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NEW YORK
BOTANICAL GARDEN

Transactions

OF THE

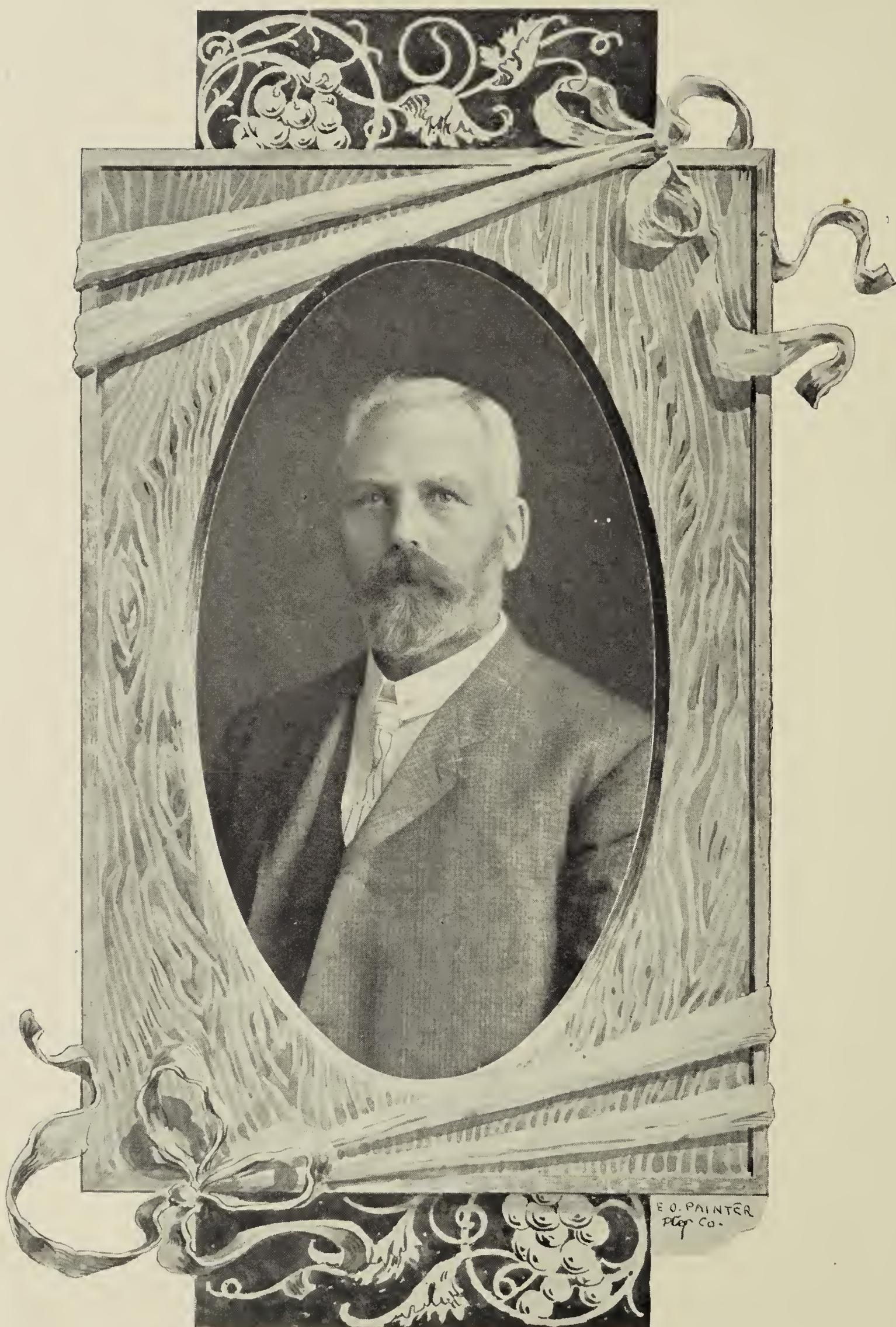
FLORIDA STATE

Horticultural Society

FOR

1905





E. O. PAINTER
Phot Co.

G. L. TABER.
(See Resolutions.)

PROCEEDINGS
OF THE
Eighteenth Annual Meeting
OF THE
Florida
State Horticultural Society

HELD AT
Jacksonville, May 9, 10 and 11, 1905

Compiled by the Secretary.

PUBLISHED BY THE SOCIETY.

DE LAND, FLA.:
THE E. O. PAINTER PRINTING COMPANY

1905

CONSTITUTION.

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

ARTICLE 2. Any person may become a 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.

ARTICLE 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.

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

ARTICLE 5. The duties of the President, Vice-Presidents, 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.

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

ARTICLE 7. The Constitution may be amended by a vote of two-thirds of the Members present.

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 standpoints, 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.

Florida State Horticultural Society.



OFFICERS ELECT FOR 1905:

PRESIDENT:

C. T. McCARTY, Eldred.

VICE-PRESIDENTS:

Dr. GEORGE KERR, Pierson; G. W. WILSON, Jacksonville;
DR. C. W. RICHARDSON, Tampa.

SECRETARY:

E. O. PAINTER, Jacksonville.

TREASURER:

W. S. HART, Hawks Park.

EXECUTIVE COMMITTEE:

LYMAN PHELPS, Chairman, Sanford; E. S. HUBBARD, Federal Point;
G. L. TABER, Glen St. Mary.

President, Secretary and Treasurer, ex-officio.

STANDING COMMITTEES.

Citrus Fruits: L. B. Skinner, Dunedin; E. L. Brady, Titusville; L. B. Knox, Bulow.

Diseases, Insects and Method of Control: F. M. Rolf, Lake City; W. S. Hart, Hawks Park; F. G. Sampson, Boardman; A. C. Haynes, DeLand; F. C. Armstrong, Terra Ceia; E. S. Hubbard, Federal Point; The President and Secretary ex-officio members.

Peaches, Plums and Pears: C. M. Grif-
fing, Jacksonville; J. Y. McKinney,
Candler; E. H. Hayward, DeLand.

Grapes, Figs and Kaki: B. M. Hampton,
St. Augustine; J. E. Bacon, Ormond;
A. J. Pettigrew, Manatee.

Pineapples and Other Tropical Fruits:
Wallace R. Moses, West Palm Beach;
P. H. Rolfs, Miami; J. D. Bell, St.
Petersburg.

Ornamentals: Mrs. Geo. S. Gates,
Welaka; W. C. Steele, Switzerland; E.
N. Reasoner, Oneco.

Fertilizers and Irrigation: Prof. Flint,
Lake City; L. A. Wilson, Jacksonville;
F. D. Waite, Palmetto; L. Heimberg-
er, Jacksonville.

Nut Culture: H. K. Miller, Monticello;
J. H. Wylie, Interlachen; C. F. Bar-
ber, McClenney.

Transportation: Capt. C. E. Garner,
Jacksonville; T. A. Carroll, Jackson-
ville; W. A. Bours, Jacksonville.

Strawberries and Miscellaneous: B. F.
Rigdon, Palatka; J. M. Brownlee,
Starke; R. K. Muirhead, Pasadena.

Vegetables: A. L. Liles, Terra Ceia;
A. F. Wyman, Bradentown; W. M.
Gist, McIntosh.

Ad Interim Committee on New Fruits
and Nomenclature: G. L. Taber, Glen
St. Mary; E. N. Reasoner, Oneco; O.
W. Conner, Tangerine.

Legislature: G. P. Healy, Jeffrey; L. H.
Gaitskill, McIntosh; M. F. Robinson,
Sanford.

List of Members.

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Redmond, D., St. Nicholas, Fla.

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Allen, Wm., 136 W. 79th St., New York City,
Postoffice box 909.
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Chidester, D. D., Philadelphia, Pa., 2321 Madi-
son Square.
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Adams, G. W., Thonotosassa, Fla.

