, Bessie, King, Maltese Oval; Very Late, Hart's Late

Varieties distinctly marked in their exterior appearance, like the Navels, Bloods, Du Roi, etc., are, other things being equal, most desirable for market

POMELOS—Grape Fruit (*Citrus Pomelanus*) and Shaddocks (*Citrus Decumana*.)

(See Explanation of Abbreviations on page iv.)

NAMES, (Varieties.)	DESCRIPTION.										Adaptability.	
	Origin.	Fruit.					Tree.					
		Use.	Size.	Form.	Color.	Quality.	Season.	Vigor.	Prolificness.			
1 Aurantium.....	N	d s	1 m	r	1 y	g	1 m	v	v p	—	** *	
2 Blood Shaddock.....	F		1	r	1 o	f		v		—	** *	
3 "Forbidden Fruit"	F									—	** *	
4 Mays (Hart)	N	d s	1	r	1 y	v g	1 m	v	v p	—	** *	
5 Josselyn	N	d s	1	r	1 y	g	1 m	v	v p	—	** *	
6 Mammoth or Orange Shaddock....	F		1	r	1 o	f		v		—	** *	
7 Seedless										+	+	
8 Triumph	N	d s	s m	r	1 y	v g	1 m	v	v p	—	** *	
9 Walter	N	d s	1 m	r	1 y	g	1 m	v		—	** *	

THE POMELO.—Growing the Pomelo for market is a comparatively recent development, but considerable quantities are now shipped, and its culture is rapidly extending. It has proved popular in the general market, and its culture profitable. Its range of adaptability is about the same as the orange. Most of the older trees were planted before named varieties were introduced. The above list comprises the leading kinds now generally planted.

CATALOGUE OF FRUITS.

IX

LEMONS—(*Citrus Limonum.*)

(See Explanation of Abbreviations on page iii.)

NAMES (Varieties.)	Origin.	DESCRIPTION.								Adaptability.	
		Fruit.				Plant.					
		Use	Size.	Form.	Color.	Quality.	Season.	Vigor.	Prolificness.		
1 Belair	F	c s	m	bl	l y	b	f	v	v p	Western North Fla.	
2 Genoa (Eureka)	F	c s	m	l	l y	b	f	v	v p	Eastern North Fla.	
3 Imperial (Messina).....	c s	m	l	y	g	f	v	v p	Central Florida.		
4 Sicily (Sanford's Thornless)...	F	c s	m	l	l y	b	f	v	v p	**	
5 Villa Franca.....	F	c s	m	l	l y	b	f	v	v p	**	

THE LEMON.—Lemon growing in Florida is an industry of some importance, the crop of 1894 being estimated at 150,000 boxes. The tree stands less cold than the orange, and planting is confined to lower latitudes and locations of comparative frost exemption. The foregoing varieties are highly esteemed and generally planted.

MINOR CITRUS FRUITS.

(See Explanation of Abbreviations on page iii.)

NAMES.	Origin.	DESCRIPTION.								Adaptability.	
		Fruit.				TREE OR PLANT.					
		Use	Size.	Form.	Color.	Quality.	Season.	Vigor.	Prolificness.		
KUMQUATS-Kin Kans(<i>Citrus Japonica</i>)											
1 Marumi	F	d e s	s	r	o			m	p	Western North Fla.	
2 Nagami	F	d e s	s	o	o			m	p	Eastern North Fla.	
LIMES (<i>Citrus Limetta</i>)											
3 Mexican	F	c s	m	l	l y	v g		v	v p	Central Florida.	
4 Persian	F	c s	m	l	l y	v g				Southern Florida.	
5 Tahiti	F	c s	m	l	l y	v g					
CITRONS (<i>Citrus Medica</i>)											
6 Lyman	F	c	m	l	oy	g					
7 Lemon	F	c	l	l	oy	g					
8 Orange	F	c	s	r	oy	g					
9 BERGAMOTS (<i>Citrus bergamium</i>)											
10 OTAHEITES (<i>Citrus sinensis</i>)	*	—	—	—	—	—	—	*	**		
11 TRIFOLIATAS (<i>Citrus trifoliata</i>).....	*	—	—	—	—	—	—	*	**		

REMARKS.—On varieties and species as numbered above: No. 9, grown as an ornamental, yields an essential oil; 10, grown as an ornamental, and as a stock for dwarfing—fruit valueless; 11, a hardy species, grown as ornamental, extensively used as stock and for hedges—fruit valueless.

DECIDUOUS FRUITS.

PEACHES—(*Persica vulgaris*.)

NOTE.—The time of ripening of any particular variety varies considerably, in Florida, as elsewhere, according to season and locality. Under head of "Season," "very early" means April 20 to June 15; "early," from June 1 to July 15; "medium," from July 1 to August 10; "late," from August 1 to September 20; "very late," September 10 to November 1.

NOTE.—"Color," as applied to peaches, refers to the flesh, and not to the exterior, as with other fruits.

(See Explanation of Abbreviations, on page iv)

NAMES	Origin.	DESCRIPTION.						Adaptability.	
		Fruit.			Plant.				
		Use.	Size.	Class.	Color.	Quality.			
1 Alexander.....	Per	d s	m	f	w	f	v e	Western North Fla.	
2 Amelia.....	Per	d c n	l	f	w r	b	v	* *	
3 Angel.....	P-to	d s	l	f	w	b	e	**	
4 Belle of Georgia.....	N C	d s	l	f	w	g	m	*	
5 Bidwell's Early.....	P-to	d s	m	c	w	g	v e	**	
6 Bidwell's Late.....	P-to	d s	l	c	w	g	e	**	
7 Cabler's Indian.....	S	d c n	l	c	r	b	m	**	
8 Carman.....	N C	d s	l	f	w	b	m	*	
9 Chinese Cling.....	N C	d n	l	c	w	b	m	*	
10 Climax.....	H	d s	m	f	w r	g	g	*	
11 Colon.....	H	d s	m	f	w r	g	g	*	
12 Countess.....	S	d n	l	f	w	g	g	*	
13 Crawford's Early.....	Per	d l s	l	f	y	b	g	*	
14 Elberta.....	N C	a	v l	f	y	b	g	**	
15 Emma.....	N C	a	v l	f	y	b	g	+	
16 Estella.....	S	d s	l	f	w r	g	g	*	
17 Everbearing.....	S	d s	m	f	w r	g	g	**	
18 Ferdinand.....	H	d s	m	c	w r	g	g	*	
19 Florida Crawford.....	S	d e n	l	f	y	b	g	*	
20 Florida Gem.....	H	a	m	f	w r	v g	g	**	
21 General Lee.....	N C	a	l	c	w	g	g	**	
22 Gibbon's October.....	S	d n	m	f	w	g	g	**	
23 Greenboro.....	Per	d s	m	f	w	g	g	*	
24 Honey.....	H	a	m	f	w	g	g	*	
25 Imperial.....	H	a	l	f	w	v g	g	*	
26 Japan Dwarf Blood.....	NOB	d s	m	f	r	f	v e	*	
27 Jessie Kerr.....	Per	d s	m	f	w	f	v e	*	
28 Jewel.....	P-to	d s	m	f	w	g	v e	*	
29 La Magnifique.....	S	d e n	l	c	w	g	g	*	
30 La Reine.....	S	d e n	l	c	w	g	g	*	
31 Maggie.....	P-to	d s	m	c	w	g	g	*	
32 Mamie Ross.....	N C	d s	l	c	w	b	g	**	
33 Mascotte.....	P-to	a	l	f	w	b	g	**	
34 Mountain Rose.....	Per	d s	m	f	w	b	g	+	
35 Onderdonk.....	S	d c n	m	f	y	g	g	+	

CATALOGUE OF FRUITS.

XI

PEACHES—Continued.

(See Explanation of Abbreviations on page iii)

NAMES.	Origin.	DESCRIPTION.							Adaptability.
		Fruit.				Tree.			
		Use.	Size.	Form.	Color.	Quality.	Season.	Vigor.	Prolificness.
36 Oviedo.....	H	a	m	f	w	g g g g	e	g	*
37 Pallas.....	H	d s	m	f	w	g g g g	e e	m	*
38 Peen-to.....	P-to	a	m	c	w	g g g g	v e	v	—
39 Power's September.....	S	d n	m	f r	w	g g g g	v l	p	*
40 Red Ceylon.....	NOB	c	m	f	r	g g g g	v e	p	—
41 Sangmel.....	H	d s	m	c	w r	g g g g	e	m	*
42 Sneed.....	N C	d s	m	c	w	g g g g	v e	p	**
43 Stanley.....	H	d s	m	c	w	g g g g	e	v	*
44 Suber.....	P-to	d s	m	c	w	g g g g	v e	p	—
45 Taber	H	d s	m	c	w r	b	e	p	**
46 Thurber.....	N C	d e n	l	f	w	g g g g	m	f	*
47 Triana.....	H	d s	m	f	w r	g g g g	e	g	**
48 Triumph.....	Per	d s	m	f	y	g g g g	v e	f	*
49 Victoria.....	S	d e n	l	f	y	g g g g	l	f	*
50 Waddell.....	N C	d s	l	f	w	g g g g	e	v	+
51 Waldo.....	P-to	d s	m	f	w	g g g g	v e	p	+
52 Yum Yum.....	P-to	d s	m	c	w	g g g g	g	g	—

REMARKS.—The Peach is successfully grown in localities throughout the greater part of the State, and in some districts is extensively produced for shipment to Northern markets. As a rule, for this purpose, only those varieties are grown which are marked "early" and "very early" in the above table, and which come in before the general crop farther north. To this there are some exceptions, notably in Western North Florida, where some mid-season varieties, like Elberta, are successfully grown for shipment.

While the list of peaches grown in the State embraces many varieties, the various sections, covering a wide range of latitude and longitude, differ to such an extent in soil, climate and conditions of local environment, that the varieties adapted to a particular region are comparatively limited in number. A first and vital essential to successful peach production is the adaptability of variety to locality; in general this is true of peaches to a greater extent than other fruits, and especially so in Florida.