Adams, Mrs. G. W., Thonotosassa, Fla.
Adams, F. H., Dunedin, Fla.
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 Hume, Mrs. H. H., Raleigh, N. C., care H. H. Hume.
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 Mims, S. C., Bonaventure, Fla.
 Moehler, Theo., Palm Beach, Fla., Postoffice box 161.
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 Perry, D. W., Pomona, Fla.
 Perry, Francis W., Ft. Myers, Fla.
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9

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 Rankin, W. H., Punta Gorda, Fla.
 Rector, H. J., Florahome, Fla.
 Rector, Mrs. H. J., Florahome, Fla.
 Reibold, C. P., Sanford, Fla.
 Read, E. H., Grott Dratsenstein, Wellington, Cape Colony, South Africa.
 Reasoner, E. N., Oneco, Fla.
 Reed, J. E., Indianola, Fla.
 Reeve, W. S., Cottage Hill, Fla.
 Reimer, F. C., Lake City, Fla.
 Richardson, H. H., Jacksonville, Fla.
 Richardson, Erving L., Avon Park, Fla.
 Richardson, H. C., Tampa, Fla.
 Richardson, C. O., Miami, Fla.
 Riggin, G. W., Bradenton, Fla.
 Robinson, Will, Palmetto, Fla.
 Rollins, C. A., Thonotosassa, Fla.
 Rolfs, F. M., Lake City, Fla.
 Rolfs, Mrs. F. M., Lake City, Fla.
 Rolfs, Mrs. P. H., Miami, Fla.
 Rose, R. E., Tallahassee, Fla.
 Rose, Mrs. R. E., Tallahassee, Fla.
 Ross, E. H., Miami, Fla.
 Roesch, Robt., Bradenton, Fla.
 Ruple, Geo. W., Ft. Pierce, Fla.
 Sadler, F. A., Clearwater, Fla.
 Sampson, F. G., Boardman, Fla.
 Sardy, Arthur L., Jacksonville, Fla.
 Saunders, Mrs. N., Eden, Fla.
 Sawyer, L. J., Tibbals, Fla.
 Schaefer, J. M., Chicago, Ill., 6630 Yale Ave.
 Schabinger, J. J., Delray, Fla.
 Schmelz, V., Sylvan Lake, Fla.
 Schnider, Chas. F., Ocala, Fla.
 Schnauber, F., Yankton, S. D.
 Scott, Dr. A. L., Starke, Fla.
 Scruggs, S. M., South Jacksonville, Fla.
 Sellards, E. H., Lake City, Fla.
 Sellmer, Chas., Zellwood, Fla.
 Shaddick, W. H., Lady Lake, Fla.
 Shepherd, S. P., Winter Park, Fla.
 Shepherd, F. W., Winter Park, Fla.
 Shryock, W. P., New Smyrna, Fla.
 Simmons, Mrs. Ezra, Georgiana, Fla.
 Simmons, W. P., Jacksonville, Fla., care E. O. Painter Fertilizer Co.
 Simpson, J. L., Weirsdale, Fla.
 Skinner, L. B., Dunedin, Fla.
 Smith, G. F., Ft. Myers, Fla.
 Smith, W. E., Daytona, Fla.
 Smith, F. E., Jacksonville, Fla.
 Smith, James A., Culter, Fla.
 Snow, Geo. E., Eastlake, Fla.
 Snyder, A. S., St. Petersburg, Fla.
 Sorensen, John, Jensen, Fla.
 Soar, J. J., Little River, Fla.
 Spencer, Harold E., New York City, N. Y., 198 Broadway.
 Spencer, Thomas, New York City, N. Y., care Kingan Provision Co., Manhattan Market.
 Spencer, Mrs. Thomas, New York City, care Kingan Provision Co., Manhattan Market.
 Spleiss, G., New Smyrna, Fla.
 Springstead, I. E., Palmetto, Fla.
 Standard Fertilizer Co., Gainesville, Fla.
 Stanton, W. E., Miami, Fla.
 Steele, W. C., Switzerland, Fla.
 Stenstrom, M. J., Sanford, Fla.
 Stenstrom, Mrs. J. J., Sanford, Fla.
 Sterling, Miss Emma M., Thonotosassa, Fla.
 Sterling, H. J., Delray, Fla.
 Stevens, H. B., Stetson, Fla.
 Stewart, I. A., DeLand, Fla.
 Stockbridge, H. E., Lake City, Fla.
 Street, A. W., Ormond, Fla.
 Strout, N. T., Fruitland Park, Fla.
 Stryker, T. H., Rome, N. Y.
 Strunk, W. P., Roodhouse, Ill., Postoffice box 401.
 Switzer, W. A., Port Tampa City, Fla.
 Tancre, Mrs. W. H., Ankona, Fla.
 Terrell, Chas. M., Miami, Fla.
 Terwillegar, A. M., Mims, Fla.
 Thomas, L. P., Palmetto, Fla.
 Thompson, W. B., Oneco, Fla.
 Thompson, C. H., Winter Haven, Fla.
 Thompson, J. O., Oneco, Fla.
 Thornton, C. B., Orlando, Fla.
 Tillinghast, B. F., Davenport, Iowa, Postoffice box 405.
 Tinny, R., Ozona, Fla.
 Tichler, P., Jacksonville, Fla.
 Tompkies, Mrs. T. W., Ft. Pierce, Fla.
 Tompkins, C. A., Lake City, Fla.
 Tonner, W. E., Citra, Fla.
 Townsend, C. M., Philadelphia, Pa., 500 N. Broad St.
 Tracey, John F., Glen St. Mary, Fla.
 Trueman, R. B., Ft. Pierce, Fla.
 Tucker, R. M., Orange City, Fla.
 Tupper, Jennie L., Ormond, Fla.
 Turner, J. P., New Smyrna, Fla.
 Turner, L. M., Rome, Ga.
 Tysen, J. R., Jacksonville, Fla.
 Tysen, C. R., Jacksonville, Fla.
 Upham, E. S., South Lake Weir, Fla.
 Van Wyck, Miss Mary, Federal Point, Fla.
 Van Gorder, W. D., St. Petersburg, Fla.
 Verelst, Chas. F., Jacksonville, Fla.
 Von Luttichau, H., Earlton, Fla.

FLORIDA STATE HORTICULTURAL SOCIETY.

- Wait, F. D., Palmetto, Fla.
Waddell, E. A., Miami, Fla.
Wakelin, G. M., Lane Park, Fla.
Wakelin, Miss Grace V., Lane Park, Fla.
Wakelin, Amos, Philadelphia, Pa., Bullit Building.
Walton, W. Emley, Miami, Fla.
Walker, Dr. G. E., Huntington, Fla.
Walker, Mrs. G. E., Huntington, Fla.
Walker, E. B., Jacksonville, Fla.
Waldo, C. P., Emporia, Fla.
Warner, S. C., Palatka, Fla.
Warner, F. D., Gainesville, Fla.
Warnock, W. A., Oak Hill, Fla.
Watney, A. P., Fulton, Fla.
Warren, I. R., Harcourt, Victoria, Australia.
Watson, Capt. A. P., Bradenton, Fla.
Watts, B. F., Leesburg, Fla.
Weeks, Geo. M., Glen St. Mary, Fla.
Weidman, Jacob, Pittsburg, Pa., 319 Lexington Ave.
Wells, W. T., Melbourne, Fla.
Welch, Irving H., Jacksonville, Fla.
Welch, D. H., Palmetto, Fla.
Westlake, J. Willis, Lake Helen, Fla.
Wester, P. J., Miami, Fla.
Whitaker, Arthur, New Smyrna, Fla.
White, Miss L. M., Dupont, Fla.
Whitman, A. M., W. Palm Beach, Fla.
Whitten, W. M., Punta Gorda, Fla.
Whitten Miss Emily, Punta Gorda, Fla.
Wightman, L., Tampa, Fla.
Wilkinson, A. B., Oak Hill, Fla.
Wills, F. L., Sutherland, Fla.
Williams, Edward H., New York City, N. Y.,
 32 Broadway.
Williams, Chas., Honokaa, Hawaii.
Williams, Mrs. C. M., St. Petersburg, Fla.
Williams, D. E., Jacksonville, Fla.
Wilson, Geo., Jacksonville, Fla.
Wilson, John A., San Juan, Porto Rico.
Woodall, Henry, St. Petersburg, Fla.
Woolwine, E. M., Seville, Fla.
Wyeth, Mrs. J. H., Winter Park, Fla.
Wyman, A. F., Bradenton, Fla.
Wylie, J. H., Interlachen, Fla.
Wyckoff, Jno. S., Citra, Fla.
Yocum, Mrs. W. F., Lake City, Fla.

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

The Eighteenth Annual Meeting was held in the Board of Trade rooms, Jacksonville, commencing Thursday evening at eight o'clock. The meeting had the largest attendance of any session held in Jacksonville; nearly two hundred members having registered sometime between the first and the last day. The program was a very interesting one and the

sessions were all well attended. The entertainment furnished by the Board of Trade, Ladies' Friday Musicale and others was greatly enjoyed by the members. The members evidently thought that Jacksonville was the home of the Society as when the question of the next place of meeting was brought up, Jacksonville was unanimously selected.

Minutes.

FIRST DAY.

Evening Session.