No. 24 is of peculiar shape, being elongated, with deep suture, and sharp recurved point. It is very sweet as its name "Honey" indicates: This variety comes from China and is the progenitor of a race of peaches well suited to the central and northern sections of the State. No. 38, the Peen-to, is also possessed of marked individual characteristics; its shape being flat like a tomato, and unless grown with fertilizers rich in phosphoric acid and potash is apt to be possessed of a bitter almond or noyau flavor. It comes from Southern China or Java and the varieties that have originated from it have given us a sub-tropical race of peaches well adapted to Southern and Central Florida. It is safe to say that nine-tenths of the commercial peach culture of peninsular Florida is confined to the varieties that have been originated from the above two introductions from the Orient. It should be mentioned, however, that neither the varieties that have originated from the Honey or from the Peen-to retain to such a marked extent the shape of the parent. Those that have originated from the Honey show a tendency to the recurved point but in a less marked degree. Those that have originated from the Peen-to are of regular peach shape.

PLUMS—(Prunus.)

NOTE.—“J,” as used in “Origin” column, means that the variety belongs to the Japanese class (P. Triflora) but not necessarily imported from Japan.

(See Explanation of Abbreviations on page iv.)

NAMES (Varieties.)	Origin.	DESCRIPTION.									Adaptability	
		Fruit.					Tree.					
		Use.	Size.	Form.	Color.	Class.	Quality.	Season.	Vigor.	Prolificness.		
1 Abundance.....	J	a	l m		y r	c	e m	v	f	*	Western North Fla.	
2 Babcock.....	J	a	l		r	c	m	v	f	**	Eastern North Fla.	
3 Berckmans.....	J	a	l m		y&r	c	e	v	f	**	Central Florida.	
4 Burbank	J	a	l m		p y	c	e m	v	f	**	Southern Florida.	
5 Chabot.....	J	a	l m		r p	c	m	v	f	+		
6 Excelsior.....	J H	a	m		r p	c	v e	v	v p	+		
7 Hale.....	J	a	l		r	c	m l	v	f	+		
8 Kelsey.....	J	a	v l		g y	f	e	v	s	+		
9 Normand.....	J	a	m		r	f	v e	v	f	+		
10 Red June.....	J	a	m		r	c	m l	v	f	+		
11 Satsuma.....	J	a	l		p	c	m	v	f	+		
12 Wickson.....	J	a	l		b r	c	m	v	f	+		

PEARS—(Pyrus Communis.)

NAMES (Varieties.)	Origin.	DESCRIPTION.									Adaptability	
		Fruit.					Plant.					
		Use.	Size.	Form.	Color.	Quality.	Season.	Vigor.	Prolificness.			
1 Garber	O	a	l	rbp	y&r	gg	m	v	f	*	Western North Fla.	
2 Kieffer	O	a	l	rbp	y&r	gg	v l	v	v p	**	Eastern North Fla.	
3 Le Conte.....	O	a	l	olbp	y g	gg	e	v	p	**	Central Florida.	
4 Smith.....	O	a	l	e p	y g	gg	e	v	p	**	Southern Florida.	

CATALOGUE OF FRUITS.

XIII

GRAPEs—(*Vitis—Labrusca, Aestivalis, Vulpina, etc.*)

(For Explanation of Abbreviations see Page iv.)

NAMES (Varieties.)	Origin.	DESCRIPTION.										Adaptability.	
		FRUIT.					VINE.						
		BUNCH.	BERRY.		Size.	Form.	Size.	Form.	Color.	Quality.	Season.		
Use.	Size.	Form.	Size.	Form.	Vigor.	Prolificness	Western North Fla.	Eastern North Fla.	Southern Florida.	Central Florida.			
1 Concord	L	d nw	l	s h	l	r	b	v gg	m	g	f	*	
2 Cynthiana	A	d w	m	shep	s	r	b	v gg	1	v	f	**	
3 Delaware	H?	a	s	shep	s	r	b	v gg	m	v	p	*	
4 Diamond	L	d s	m	shep	m	r	w	v e	m	v	p	*	
5 Elvira	RH	w	s	c p	m	r	w	v gg	m	v	p	*	
6 Flowers	V	d nw	s	r	v l	e	b	f	v l	v	p	**	
7 Goethe	H	d n	m	shep	v l	e	w	v g	l	v	p	*	
8 Herbemont	A	d w	m	shep	s	r	b	v g	l	v	p	*	
9 Ives	L	s w	m	c p	m	r e	b	f	v e	v	p	*	
10 Niagara	L	d s	l	c p	m	r	w	v gg	v e	v	p	**	
11 Norton	A	d w	m	shep	s	r	b	v gg	l	v	f	*	
12 Salem	H	d n	m	shep	l	r	r	v g	m	v	f	—	
13 Scuppernong	V	d nw	s	r	v l	r	bzw	g	v l	v	v p	**	
14 Lindley	H	d s	l	shep	l	v	v	v g	e	v	v p	*	
15 Thomas	V	d nw	s	r	v l	r	rb	g	v l	v	v p	**	
16 Wilder	H	d n	l	b r	v l	r	b	v g	m	v	f	*	
17 Eden	V	d nw	s	r	v l	r	b	v g	v l	v	v p	**	
18 James	V	d nw	s	r	v l	r	b	g	v l	v	v p	**	

REMARKS.—Numbers 6, 13, 15, 17, 18, entirely free from fungus diseases; 2, 9, 11, almost free from fungus diseases; 1, 3, 4, 5, 10, 14, subject to fungus diseases in wet seasons; 8, 12, 14, 16, subject to fungus diseases; 8, stars apply especially to the East Coast.