1. Called to order by President Taber.
2. Opening prayer by Rev. W. A. Hobson.
3. Address of Welcome on behalf of the city by Mayor G. M. Nolan.
4. Address of Welcome on behalf of the Board of Trade by Capt. C. E. Garner.
5. Response for the Society by C. T. McCarty.
6. Annual Address of the President.
7. Remarks by Maj. Fairbanks and Geo. L. Wilson.

SECOND DAY.

Morning Session.

1. Report of the Standing Committee on Citrus Fruits: E. S. Hubbard, O. W. Conner.
2. Discussion of same.
3. Report of Standing Committee on Diseases, Insects and Method of Control: Prof. H. A. Gossard, John J. Beers, A. B. Harrington, Prof. P. H. Rolfs.
4. The Society adjourned and took a trip on the Ferry Boat Duval to the works of the E. O. Painter Fertilizer Co., at South Jacksonville, where they were

treated to a bountiful spread and had the privilege of inspecting the factory, returned in time for the afternoon session.

Afternoon Session.

1. Report of the Standing Committee on Pineapples and Other Tropical Fruits, Mrs. E. E. Ankeney, Eldred.
 2. Report of the Standing Committee on Figs, Grapes and Kaki, H. von Lutichau, Earleton; J. H. Wylie, Interlachen.
 3. Special Paper on Kaki, by Wm. Macklin of Dinsmore.
 4. Report of the Standing Committee on Vegetables, C. G. White, Hastings; F. C. Armstrong, Terra Ceia; E. V. Blackman, Miami.
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Evening Session.

1. Report of Standing Committee on Ornamentals, Mrs. C. T. McCarty, Eldred; Mrs. P. H. Rolfs, Miami; G. A. Purdie, Ormond.
 1. Preparation of Foods from Home Grown Products, Mrs. H. H. Harvey, Seffner.
 3. Entertainment by the Ladies' Friday Musicale under the auspices of the Board of Trade.
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THIRD DAY.

Morning Session.

1. Report of the standing Committee on Peaches: J. P. Mace, Lake Helen; H. F. Hole, Fulton.
2. Report of Standing Committee on Fertilizer and Irrigation, Dr. W. C. Richardson, Tampa; C. W. Butler, St. Petersburg.
4. At ten thirty a. m., the Society ad-

journed to accept the invitation of the Board of Trade for a ride on the St. John's River on the Steamer Garner. Owing to an accident to the shaft of the Steamer Garner, the Ferry Boat Duval was substituted and the Society enjoyed a ride on the river and were served with a collation such as only the Board of Trade can put up.

Afternoon Session.

1. Election of Officers.
President—C. T. McCarty.
Vice-Presidents—Dr. C. W. Richardson, G. W. Wilson, G. F. Kerr.
Secretary—E. O. Painter.
Treasurer—W. S. Hart.
Executive Committee—Rev. Lyman Phelps, E. S. Hubbard, G. L. Taber.
 2. Jacksonville selected as next place of meeting.
 3. Reports of the Secretary, Treasurer and Executive Committee read.
 4. Report of the Standing Committee on Transportation.
 5. Report of the Committee on Resolutions.
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Evening Session.

1. Diseases of the Irish Potato, illustrated with stereopticon views, by F. M. Rolfs assisted by E. O. Painter.
2. The Necessity of a Commercial Stock Food Law in Florida, Capt. R. E. Rose.
3. Special papers were presented by T. A. Carroll and W. S. Hart and ordered printed in the minutes.
4. Adjourned, sine die.

Address of Welcome.

BY MAYOR G. M. NOLAN.

Mr. President, Ladies and Gentlemen:

In looking over this large audience I see a great many familiar faces, emphasizing the fact that you are not sojourners in our beautiful State nor strangers in its metropolis, but one of the oldest organizations in the State and one of its staunchest pillars of prosperity. I am glad also to see so many ladies, fair daughters of Florida, present, and congratulate you and the Florida State Horticultural Society upon the large attendance at the opening of your eighteenth annual session.

Mr. President, the city of Jacksonville as you know has now become one of the greatest convention and assembly meeting places in the country. I may tell you in advance, that the gentleman who will follow me in an address of welcome on behalf of the Board of Trade of this city, Captain C. E. Garner, will inform you that these annual meetings of societies and conventions keep the mayor almost constantly on his feet delivering welcoming addresses, and that I have a cut and dried speech which I deliver to every one of them. While it is true that it is one of the most important functions of the mayoralty, these privileges are a great pleasure to me, and these annual meetings of the various societies are a great benefit not only to the city of Jacksonville, but to the State at large as well. I am not here to give you a cut and dried or second hand address of welcome, for of all the societies that hold their annual sessions in this city, none of them are, I wish now and

here to assure you, more heartily welcome than the Florida State Horticultural Society, whose great work, past and future, for the interests of the great State of Florida, has been basic, and it is and will continue to remain one of the staunchest foundation-stones of the prosperity of this State.

Mr. President, I must confess that I am not sufficiently versed in the nomenclature of Horticulture to know or define its limitations. My idea, however, is that horticulture embraces everything at least that would not properly come under the generic term of agriculture, and of necessity it must include some of the arts of agriculture, I therefore conclude that it is esthetic agriculture, it gives us the fruits and flowers of the gardens and orchards of the homes, rather than the products of the broad acres, and as the State of Florida is destined to become the garden and orchard of this country, the great work of your society is of the greatest interest to the prosperity of the State of Florida. Indeed Mr. President I have perceived and do perceive, as must every one with common knowledge of your great work, that upon your endeavor and achievement rests in a great degree the name and the fame of the great State of Florida.

Now, Mr. President, should I attempt to catalogue the vast collections and varieties of the fruit of the orchard, the ornaments of the garden, tropical and semi-tropical, with which every active member

of your society is doubtless familiar, I should become bewildered. The greatest ancient achievement in horticulture was perhaps the hanging gardens of Babylon, from whence transplanted from Persia we know came the rose, apple, pear, quince, pomegranate and the peach—there, Mr. President, at the mention of the luscious peach I can proceed no further. I do not say this with any disparagement against any of the other of our great family of citrus fruit, the orange, the grapefruit, the plum, the apple, but the vision and aroma

of peaches and cream makes oratory succumb to appetite, and I must stop. (Applause.)

Mr. President, in conclusion, I have the great honor to tender to you the keys of the city, and to extend to you and each of you a double, thrice welcome to the City of Jacksonville, the Metropolis of your State, and bespeak for you a session of great benefit to the State as well as of pleasure and profit to each of you individually, and as a society.

ON BEHALF OF THE BOARD OF TRADE.

BY CAPT. C. E. GARNER.

Mr. President, Ladies and Gentlemen:

On behalf of the Board of Trade as its president, and as representative of the business interests of the City of Jacksonville, I desire to extend to you, to the Florida State Horticultural Society and to each of you individually and collectively a most hearty, cordial welcome to our City. I wish to reiterate what has been said by the Honorable Mayor who has just preceded me, that Jacksonville has become one of the greatest convention and assembly meeting places in this country. There are at the present moment several other organizations and societies holding their annual sessions in the city, moreover these conventions and gatherings are not confined to those of the State, they come here from all over the country to hold their annual meetings. Many of these dates being arranged for during the winter months in order that they may enjoy the balmy climate of our fair State for their deliverances, Mr. President, I wish

here to assure you that, of all of these societies, none of them are more welcome than the Florida State Horticultural Society, indeed we claim you as one of us, to you, to your great work, is due in a great measure the renown of our fair State.

Mr. President, I wish at this time to invite the attention of your society to a movement in this State which in my judgment, if properly handled, will prove of much benefit to the State and to the Horticultural interests of this State. I refer to the effort now being made to the transplanting of a Japanese Colony in Florida. The Japanese, Mr. President, as you know, are essentially a horticultural people, and I believe if this movement receives the encouragement it merits that the State will be greatly benefitted, especially the horticultural interests of the State.

Now, Mr. President, after you have listened to the eloquent address of the Honorable Mayor, you will perhaps be inclined to expect me to soar into similar flights of

oratory, this I am unable to do, it has always been my portion to follow the Honorable Mayor, and he has the happy faculty of covering the very points on which I would address you. This he does with so much grace and elegance that it would be folly for me to undertake to improve upon it, therefore I crave your indulgence in that direction, but when it comes to the cordiality of the welcome that I am commissioned to extend to you, that is peculiarly my province, and where I may fail in eloquence, I hope to come up to the measure of a counterbalance in the fullness and completeness of this privilege.

In conclusion, Mr. President, I wish to announce that the Board of Trade has planned and arranged for a portion of your entertainment, a trip upon the beautiful St. Johns river on the good Steamer May Garner, which is duly announced upon your program.

Trusting that the deliberations of this your eighteenth annual session, will prove to be of much pleasure to the society and of benefit to the State, and with assurances of that welcome which is yours as of right as your home, I bid you again a most hearty, cordial welcome.

Response for the Society.

BY C. T. McCARTY.

Mr. Mayor and Mr. President of the Board of Trade, and Mr. President of the Florida State Horticultural Society, Ladies and Gentlemen:

It affords me infinite pleasure to be given the opportunity to reply to the glowing and cordial words of welcome to which we have listened with so much pleasure, uttered by his Honor, the Mayor of the City of Jacksonville, on behalf of its citizens and the President of the Board of Trade, representing the great commercial interests of this Metropolis of the great State of Florida. The address of welcome of modern times has become an oration—a poem, and it has been made the occasion for the display of wit and wisdom, oratory and rhetoric of some of the most brilliant and far-seeing of our fellow-countrymen. The responses to the ad-

dresses of welcome have necessarily had to keep pace with the character of the addresses themselves. This has imposed some hardship upon those who are called upon to respond to these eloquent addresses of welcome.

Jacksonville is to-day pre-eminently the Convention City of the State. Within her portals she has harbored and entertained during the last year the various Conventions that have represented the great Business, Commercial, Horticultural and Agricultural enterprises of the State. In the progress of these Conventions you have developed some trained Orators, in the persons of your magnetic and eloquent Mayor, and your sound and far-sighted President of the Board of Trade. Among the splendid efforts that they have made in the past, none, we think, exceeds those

glowing speeches to which we have to-night listened.

The lover, whose eloquent words of endearment and encouragement are breathed into the ear of his beloved, tells but little that is new. He repeats the same old, old story, but it is always fraught with magnetism and poetry for the loved one who hears it. This shall always continue to be the case so long as Humanity shall continue to remain true to those high and holy instincts that have characterized it in the past.

The mother standing on the threshold of the Home, who receives to her bosom the long-absent son, speaks a few broken words of welcome and receives in response a few words of gladness and comfort, only an interchange of expressions of welcome of the mother and the response from the glowing heart of the son. In both of these cases the phrases spoken were reduced to the plain, "Thou art welcome" and the response that the welcome "is appreciated and reciprocated," whatever is said means the same.

But in the evolution of these civic and fraternal gatherings these addresses of welcome and responses have grown to things of beauty and things of great proportion, and among the various illustrations of such beautiful addresses, those we have listened to to-night stand pre-eminent. I do not hope to be able to give fit utterance to the feelings that well up within me in attempting to-night to respond to these eloquent addresses. I can only assure you, Mr. Mayor, and Mr. President of the Board of Trade, that what my words shall lack in oratory and logic they shall amply make up in sincerity and cordiality.

This Society in its travels about the State, has visited nearly all of the prin-

cipal cities and towns. We have been to far-off Pensacola; we have been down to beautiful Tampa; we have enjoyed the hospitality of the young and lusty Miami by the Bay of Biscayne; we have dreamed in the historic old St. Augustine, and enjoyed its hospitality, we have enjoyed our visit to Ocala and Ormond and to many other places and at all of these towns and cities we have listened to glowing words of welcome by their distinguished sons, and the Mayors of those proud municipalities. Our best efforts have been called in play to reply to these words of welcome and show our appreciation of the hospitality extended to us everywhere we have gone. On none of these occasions have the words of welcome spoken, been sweeter to us, or more fittingly expressed than at this hour. Your eloquent Mayor is famous throughout the State for his witticisms, his profundity and his eloquence. The President of your Board of Trade has in his analytical and business-like way nobly presented the sentiments of the business element of this fair city who have greeted us to-night.

A few years ago we accepted your hospitality and before the meeting time the fiery demon ran riot through your fair city. The Fire-King added to his trophies the destruction of beautiful Jacksonville. He added your fire to the history of celebrated fires, those of Moscow, Boston and Chicago. In your hour of fallen splendor and buried glory we accepted the hurried invitation of your sister City, St. Augustine. We came as close to Jacksonville as we could well come and be entertained. As soon as your recovery permitted, we again accepted your cordial invitation to hold our meeting in your midst. We came—and behold! a new city had arisen. The spires of your churches and school

houses again pointed heavenward. Mammoth business blocks had arisen, adding to your commercial prosperity and your noble river was crowded with the commerce of the State, bound for the nations of the earth. Your magnificent railway systems were taxed to their fullest capacity in carrying to and from your busy marts the commerce that was to gladden you and build up the entire state. We enjoyed on that occasion, and on every other when we accepted your hospitality, sessions of the greatest success, marking the greatest prosperity in the history of our Society. Your sons and daughters entertained us with excursions, with music, with receptions, with everything that became them and was worthy of the City they represent. We are again your guests. We see all around us new evidences of that prosperity which not only at this time characterizes Jacksonville, but the whole State of Florida and the entire South.

Mr. President: In viewing the prosperity of this country at large we are prone to forget its real importance. We are likely to overlook the main things that are bringing to pass this commercial and business prosperity. To-day there are two great industrial enterprises on foot that shall stamp their impress upon this country, that shall give it new impetus. I refer to the great Panama enterprise and the extension of the East Coast system of railroad to the distant island of Key West. Of the latter I wish especially to speak and in speaking of it I feel that I represent not only the people of the South and the people of the State of Florida, but in a special way, the business of the Florida State Horticultural Society. It has been well said that, "The history of a country is the biography of her

great men." In dealing with this immense business enterprise the extension of railroad facilities to the Island of Key West, we must necessarily consider the part played in it by the Friend and Patron in the development of what was but a few years ago the wilderness known as the East Coast of Florida. That wilderness became the object of attention of one of the great Captains of Industry of the twentieth century. In it he beheld vast possibilities. Actively and indomitably he pushed forward step by step southward until the shores of the Indian River were reached. Onward, still onward, until beautiful Lake Worth was bound to Jacksonville by ribs of steel. Here a pause was made until the beauties of the Bay of Biscayne were brought to light by this indomitable developer. Then he pushed forward into the country of the Seminoles, the country of the everglades the faraway tropics of the State. Everywhere palaces of beauty arose. The various industries of the sections touched were developed. Splendid facilities for trade and commerce were afforded and the East Coast became the Shibboleth of the Home-seeker, the Tourist for pleasure and those in search of health. And to-day the stupendous announcement is made that this Captain of Industry is determined to link the isolated Key West with the balance of the state and of the nation. At what cost of energy and of capital I dare scarcely guess. That it is one of the most stupendous enterprises of modern times is admitted by all, and yet the Wizard of the East Coast, with vision sharpened by experience and with the courage of the man of affairs, and above all with the love for his State which has strengthened with the passing years, is eager to undertake this great enterprise. A glance at the

map of the State will show the splendid geographical situation of Key West as *entrepot* of the commerce of the West Indies, of South and Central America, and the far-off Pacific Coast via the Panama Canal. It requires no prophet to foresee the prosperity and the development that will follow the completion of this enterprise, and that it will be completed, and within the lifetime of its great originator I have no doubt. Where has that brain expended itself for the betterment of a locality, for the accomplishment of a great purpose—and ever failed? On that progressive escutcheon only the word "SUCCESS" is engraved. In that great heart only sentiments of generosity find a lodgment. That ample purse is always open for the development of new enterprises and the addition of new resources to the commerce and industries and enlightenment of the age.

Mr. Chairman: I know not what the generous people of Jacksonville have provided in the way of entertainment for this society, but if the experience of the past is to be the prophecy of the future that entertainment will be ample, delightful and worthy of the guests and of the hosts. On behalf of the Society I extend to the

people of Jacksonville a cordial invitation to attend our sessions, to partake with us in the deliberations that shall come before our Society. We are here, not alone for entertainment, and pleasure, but for work. In the every-day experiences of the Horticulturist there are problems to solve, questions to answer, that call for the wisdom of all of our members and in the solution of these problems will be found the key to our success. It will afford us extreme pleasure to see as many of the ladies and gentlemen of Jacksonville present at our meetings as can conveniently attend.

Mr. President, in conclusion I desire to thank most cordially the people of Jacksonville through their distinguished Mayor, and the business interests of Jacksonville, through the President of the Board of Trade, for the cordial welcome they have given us; the words of cheer they have spoken, the high and noble purposes to which they have called us, and when the Session of 1905 shall have passed into history, we trust that the work done in this meeting, its joys and its pleasures will endure as a memento of the Present and a prophecy of the Future.