GRAPES.—In many locations throughout the State varieties (as indicated by the starring above) succeed well, and are grown for shipment to Northern markets as well as for local consumption and the manufacture of wine.

FOR MARKET.—Delaware, Niagara, and Ives (only) have proved a success as shipping grapes for distant markets (when properly packed). Diamond, on account of its compactness and tendency to crack, does not stand long shipment.

FOR RED WINE.—Cynthiana, Norton and Ives are the red-wine grapes of Florida, as they are the red-wine grapes of the United States. Especially is this true of the first two named; their juice is dark and rich in saccharine matter, and the wine made from these two grapes is said to possess great medicinal properties, owing to its large percentage of tannin. From Thomas, a red wine of a special character can be made, which finds many admirers in the South.

FOR WHITE WINE.—Elvira, Delaware and Niagara are, among the varieties above named, the best grapes for white wine—especially dry wine. It is from Elvira that the famous San Luis Sauternes are made, which have established the reputation of Florida wines. Delaware is better adapted to the manufacture of sweet wine, and from Niagara a good dry wine can be made—much superior to the article made from Northern grown Niagaras, our Florida Niagaras being almost entirely free from that foxy taste so prominent in all Northern Labruscas.

THE MUSCADINE VARIETIES.—Flowers, Scuppernong and Thomas belong to this class, which is very distinct from the other grapes named. They are prodigious growers and bearers, a popular dessert and wine fruit in the South, but are not grown for Northern market.

EUROPEAN VARIETIES (*V. vinifera*)—The U. S. Department of Agriculture, Division of Pomology, has established an experimental vineyard of European varieties, about 550 vines of 175 varieties at Earleton, under the charge of Baron H. von Lutichau. They are all grafted on *V. riparia* and *V. rupestris*, are now in their fourth year and so far are remarkably successful.

OTHER VARIETIES.—Besides the varieties described in the list above, other varieties may do well in particular localities or favored locations, and may be satisfactorily grown for family use, but varieties not included in this Catalogue should not be attempted on a large scale until their value has been demonstrated by experiment.

CATALOGUE OF FRUITS.

KAKI—Japanese Persimmon—(*Diospyros Kaki*.)

(See explanation of Abbreviations on page iv.)

NAMES.	Origin.	DESCRIPTION.							Adaptability.	
		FRUIT.				TREE.				
		Use.	Size.	Form.	Color.	Quality.	Season.			
1 Costata	J	d s	m	rept	s r	g	l	v	p	
2 Hachiya	J	d s	v l	obpt	b r	v g	o	g	s	
3 Hyakume	J	d s	l	rfob	o r	g	m	v	p	
4 Okame	J	d s	l	r f g	b c r	g	&me	v	v p	
5 Tabers No. 129	J	d s	m	rpt	o r	rfob	v e	v	p	
6 Tane-nashi	J	d s	1	rept	l r	b	m	g	vg	
7 Tsuru	J	d s	1	olpt	b r	g	v i	v	v p	
8 Yeddo-ichi	J	d s	m	r f	d r	v g	m	g	p	
9 Yemon	J	d s	l	r f g	o & r	v g	m	v	v p	
10 Zengi	J	d s	s	r f	d r	g	v e	v	*	

THE KAKI succeeds well throughout the State, and is generally, though not extensively, grown. For market, this delicious fruit has the merit of shipping well and keeping long. While new markets are often reluctant to take hold of it, wherever known it sells well.

NOMENCLATURE.—While there has been much confusion in regard to the names of varieties, the above kinds are now as well known as the leading varieties of other fruits; they embrace the most valuable kinds, and the names as given are correctly applied.

CHARACTERISTICS.—Some of the varieties have dark flesh, others light flesh, still others a mixture of the two. The light and dark flesh differ radically in texture and consistency as well as appearance, and when found in the same fruit are never blended but always distinct. The dark flesh is never astringent; the light flesh is astringent until it softens. The dark-fleshed fruit is crisp and meaty, like an apple, and is edible before it matures. Some of the entirely dark-fleshed kinds improve as they soften, like Hyakume and Yeddo-ichi; others are best when still hard, like Zengi and Taber's No. 129. All are good to eat before they are ripe, it is not so important that the dark-fleshed kinds be allowed to reach a certain stage before being offered to consumers unfamiliar with the fruit. The light-fleshed kinds, and those with mixed light and dark flesh, are very delicious when they reach the custard-like consistency of full ripeness. In some the stringency disappears as the fruit begins to soften, as the Yemon, and in a less degree with Okame and Tane-nashi; in others it persists until the fruit is full ripe, as with Tsuru. The light-fleshed kinds should not be offered to consumers unacquainted with the fruit until in condition to be eaten. A person who has attempted to eat one of them when green and "puckery" will not be quick to repeat the experiment. Seeds accompany the dark flesh. The light-fleshed kind are seedless. The kind with mixed flesh have seeds in proportion to the quantity of dark flesh. Hyakume, Zengi and Hachiya are usually overspread at the blossom end with penciling or net-work of dark lines, and this sometimes occurs in other kinds.