President's Annual Address.

BY G. L. TABER.

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

The message that I bring you to-day is of the woods. It is written in the midst of what is, to me, a most interesting thicket, covering an area of some thirty acres, which for seventeen years has been protected from fire. The particular trees under which my impromptu seat is placed are Liquidambars; seventy-five to ninety feet tall and from eighteen to twenty-four inches in diameter. The four trees that remain of this older generation are the survivors of many protracted and unequal battles. At the ground, their still open wounds bear mute evidence of the terrible onslaught of fire that destroyed their comrades. Higher up, their trunks are covered, for the distance a boy can reach, with healed-over scars, where youngsters of twenty years ago had made incisions for the liquid amber to collect and harden into the prized chewing, or sweetgum—from which the common name of the tree is derived.

Everywhere, individually and in clusters, throughout the basic pines of the thirty acre thicket, is a younger progeny of lusty trees of many species. As is fitting the giant Liquidambars, the largest deciduous tree in this particular thicket, are rearing up a younger brood and their light green, starry, maple-shaped foliage, as it glints in the sunshine against the darker background of the pines, presents an effect no less pleasing than that of the

tops of the giant parents as outlined against the sky.

Less than fifty feet from the large Liquidambars, stands another gum but of a different genus—the so-called black or sour gum, *Nyssa sylvatica*. This is also a stately tree but of a very different habit of growth from the Liquidambars; for while the former send out their branches at an oblique angle and are inclined to climb skyward, the latter sends out branches more nearly at a right angle, and often clustered, in such a way as to offer the fantastic suggestion that one might cut from the trunk a succession of naturally grown wagon hubs in which the spokes are already set.

A few feet farther on stands an American Holly, the shiny broad-leaved, spiny-toothed *Ilex opaca*. At all seasons of the year, this is a most beautiful tree but particularly striking during the winter months when its smooth, light colored bark, bright green foliage and abundance of scarlet berries accentuate the fact that the most rigorous winters we ever get in the Southland possess no terrors for it. In speaking of hollies, this is the species that we naturally associate with the name, and yet it is much less frequently seen than other species of *Ilex*—many of which we pass by with but little thought other than that they are graceful shrubs or trees as the case may be. In this thicket, there are at least six different species of *Ilex*, as follows: *Ilex opaca*, as above

described. *Ilex dahoon* with oblong, pointed, smooth foliage, and which also bears an abundance of yellowish red berries, *Ilex verticillata*, with smooth but darker colored bark, foliage somewhat serrate, and, as its name indicates, of slender, upright growth. *Ilex cassine*, found in abundance in this section, around the edges of shallow ponds or bay heads; ranging in height from three to twenty feet, and, during the winter, covered with berries of a color varying from scarlet to reddish-yellow. This is the very small-leaved species sometimes called "Yaupon" and "*Ilex vomitoria*." Its leaves are supposed to have a medicinal quality as indicated by the latter not particularly attractive name—or at least attractive, in its significance, only to one who might be possessed of a feeling that his stomach was overloaded. Equally in evidence, handsome shrubs when growing in clumps in congenial situations, are *Ilex lucida* and *Ilex glabra*. Some of you may think that nothing possessing the common name of gall-berry should be mentioned among desirable plants; and yet varieties which carry this distasteful name and that come under the above named species are, with their lustrous dark, evergreen foliage and shining black persistent berries, more attractive as a part of Nature's handiwork than some of the less thrifty exotics—even if possessed of more euphonious names—with which the average horticultural gardener might be inclined to supplant them.

In further reference to names, I would say that it is not the purpose of this address to pick a bone with the champion of either botanical or common names; nor to air any slight amount of knowledge the writer may possess. Common names may be however, in some cases, very inade-

quate. For instance, Small gives "Winterberry" as the vernacular for three different species of *Ilex*; the smallest of which, *Ilex glabra*, reaches a maximum height of about five feet and the largest, *Ilex verticillata*, a maximum height of about twenty feet. We therefore see that in gathering "Winterberries" we may either go to the woods empty handed, or carry along a twenty-foot ladder, according to our own interpretation of the name. On the other hand, gall-berry is not mentioned, as a common name, in any botanical description I can find although it is a name commonly enough applied to several species of *Ilex*, including *Ilex glabra* and *Ilex lucida*. If we could forever disassociate the name of gall-berry from the handsomer varieties of some of these species of *Ilex* it would be equally desirable with that of striking the common, deprecatory name of stinking cedar from the beautiful *Torreya taxifolia* of the Apalachicola River, or the inappropriate and entirely unauthoritative name of Judas tree from the handsome *Cercis canadensis*, or Red Bud.

In speaking of shrubs, we must not overlook the *cornus* or dogwood which, in its several varieties, is one of the first harbingers of spring. Its numerously clustered small flowers—which present the appearance of one large one—put in their appearance in advance of the foliage; as do also those of the handsome pink azalea or wild honeysuckle, the botanical name of which is *Rhododendron nudiflorum*. Dogwood and pink azaleas are very much in evidence in this particular thicket and it might be said that the pink azaleas were establishing sub-thickets of their own.

But if the handsome pink azaleas are colonizing, our beautiful native yellow

jessamine, *Gelsimium sempervirens*, has already colonized; for, running into the fringe of the woodland, it has blanketed the smaller trees without respect to genera or species, and farther on, finding a comparatively open glade, has covered it as with a carpet; although a carpet, it must be confessed, that is badly frayed at the edges and that displays a surprising tendency to climb up anything that would answer for chair or table legs.

Equally at home with the yellow jessamine are the cat briars or sweet briars, one of which, *Smilax Walteri*, produces an abundance of coral red berries which, in winter, as they hang from the then inconspicuous, leafless vines, give to the trees over which they run, the peculiar effect of having formed a trust and settled amongst their respective genera and species, upon one particular fruit that they will bear. The smilax, of which there are many species, together with wild grapes of the muscadine type, contest with each other and with the yellow jessamine for the honor of most quickly covering up decaying or decayed matter as well as the height to which they will climb on any natural growth of trellis-like formation.

I see I have wandered from large trees down to shrubs and vines. Let us return in the same way and, in passing, consider the haws. Of these, the botanists list no less than forty-seven species found growing wild in this state, many of which are decidedly worth cultivating, either as individual specimens or for hedges. In my thicket, I have at least three species, all handsome in flower and leaf. They belong to the genus *Crataegus*. It is one of the same family as *Pyrus*—to which apples and pears belong.

Wild huckleberries, or *Vacciniums*, are also very much in evidence and one

species of these which assumes large, shrub-like proportions—often reaching a height of twelve feet—is very beautiful. This is particularly true when in early spring its delicate pink and white blossoms, on slender branchlets, are putting in their appearance in advance of the foliage.

The bare mention of early spring brings us back to two different species of *Prunus*. One *Prunus angustifolia*, our common wild Chickasaw plum, with its abundance of snowy white blossoms; the other, *Prunus serotina*, our common wild cherry, with its smooth, dark glossy bark and beautiful, shining dark green leaves. Both of these are amongst the earliest trees to notify us that spring is at hand—the wild plum with its blossoms, the wild cherry with its foliage.

Almost, in the same breath, as far as season of growth is concerned, we notice flames of scarlet, both isolated and in clusters throughout our woodland. These are the tiny young leaves and blossoms of the scarlet maple, *Acer rubrum*, which furnishes a wealth of color during its season of initial spring growth; continues it during the ripening of its keys, or samaras, and grandly accentuates it again later in the season when it begins to think of disrobing for its winter nap. *

Although the sweet gum does not have the gorgeous spring coloring of the scarlet maple, it vies with it in the fall and both are surpassed, if such a thing is possible, by the black or sour gum. One writer has said that if the leaves of sweet gum and scarlet maple are fiery in their fall redness those of black gum are a conflagration. Of this, I have abundant proof for standing by itself just outside this thicket, and in plain sight of my office window, a magnificent black gum has, for

many successive years, impressed all beholders with the magnificence and persistence of its autumn color.

And here I wish to insert a word as to character of growth—and this applies not only to the Nyssas, or gums, but to many other genera—which is that one must bear in mind very closely the environment when he is trying to identify a tree for his own satisfaction or to describe it to the satisfaction of others. The particular black gum just referred to has, for instance, a wide, spreading, well-rounded top with branches that would sweep the ground if, unfortunately, these lower branches did not have to be trimmed, annually, to keep open the road that runs beneath it. The gums in the river swamp close at hand send up a sturdy bole for many feet before signs of the first decaying or decayed branches give intimation that the foliage, necessary to the tree's life, has had to climb higher and still higher after air and sunshine. The crowding of many trees into a space where but one can fulfill its allotment of years offers an interesting study in the survival of the fittest, as well as the scope allowed by Nature in the form of growth the surviving species may assume in the struggle.