VARIETIES.—Name-nashi, Okame, Yemon and Yeddo-ichi excel in quality, perhaps in the order named. Okame (on account of the difficulty of getting the fruits all in the same stage of ripeness) and Hachya are not as good shippers as the others; the latter is valued for its immense size and showiness. Okame, on account of its long season, exquisite beauty, and superior quality, is the best for home use and local market. Zengi and Taber's No. 129 are valued for their earliness, as are Tsuru and Costata for their lateness. Costata is very distinct and handsome in both tree and fruit. Hyakume is most generally grown of the dark-fleshed kinds. Tane-Nashi is perhaps, most highly esteemed in market.

STOCK.—The Kaki should be grafted on the native persimmon, on which it is much more satisfactory than upon its own or imported stocks.

CATALOGUE OF FRUITS.

XV

MINOR DECIDUOUS FRUITS.

(See Explanation of Abbreviation on page iv.)

NAMES.	Origin.	DESCRIPTION.								Adaptability.	
		Fruit.				TREE OR PLANT.					
		Use.	Size.	Form.	Color.	Quality.	Season.	Vigor.	Prolificness.		
APPLES— <i>Pyrus malus</i>											
1 Jennings	N ? F	d n d n	l l	f r	g r	g g	e e	v	p	* * * + -	
2 Red Astrachan											
APRICOTS— <i>Armenica vulgaris</i> .											
3 Santa Fe	N	d n	m	r f	y & r	g	v e	v		* * * +	
Figs— <i>Ficus carica</i> .											
4 Black Ischia	F	d c n	m		b	s				*	
5 Blue Genoa	F	d c n	m		b l	s				*	
6 Brown Turkey	F	d c n	m		b r	s				*	
7 Brunswick	F	d c n	l	v b r	b g	s	v	v p	*	*	
8 Celestial	F	d c n	s	p v	b g	s	v	v p	*	*	
9 Green Ischia	F	d c n	m		g	s	v			*	
10 Lemon	F	d c n	m		y	s	v	v p		*	
MULBERRIES— <i>Morus nigra</i>											
11 Downing	A		m	o l	b	E	v	s		*	
12 Hicks	A		m	o l	b	E & L	v	v p		*	
13 Stubbs	A		l	o l	b	M	v	p		*	
POMEGRANATES— <i>Punica granatum</i>											
14 Acid	d	l	r	r y	b	F	v	p		*	
15 Purple	d	l	r	r y	g	F	v	p		*	
16 Sweet	d	l	r	r y		F	v	p		*	

REMARKS.—Nos. 1 and 2, home use; 3, freestone, home use; 12, unsatisfactory bearer; 13, enormously productive; 14 and 15, superior quality acid; 17, most desirable.

APPLES AND APRICOTS—Are not recommended for general culture, although the varieties named give fair results in the home orchard in the regions indicated.

THE FIG—A most delicious fruit for the table and culinary use, thrives everywhere. It is not grown for shipment, but is one of the most valuable and generally grown home-use-and-local-market fruits. All the varieties named are desirable.

MULBERRIES—Are well adapted to all sections. They are largely grown for swine, poultry, and as a toll for birds; and, by some, the more acid kinds are esteemed for table use.

THE POMEGRANATE—An agreeable fruit, desirable for occasional use, and especially valuable as an ornamental shrub or tree, is not grown for market, but most plantations have a few trees.

MISCELLANEOUS FRUITS.

STRAWBERRIES—(*Fragaria*.)

(See Explanation of Abbreviations on page iv.)

NAMES (Varieties.)	Origin.	DESCRIPTION.										Adaptability.	
		FRUIT.					PLANT.						
		Sex.	Use.	Size.	Form.	Color.	Quality.	Flesh.	Season.	Vigor.	Productive- ness.		
1 Cloud.....	A	P	a	l	bo	d c	f	m	e l	v	p	Western North Fla.	
2 Hoffman.....	A	B	s	m	c	d c	f	f	v e	m	p	**	
2 Lady Thompson..	A	B	s	l	o	s c	f	f	e	m	p	**	
4 Michel.....	A	B	d n	l	b c	y r	v	s	v e	v	p	**	
5 Newnan.....	A	B	a	m	o	c	g	f	e l	v	p	**	
6 Clyde.....	A	B	a	l	c	c	b	f	e l	v	p	**	
7 Brandywine....	A	B	d n	l	c	c	f	f	l	m	f	**	
8 Nick Ohmer....	A	P	n	l	c	d c	b	m	l	v	p	**	
9 Bismarck.....	A	B	s	l	c	s c	f	f	e	v	p	**	
10 Phenomenal....	F	B	a	f	c	d c	b	f	e l	v	p	*	
11 Bubach.....	A	P	d n	l	r c	d c	f	s	l	m	f	**	
12 Excelsior.....	A	B	a	m	o l	d c	g	m	v e	m	p	**	
13 Rising Seedling ..	A	P	a	m	o l	d c	m	f	v e	v	v p	**	
14 Murray's Early...	A	P	a	o	d c	m	f	v e	v	v	v p	**	

REMARKS.—Since 1895 strawberry culture has been largely extended, especially on the Western slope of the peninsula. The Newnan has been allowed to degenerate and the fruit is now rather small for shipment. The Hoffman does better on clay than on sandy lands and needs high fertilizing. The Cloud is vigorous in North Florida and stands drouth well; prolific early in the season. Not liked so well in South Florida. The Rising Seedling is very vigorous and prolific, a firm berry and an excellent shipper. Its foliage, however, grows rather open and it does not protect its fruit well against a frost. The Phenomenal seems to be almost identical with the Hoffman in physical characteristics, but it has a longer season in South Florida. In Bradford county Aroma and Middleton's Early have been tested by individuals and reported on favorably. Glen Mary, Hood River, Dollar, Warfield, Star, Robbins Early, Splendid, Pride of Cumberland and Gandy have been tested and condemned. Klondike is a recent introduction of great promise.

MINOR MISCELLANEOUS FRUITS.

(See Explanation of Abbreviations on page iv.)

NAMES	Origin.	DESCRIPTION.							Adaptability.
		Fruit.				Plant.			
		Use.	Size.	Class.	Color.	Quality.	Season.	Vigor.	Prolificness.
BLACKBERRIES— <i>Rubus villosus</i>	A	d n							
DEWBERRIES— <i>Rubus canadensis</i>	A	d n							
LOQUATS— <i>Eriobotrya Japonica</i>	F	d n	m	e	y	v g	Sp F	v	p
OLIVES— <i>Olea Europea</i>	F	c s	s	e	r b			v	p
SURINAM CHERRY (<i>Eugenia Micheli</i>). .	E I	d c	s	r	y				*

DEWBERRIES, also BLACKBERRIES in some varieties succeed admirably in the regions indicated, but are not cultivated to any considerable extent, owing to the abundance of native, wild berries.

LOQUATS—Are grown in a small way for home consumption. They are a desirable fruit for table, as well as culinary use. At present the Loquat is propagated from seed, and the fruit varies greatly in size and quality. Improved varieties should be originated and disseminated.

OLIVES.—Many trees have been planted, and there are some old groves. The varieties, of which there are many, are not sufficiently known in this State to catalogue.

THE SURINAM CHERRY.—A delicious, acid fruit—is grown to a limited extent, for home use.

TROPICAL FRUITS.

PINEAPPLES—(*Ananas Sativa*.)

(See explanation of Abbreviations on page iv.)

NAMES.	Origin.	DESCRIPTION.							Adaptab'ility.
		FRUIT.				TREE.			
		Use.	Size.	Form.	Color.	Quality.	Season.	Vigor.	Prolificness.
1 Abakka.....	F	a	l	o l	o y	b	m	m	
2 Antigua, Black.....	F	a	s	o l	o y	b	s	l	m
3 Antigua, White	F	a	m	r	y	g g	m	l	g
4 Black Jamaica.....	F	a	m	o l	o y	g	m	l	m

PINEAPPLES—Continued.

NAMES.	Origin.	DESCRIPTION.						Adaptability.
		Fruit.			TREE OR PLANT.			
		Size.	Form.	Color.	Quality.	Season.	Vigor.	Prolificness.
5 Black Prince.....	F	a	m	o y	f	m	m	s
6 Blood.....	F	a	s	r o	f	v f	m g m g	p
7 Crown Prince.....	F	a	m	o y	g g	m	m	r
8 Charlotte Rothschild	F	a	m	o y	v g	m	m	r
9 Egyptian Queen.....	F	a	m	y	m	e	m g g	p
10 Ripley Queen.....	F	a	m	d y	b	f	m g g	r
11 Lord Carrington	F	a	m	o y	m	m	m g g	r
12 Prince Albert.....	F	a	l	o y	r	m	m g g	p
13 Porto Rico.....	F	a	v l	o y	g	m	m g g	f
14 Pernambuco.....	F	d n	s	dy	v	v s	m g g	v p
15 Red Spanish.....	F	a	m	r g	g	f	v v	p
16 Smooth Cayenne.....	F	a	l	o y	v g	f	m g	p
17 Sugar Loaf.....	F	a	s	y	v g	s	m l	r
18 Envile.....	F	a	m	o y	r	s	m	f

REMARKS.—All varieties of pineapples are adapted to South Florida with light protection, though three-fourths of the acreage is unprotected and escapes in ordinary winters without material damage from cold. In South Central Florida they require artificial heat to protect them from frost during the winter. Further North they cannot be successfully grown except under glass.