If through dimness of vision, or extreme height of our supposed black gum, we are unable to differentiate the foliage from that of the neighboring species, that interlace it, let us use the convenient hatchet we have brought along and cut out a small section of root. This, in the deep mold where alone our tree would have grown tall enough to require such procedure, will not materially injure it and, if we have been correct in our guess, we can take home a section of root so light and corky in character as to be a handy substitute for the bottle stoppers of commerce—

which are made from the bark of a particular species of oak. If, on the other hand, we should happen to run across a black gum in the open, its branches will be so close to the ground that no hatchet or root will be necessary to identify it; but, if our quest has been made in the fall, we may then carry home a few quarts of the bluish-black, cherry-like drupe, that is its fruit, and make it into a most excellent jelly.

But I have strayed from my thicket into the clearing on the one side and into the river swamp on the other. Let us return and for a few minutes examine the genus to which so many complimentary adjectives have been applied,—grand, sturdy, time-defying—*Quercus*, the oaks. They are here in abundance and, like the Liquidambars, preempting ground in the most lavish way. The outlines of their respective staked claims are but dimly marked; and here again it will be a case of "might is right" unless some friendly hand decides in favor of one over the other.

Which shall it be; shall we interfere or let them rustle for themselves? And again, if we do interfere, shall we do so without respect to families? Shall we tell *Quercus aquatica* that he is, and should recognize that he is, a water oak, and that it is both indecorous and ungallant to flaunt his flaming spring habiliments in the face of his more sedate and more permanently clothed relative, the live oak, *Quercus virens*, from Virginia? If we do tell him anything of this sort, let us do it in a kindly way and impress upon him that if he will take time to think it over, he will at least look cooler.

However, perhaps it is best to say nothing but just lie low and await developments. Our water oak will undoubtedly

show a hectic flush again in the fall but this may be one of either shame or choler at having to disrobe for the winter. At all events, his choler, if choler it is, will be surpassed by both the sweet gum and the scarlet maple, and all three of them out-classed in this respect by the black gum. But as even the dwarf, illy-developed sumach seems to vie with its o'ertopping neighbors in this direction, we will assume that they have all merely eaten and drunk to repletion and that the plethora of fullness, as sometimes observed in their two-legged neighbors, shows in their faces.

In this connection, I would say that the formerly accepted theory that highly colored autumn foliage is due to the action of frosts, has of late been widely disputed. Careful investigation seems to show that richness of tint in fall foliage is dependent, to quite a considerable extent at least, on the character of the preceding summer. If the summer and fall have been very dry, only low tints will be shown in the foliage. If wet, high tints will develop.

Still, I know one man, at least, who will dispute the latter theory; the editor of a paper very properly called "Above the Clouds," printed on top of Mount Washington, New Hampshire. I had the good fortune to spend an evening with this editor, last summer, in his rocky eyrie, and he told me that the fall foliage was much more resplendent as seen from the top of the mountain than when viewed from the valley. As his point of vision was from an altitude of considerably over a mile above sea level, and he was therefore above the trees, as well as, often, above the clouds, he was necessarily looking down into the tops of the trees instead of looking up into them like ordinary

mortals. It may be that this inverted angle of vision may have a bearing on the subject. I did not think to ask his views on this point. At any rate, he would have seen more of the upper, and more highly colored, side of the foliage than the most of us, and with less intervening shadow to dim its splendor.

But to go back to our thicket and our oaks. Here are not only water oaks and live oaks but the post oak, *Quercus minor*, with its beautiful large five-lobed leaf, and several other species besides, all of which show more difference in individual specimens than a casual observer would give them credit for. And indeed it is an interesting study to pick out varieties of these or in fact, any species of trees and note the latitude of form that Nature gives to her offspring. We must remember that botany stops, for the most part, with species and that beyond these are individual characteristics as varied in different species of our forest trees as are those in any species of fruit trees like the orange and peach. If these forest species produced edible, merchantable fruit, there would be the same necessity for varietizing them as there is with the kinds we cultivate in groves and orchards; but as they do not, we simply pass them by with the general remark that such a tree is a live oak, the next a maple, and so on, without ever really becoming acquainted with the varietal characteristics of any particular individual of a species.

Here, for instance, is a young sweet gum with comparatively smooth, light colored bark resembling a maple, and with foliage too that, at a little distance, might easily be confounded with that of the maple. The lighter tint of green of the sweet gum's foliage might, however, strike us at once and lead us to identify

it as a sweet gum. A little farther on, we come to another tree, the trunk of which is covered with peculiar, ridged, corky bark and the smaller limbs and twigs possessed of fantastically winged appendages—the bark apparently fastened on edgewise—and we immediately know it for a sweet gum.

Take also *Ilex opaca*, the spiny toothed one known as American holly, and close examination will show well accentuated varietal characteristics in individual specimens, some trees possessing much broader leaves than others and the leaves having much longer spines. I have mentioned this particular species not that it is distinct from others in the number of its varietal changes but that the species itself is so distinct as to be, we think, unmistakable. We had best handle this word unmistakable with gloves, however, for its too free and careless use has, before now, gotten many a man into trouble. Indeed it is strange how lacking in astuteness some of us can be at times—or at least I know I can—and following is a case in point:

There is a half acre of comparatively open ground in this thicket where tree growth is much more sparse than anywhere else, and I have wondered, a dozen times, why it did not grow up as fast as the rest. But one day, all of a sudden, it flashed over me that, a few years ago, the man with the mowing machine had been there, appropriating bedding for the mules. Any succulent new tree growth that was mingled with the heavy crop of wire grass was not sufficient to make itself apparent or to interfere with the mower, and the mowing machine and horse rake had denuded this particular half-acre of several successive years' accumulation, which would have, by this time, turned into a heavy mold and

been recognized as a ready seed bed by the thousands of seeds that wait on proper conditions to develop.

Just now, I am as interested as a boy, watching development on that particular half acre. What particular species will first assert itself? The black gums and sweet gums are pushing in from either side. The pink azaleas have thrown out skirmishers. A few scattering pines are holding up their unlighted candles as if awaiting instructions to proceed; and the scarlet maple, which holds its growing tips aflame all summer, in readiness for its fall conflagration, is apparently proclaiming "Come on, there is good footing here, I will lead the way."

I have not mentioned all the species to be found in my thicket and those named are not necessarily the same as would be produced in other portions of the state. Nature does not make exact reproductions of herself over any large given area. Latitude, longitude, altitude, isothermal lines, soil formations, proximity to bodies of water, large or small, fresh or salt, running or stagnant; all of these things have a bearing on what we may expect. The point however is that we may not only expect, but look forward with absolute certainty to a reforestation of our denuded lands if we will but keep fire out; and not only to reforestation of the land but enrichment of the soil; for Nature's forces work continually toward conserving and building up, instead of dissipating, whenever they are allowed to do so.

This is one application of my thicket story but by no means the only one; and to more fully illustrate the next one, I should like to take you with me, if we had time, just over the fence, across the road and into the borders of the fast running creek that during the rainy season,

rises to its full river dignity. By following the crooks and turns of this creek and up a confluent that runs out of the hammock a few miles away, we should see the most of the species that we left in the thicket and many more besides; innumerable more than the upland pines and lowland cypress which the traveler over our public highways gives us credit for. Here we should find chestnut oaks, with most magnificent, broad, and as their name indicates, chestnut-like foliage; ash of several different species; the magnolia family including both grandiflora and the several varieties of bays; horn-beam or iron wood; poplar, myrtle, laurel, birch, alder, virburnum, farkleberry or sparkleberry, elm, several species of gums, including the so-called ogeche lime; red cedar, cabbage palmetto, and other species of trees, shrubs and plants, which in wealth of numbers or beauty of individuality might easily divert us from our search for those named.

And herein lies the broader application of my thicket: Notwithstanding its attractions I did not keep myself within its confines, anymore than you will or can keep yourselves within the confines of a similar one, after you have become really interested in it. Once one becomes interested in studying the various tree and plant growths, in all their wonderful varietal characteristics, he will not be content with any stipulated boundaries, but will wander, as I have, over the fence, into the river swamp and nearby hammock. The more he investigates the more he will wonder why he himself, or his native town or village, has not drawn more freely on home-grown plants for the purposes of shade and embellishment—plants that are growing at his very door and a hundred times better adapted and more

satisfactory than many of the high-priced exotics.