The Red Spanish, Porto Rico, Abakka and Smooth Cayenne are grown most extensively for market. The Egyptian Queen, Ripley Queen, Blood, Pernambuco and Sugar Loaf are grown for market less extensively. The Charlotte Rothschild and Envile are very little grown, and all the rest above listed only by collectors. These remarks apply to the East Coast.

In the numerous and expensive shedded pineries of Orange County and the West Coast, which are cultivated on an intensive system, the Smooth Cayenne is planted almost exclusively.

BANANAS—(*Musa*.)

(See Explanation of Abbreviation on page iv.)

NAMES, (Varieties.)	Origin.	DESCRIPTION.						Adaptability.
		Fruit.			Tree.			
		Size.	Form.	Color.	Quality.	Season.	Vigor.	Prolificness.
1 Baracoa (Red Jamaica)	W I	d s	1	r	m g g		v	p
2 Cavendish	E I	d s	m	y	m g g		v	p
3 Golden (Tahiti?)	W I	d n	1	y	m g g		v	p
4 Harts Choice	W I	d n	s	y	m g g		v	p
5 Magnifera	W I	d s	1	r	m g g		v	p
6 Orinoco ("Horse Banana")	S A	d e n	1	y	m g g		v	p

CATALOGUE OF FRUITS.

XIX

REMARKS—On varieties as numbered above. Nos. 1, 2 and 3, general market; 4 and 6, home use
COMMERCIAL BANANA CULTURE is confined to the extreme lower portion of the peninsula.

VARIETIES.—The Baracoa is the ordinary Red Banana of commerce. The Cavendish (*M. Cavendishii*) is a dwarf species, also known as "Dwarf," "Dwarf Jamaica," "Chinese," "Martinique." Except the Orinoco, Hart's Choice has a more northern range than the other sorts. The Orinoco matures further north than any other variety, it is an ordinary plantain (*M. paradisaica sapientum*) as distinguished from the Banana or Sweet Plantain (of which Baracoa and Golden are varieties); when allowed to ripen on the plant, it is of good quality, and desirable for home use, in sections too far north for other kinds.

GUAVAS—(*Psidium*.)

(See Explanation of Abbreviations on page iv.)

NAMES.	Origin.	DESCRIPTION.								Adaptability.	
		Fruit.				Tree.					
		Use.	Size.	Form.	Color.	Quality.	Season.	Vigor.	Prolificness.		
1 Common Guava (<i>P. Guaiava</i>) — many unnamed varieties ...	W I	d e n	m	p	g	s & f	v	v p	*	Western North Fla.	
2 White Winter (<i>P. Guaiava</i>)	W I	d e n	s	r	g	f	v	p	*	Eastern North Fla.	
3 Cattley (<i>P. Cattleyanum</i>).....	A	e n	s	r	y	s & f	v	p	**	Central Florida.	
4 Chinese (<i>P. Lucidum</i>).....		e n	s	r	g g	s & f	v	p	**	Southern Florida.	

REMARKS.—On varieties as numbered above. No. 2, distinct and desirable; 3 and 4, hardy.

THE GUAVA is extensively grown in Central and Southern Florida for home use, local market, and the manufacture of jelly. It is a most delicious fruit for dessert, as well as cooking and preserving. There are numerous varieties, as yet unclassified. The hardy kinds, Cattley and Chinese, have about the same range as oranges.

MANGOES—(*Mangifera Indici*.)

(See Explanation of Abbreviations on page iv.)

NAMES	Origin.	DESCRIPTION.								Adaptability.	
		Fruit.				Plant.					
		Use.	Size.	Class.	Color.	Quality.	Season.	Vigor.	Prolificness.		
1 Common (the ordinary sort) ...	E I	d e n	l	k	y & r	g	s	v	p	Western North Fla.	
2 Apricot	W I	d e n	m	k	r & y	v g	s	v	p	Eastern North Fla.	
3 No. 11 (Apple)	W I	d e n	1	r	y	v g	s	v	p	Central Florida.	

MANGOES—Are grown in Tropical Florida for home consumption and local market. Many new sorts, of probable superiority, have been introduced in recent years, but have not been sufficiently tested to be catalogued.

MINOR TROPICAL FRUITS.