Once having become really interested in the magnificent growths about us, the larger applications follow in rapid, natural sequence. We will transplant specimens that show natural advantages for the purpose wanted to our own home grounds. We will commence lining the streets that lead by our homes with other equally fine specimens. A little effort will induce others to become interested with us and our home village will have its streets lined with trees, and a village improvement association whose first thought will be for their welfare. The trees thus planted will themselves exert a salutary and benign influence, which will show itself in many ways. Tin cans and other extraneous, undesirable village adornments will be relegated to less conspicuous places than formerly and even the professional village loafer with his perennial jack-knife and dry goods box, will be brought into line with those who have a higher conception of life's duties—or pleasures.

Civic pride is not hard to enlist and particularly when that pride reaches out in a direction that is of equal benefit to all; but one must first become enthused himself before he starts to enthuse others. This is a rule that applies to progress in any direction. And I speak from actual experience when I say that if in our respective localities, we demonstrate our tree-planting enthusiasm on our own grounds, we will not find it hard to interest others in the same direction. In our own little village, a few of us got together this year and planted out over 400 shade trees. I say few of us because the town itself is small. Not a single man but became immediately interested or soon fell

into line. The trees we used were water oaks, live oaks, maples, sweet gums and wild cherry—all growing wild in this immediate neighborhood. Each street planted was set solid to one or the other of these species. Later on, other streets will be opened up and either set out with these or other species—plenty of which yet remain to be drawn on. In other sections of the state, other species than those we have used might be preferable. We have them—all of us—in our respective localities. If we are interested we will find out what they are and, in finding out surprise ourselves with the quantity and suitableness of the material at hand.

When we have come into contact with Nature's plants and shrubs and vines in all their lavishness of form and color, and her native trees in all their stateliness and grandeur, and have become not merely superficially acquainted but have, so to speak, established friendly relations with them, as individuals—instead of meeting them as a collection of perfunctorily-introduced and soon-forgotten strangers—we shall experience a sense of loss in not sooner having come into direct fellowship with them; in not having earlier accepted their proffered, standing invitation of companionship.

Some years ago, I had the good fortune to drive through one of the most majestic avenues of live oaks in this country—situated at Audubon Park, New Orleans. The remembrance of their grandeur led me, a short time since, to obtain authentic information in relation to these

Oaks. I find that there are one hundred of them in the park and that they are now approximately sixty feet high and have an approximate spread of one hundred feet, with a trunk diameter of four feet or over. These trees were planted in 1813 by Judge Gayerre and his grandfather, Etienne de Bore. Now, ladies and gentlemen, I do not know anything more about Judge Gayerre and Etienne de Bore than the information I have conveyed to you. They may have done other deeds for which they should be remembered but I submit to you that for this one deed they deserved, and in its accomplishment unwittingly erected to themselves, monuments, not one but a hundred of them, that will keep their memories green and their names revered, long after worthy expressions of their virtues in costly stone or marble would have been forgotten.

And so, to summarize, I would say to you, get acquainted with the trees. In doing so, you will derive pleasure and benefit. Protect them from fire; in protecting them, you will serve your own interests, together with those of the state. Plant them around your houses and along your highways; throughout the streets of your respective towns and villages. From a purely investment basis it will pay you in enhanced value of property. From the point of personal comfort, they will soon repay you in shade, beauty and companionship. From a higher, beneficent, philanthropic standpoint, you will leave an inheritance for which future generations will bless you.

Reminiscent Remarks.

By Major George R. Fairbanks.

Mr. President, Ladies and Gentlemen:

I thought it might be of interest to some of you to hear a few reminiscences of one of the oldest citizens of Florida. I came to Florida in 1842. At that time there was no settlement on the east coast south of Palatka or south of Micanopy in the central portion of the State. The travel in those days was by stage coach from St. Augustine through Middle Florida to Pensacola. The stage coach ride to Tallahassee in those days was long and tedious, and only accomplished by relays, and the best time that could be made was about thirty miles a day, quite a difference in the palatial travel now at thirty miles per hour as a maximum. I remember the first time I ever saw the city of Jacksonville, it was a very small place, with four or five docks on the river front. The mail was brought by boat from St. Augustine by way of Picolata or brought over to St. Augustine on horseback, twice a week, and the arrival of the boat was the signal for every man in town to go down to the docks and get the news.

Tampa was in those days a mere fishing village, and Tallahassee a small town. The principal industry in other than what is known as Middle Florida was the get-

ting out of timber; in Middle Florida the chief crop was cotton. Commerce was carried on by schooner lines to and from New York in the east and New Orleans in the west. In those days the entire population of the State did not much exceed the population now claimed for the city of Jacksonville. This remarkable development of the State within the life-history of one of her citizens is a very impressive matter to reflect upon, and I doubt not but that some young citizen now within my hearing will find the same degree of development shall he live in the State as long as I have, for in my judgment we are to have one of the greatest and most densely populated States in the Union.. The question has often been asked, why is it that the State of Florida has developed with such rapidity, especially the city of Jacksonville, with no extensive back country to support it. This question is easily answered. If you will take your globe or atlas and look the world over, ascertain the peninsulas, you find without exception that the peninsulas contain the most dense populations on the earth, this you will find to be true without exception, take the peninsula of Italy as a notable example, and all other peninsulas. The State of Florida you will find is a very narrow peninsula compared to a great many of them, and it is my prediction that within the life of many of my hear-

ers they will find Jacksonville grown to be a very large city and the State of Florida to be the most densely populated State in the Union. I say this because we have

everything here necessary to sustain a large and dense population, besides the State has now come to be known as the world's sanitarium.

By George W. Wilson.

After listening to the eloquent addresses that have been delivered you this evening, I feel unable to add thereto. I hope however to always be able to respond to anything that will be of interest to the Florida State Horticultural Society. I congratulate the society upon the large attendance at the opening of this it's eighteenth annual session. I am not only in sympathy with the great work of this society, but I was once an ardent horticulturist myself, until varying vicissitudes of life cast my lot in another direction, that of journalism, during all of which time I have never failed to take advantage of every opportunity to foster and encourage your every welfare. I consider the history of the development of this

State largely the history of the horticulturist; that it is largely due to the endeavor and achievement of the Horticultural Society that has given the great State of Florida the renown she to-day enjoys, and as it has justly been said, in your future endeavor and achievement rests in a great degree the name and fame of our State. When I speak in these terms I speak with a great deal of significance, for I am informed that nearly 85 per cent of the horticulturists are college men, you are therefore prepared by experience, education, and training to cope with the greatest interests for the welfare of the State unhampered by political affiliations or hurtful partisan motives.

Report of Committee on Diseases of Citrus.

By P. H. Rolfs.

Wither Tip.

This disease, which manifests itself in so many different ways on citrus fruits, continued to be exceedingly virulent during the past year. The total amount of damage done by this disease was, undoubtedly, greater during the last season than any season heretofore.

Work upon it has been prosecuted quite vigorously during the past year, and some new and interesting facts have been brought out. Considerable difficulty is encountered from time to time because this trouble is frequently complicated with other disturbances. Any condition of the orchard or of the fruit that lowers the vitality renders it more susceptible to attack from this fungus (*Colletotrichum gloeosporoides*), so that many trees and much fruit is found infected. Though this disease must be considered a secondary difficulty, in many cases, the primary difficulty would not have been sufficient to cause the destruction of the plant or fruit.

Late Rust.

It is a well-known fact that the rust mite causes very considerable russetting of fruit. This may occur either during the early portion of the mid-season, or when the fruit has nearly matured. As a rule, when the fruit has passed mid-season there is very little danger of russetting. This year, however, many orchards have russeted severely after the fruit had reached its full size, and in many cases after

the fruit had begun to color. Vigorous spraying with the usual remedies for preventing russetting proved of no avail. This occurred on account of the presence of the wither tip fungus, which produced a form of russetting that in general appearance resembles the rust mite russetting to a considerable extent, and in many cases is mistaken for it.

This form of russetting can, however, be readily detected by rubbing the hand over the fruit. When it is due to the rust mite the fruit feels smooth, while when it is due to the wither tip fungus the surface will usually be rough, something like rubbing the hand over sandpaper. Not infrequently the two forms of disease occur on the same fruit.

Tear Stains.

This peculiar form of russetting manifests itself by streaks running over the fruit from the side that hangs uppermost to the point which is nearest the ground.