NAMES.	Origin.	DESCRIPTION.							Adaptability.	
		Fruit.				TREE.				
		Use.	Size.	Form.	Color.	Quality.	Season.	Vigor.	Prolificness.	
1 Avocado Pear (<i>Persea gratissima</i>).....	W I	d c s	l	p	y & b r	g	s & f	v	p	Western North Fla.
2 Cherimoya (<i>Anona cherimolia</i>)	SA	d n	l	e	bry	g	s	v	p	Eastern North Fla.
3 Custard Apple (<i>Anona reticulata</i>)	W I	dc	l	c	g	g	s	v	*	Central Florida.
4 Granadilla (<i>Passiflora edulis</i>)....	W I	dc	m	r	l r	g	s	▼	*	Southern Florida.
5 Hog Plum (<i>Spondias lutea</i>).....	W I	d	s	r	g	g	s	v	*	**
6 Jamaica Sorrel (<i>Hibiscus sabdariffa</i>).....	E I	c	m	r	r	f	v	p	*	**
7 Mamme Apple (<i>Mammea Americana</i>).....	W I	d s	l	r	br	g	s	-	-	*
8 Mamme Sapota (<i>Lucuma mammosa</i>)....	W I	d s	l	e	y	g	s	-	-	*
9 Otaheite Gooseberry (<i>Cicca disticha</i>).....	W I	c	s	r	w	g	v	p	-	*
10 Pawpaw (<i>Carica papaya</i>).....	E&WI	d c n	l	e	y	f	ev	v	-	**
11 Rose Apple (<i>Eugenia Jambos</i>)	EI	d c	m	r	l	f	sp & s	v	p	**
12 Sapodilla (<i>Achras sapota</i>)	WI	d s	m	r	br	g	ev	v	p	**
13 Sour Sop (<i>Anona muricata</i>)....	WI	c	l	c	g	g	s	v	p	**
14 Spanish Lime (<i>Melicocca biguana</i>)	WI	d	s	r	g	g	s	v	p	**
15 Star Apple (<i>Chrysophyllum cainito</i>).....	WI	d	m	r	g	g	sp	v	p	*
16 Sugar Apple (<i>Anona squamosa</i>)	WI	d c	m	c	g	g	s & f	v	p	**
17 Tamarind (<i>Tamarindus Indicus</i>)	EI	d s	sm	pod	b r	f	ev	v	p	**

REMARKS.—On species as numbered above: Nos. 1, 7, 12 and 17, sell well in general market; 2, 3 and 16, much admired in the tropics; 5 delicious; 6 and 9, desirable for cooking; 13 and 17, esteemed for acid drink; 4, 6, 9 and 11, especially fine for jelly.

THE MINOR TROPICAL FRUITS.—Listed above are none of them raised for market on a large scale, but all are desirable, and are grown, over a more or less extended area, in the more tropical regions of the State, a number being produced in considerable quantities for local market or consumption. A few, like the Mamme Apple, Sapodilla and Avocado Pear, ship well and find ready sale; the Avocado Pear has brought good prices in New York market. Some, like the foregoing, the Star Apple and the Hog Plum, are agreeable to most palates upon first acquaintance, others, like the Sugar Apple, Cherimoya, and Sour Sop, which are much esteemed by those accustomed to the fruit, require an acquired taste to be appreciated. A number are grown for home use, almost or quite exclusively, either because too tender for transportation, like the Sugar Apple and Pawpaw, or for their value for culinary purposes; of the latter, the Otaheite Gooseberry is a valuable acid fruit for cooking and preserving. The Jamaica Sorrel is not a fruit, in the proper sense, but produces a pulpy calyx, which makes an excellent substitute for cranberries. The acid Sour Sop is used for flavoring, preparing drinks, etc., and is much esteemed in sickness. The Tamarind bears a pod with a pleasant acid pulp which, preserved in sugar, finds ready sale in the general market.

NUTS.

(See Explanation of Abbreviations on page iv.)

NAMES.	Origin.	DESCRIPTION.						Adaptability.					
		Fruit.			Tree.			Western North Fla.		Eastern North Fla.		Central Florida.	
		Use.	Size.	Quality.	Vigor.	Prolif.							
CHESTNUTS—Castanea													
1 Chinquapin (<i>C. pumila</i>).....	A F	d n d c s	s v l	v g g	v v	p g	*	*	*	*	*	*	+
2 Japan Chestnut (<i>G. Japonica</i>).....													
PECANS—<i>Carya oliveformis</i>.													
3 Paper Shell.....	A	d s	b	b	v	p	**	*	*	*	*	*	
4 Centennial.....	La	d s	l	b	v	p	**	**	**	**	**	**	
5 Frotscher.....	La	d s	l	b	v	p	**	**	**	**	**	**	
6 Stuart.....	Miss	d s	l	b	v	p	**	**	**	**	**	**	
WALNUTS—<i>Juglans</i>.													
7 Japan Walnut (<i>J. Seiboldii</i>)	F	d	m	b	v	p	†	†	†	†	†	†	
COCOANUTS.													
8 Seedlings.....	F	d c s	l		v	p	—	—	—	—	—	—	**

NUTS.—The pecan has long been grown in the State in a small way; it flourishes in many localities and its culture is profitable. In addition to the four varieties above listed, other good varieties as yet only of local repute, will undoubtedly become prominent in the near future. The Japan chestnut of comparatively recent introduction, has proved fairly well adapted but hardly worthy of extensive commercial culture. The Japan walnut, of still more recent introduction, bears well and makes a remarkably handsome tree, but is not up to the standard of the best English walnuts in quality.

Extensive Cocoanut plantations are to be found on the southern coast. Little or no attention has been paid to varieties.



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STEEN

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