The cause of this peculiar form of russetting is that somewhere above the fruit a twig occurs which has been infested by the fungus, and which contains the hold-over spores. Whenever sufficient rain or dew occurs to cause a dripping from this disease infected twig onto the fruit, the disseminating spores are liberated from the twig and carried with the rain or dew over the epidermis of the fruit. Many of the spores are left along in different places and these produce sufficient irritation to the epidermis to cause russetting

along in streaks, hence we have the peculiar form of tear staining or tear streaks.

All of the fruits of the citrus family are more or less subject to this trouble. Bitter sweet, sour oranges, sweet seedlings, kumquats and lemons have been found affected in this way.

Frequently this peculiar form of infection does not injure the keeping qualities of the fruit. Of course this fruit must go to market as russets, and consequently a very material loss in its selling quality is encountered.

Kumquats.

Heretofore it was thought that kumquats were quite free from the destructive attack of this disease, but during the past year many trees were discovered that had lost as high as 40 per cent. of the fruit. They were carried off by drops, directly or indirectly induced by this disease. In addition to a number of drops occasioned by the presence of this fungus, a very considerable number of the fruits themselves were infested with the characteristic spot. This has been described a number of times in various publications, and has been illustrated by photographs before the Horticultural Society, so it will not be taken up again at this point.

Remedy.

All of these investigations, of course, have for their aim the determination of some practicable remedy. Different lines of treatment were started immediately upon commencing the investigations. The first line that suggested itself was of thoroughly spraying with Bordeaux mixture. This, however, proved to be insufficient. The most thorough work possible was done upon an orchard of about fourteen acres in extent, and continued

throughout the entire year of 1902. At the end of this time the fungus seemed to have as strong a foothold in the orchard as it had in the beginning of the work. This seemed to indicate that spraying with Bordeaux mixture was merely sufficient to hold it in check, and not sufficient to reduce the difficulty in the orchard. In 1903 the work of cutting out the diseased twigs was begun. During that season this same orchard was submitted to the treatment with Bordeaux mixture, and a thorough pruning out of the twigs which had become leafless and had lost their vitality. Before the end of the year this remedy showed itself to be thoroughly successful. A more successful treatment could scarcely be expected to be found in any particular line. During the summer of 1904 still further investigations were made as to the best time for cutting out the diseased twigs by dividing the orchard of some twenty acres in extent, into six different plots. These different plots were subjected to treatment at different seasons of the year. From the experiments here we deduced the following facts: That the first time of the year for pruning is during the winter, just before the spring growth occurs, which is some time before the first of February, and a second pruning is usually necessary. In the grove under experimentation it was found that the plot No. 4, which was pruned during July, that the remedy was as successful as where pruning had occurred earlier. In plot No. 6, where the pruning had not occurred until August, the increase in the amount of the wither tip disease was so severely marked that the point to which the pruning had been carried in July could be seen to the row.

As a general rule we would say then

that the proper line of treatment would be: *First prune out all dead wood, or wood of low vitality, during January and then again during July. Second, spray thoroughly with Bordeaux mixture immediately after each pruning.*

This will, in a great measure, reduce the amount of fungus in the grove, and so very materially reduce the danger of infection. It may, however, be found necessary in the fall, when the fruit begins to ripen, to protect this against the characteristic Anthracnose spot. This has been done repeatedly last year in orchards of varying size, from a few acres to twelve acres in extent. These characteristic spots do not occur until the fruit has practically matured, then they make their appearance, first about the size of a pinhead, from this they gradually enlarge until a considerable portion of the fruit is involved. At the first appearance of the spots the fruit should be sprayed thoroughly with an ammoniacal solution of copper carbonate. If treatment has been delayed until the fruit has begun to drop off severely, it will take about two or three weeks to notice any perceptible diminution of the dropping. From that time, however, the sprayed trees show from 25 to 75 per cent reduction in the amount of the drops, and also show a similar amount of diminution in the spread of this spotting.

Foot Rot.

The past year, for some reason, seems to have been one in which this disease has been making its presence felt in many groves that previously had not been at all troubled by it. Just why this condition should occur is difficult to explain. We know, however, that many people whose groves have heretofore enjoyed freedom from this trouble have this year found

themselves in a position to enquire diligently for the best remedies. The remedy for this given by Mr. Waite a year ago is about the best that can be used. On page 53, of Report for 1904, Mr. Waite gives his formula for making the antiseptic wash, as one part sulphur and two parts of land plaster, or air slacked lime. Then this is made into a thick batter by addition of water, and then painted on the tree, the soil having been removed from around the crown so as to permit a ready application of the remedy. Other remedies are also successful in keeping down this trouble. The one essential feature in all remedies is that of removing the soil from around the crown and exposing the diseased area to the sun if possible, or where the limbs shade the trees too much, exposing it to the air. In some cases it has been found sufficient to expose the crown of the roots to the air. However, it is better not to take any chance, but to apply some antiseptic treatment, either that suggested by Mr. Waite, or a solution of one part of crude carbolic acid to two parts of water, then cutting away the diseased patch and applying the antiseptic wash to the area exposed.

Blight.

This old disease is still with us, and will probably stay with us as long as citrus growing is carried on in Florida. The studies upon it, and investigations in connection with it have been pushed as rapidly and as extensively as possible. The members of the Horticultural Society will realize that an immense amount of work has to be done on the study of this disease, and that observations confined to one section or one grove would scarcely be sufficient. When we remember that blight rarely, or

never, occurs on trees under six years of age, and that the possibility of infection occurs at the time of setting the tree out, it is readily seen that to prove any particular theory in regard to the matter will require years of awaiting. I am, however, more hopeful of finding a practicable remedy for this disease than I have been at any time previous to this. Just what the line of treatment may be, and just what precautionary measures must be taken, I am yet unprepared to say. I may, however, be permitted to say that the investigations in progress are indicative of finally securing a favorable and practicable remedy.

Scaly Bark of Orange Trees.

This disease of the orange tree has been reported quite a number of times in the last three or four years, and specimens have been sent a time or two very recently.

The name describes the disease fairly well. An attack of this disease causes the bark to peel off and look very shaggy and

scaly. This, of course, is very unusual for citrus trees, and consequently is noticed at once. When anything of this kind occurs on the younger limbs the disease causes roundish or oblong brownish blotches, varying in size from one-fourth of an inch long to sometimes three or four inches long. Mrs. Flora W. Patterson, Mycologist in the Department of Agriculture, has identified the fungus as belonging to the genus *Hysterographium*.

As yet we know no convenient and practicable remedy, consequently where it occurs on the small twigs of the tree the orange grower will find it prudent to cut out the disease and burn it.

Mention is made of this disease in this place to keep people on the lookout for the trouble, and so cut off its ravages in its incipiency. It very frequently occurs that a most innocent looking species causes a very considerable damage. As yet no serious consequences have followed an attack of this disease.

Report by J. J. Beers.

Mr. President, Ladies and Gentlemen:

My first recollection of the war between man and the insect enemies of the orange was about twenty-five years ago. My father came to Florida from Pennsylvania in June 1878 and set the first tree the following winter and a very short time after that the fight commenced. I recall seeing boxes of Whale Oil Soap in the barn and seeing the wash-boiler full of water and tobacco stems boiling on the kitchen stove. Don't you know, friends, that my mother was a good-natured woman to stand that?

When the stock solution was ready, a jug full was taken to the grove and, while a boy carried water from a nearby pond or lake, my father added a little of the stock from the jug and on his knees with a scrubbing brush washed the bodies and even the faces and hands of the little trees. He soon discovered, however, that the bark on the trees was getting hard and the trees stunted and in casting about for a better method, found a brass syringe, holding about a quart, with fine holes for an outlet, with which the trees were sprayed.

Next came a little hand spray pump. With these pumps half a dozen men sprayed the trees from pails, while a horse hauled barrels of water from some convenient lake. What was used for an insecticide at this time, I do not know, but I remember seeing them churn "kerosene butter" with these little pumps and it was made of kerosene oil and "Eagle Brand" condensed milk.

All this fighting appeared to do no good and the scale was still there, although I am not prepared to say that the spraying was properly done, or done at the proper time, for spraying orange trees was a comparatively new thing at that time.

In 1884 I was sent away to school and when I returned three years later, I found that father had gotten up the rig which I am now using. This is a four-wheeled wagon, with a three barrel tank and a force pump geared to one hind wheel of the wagon. This throws a strong spray and I spray from five to twenty-five acres per day with one hose.

Our main fight is against the rust mite and we use the sulphur solution, but when we spray regularly for that we have never been troubled with scale, except one of the wax scales which cause "smut" and this is always killed with one application of double strength.

We start spraying the first of May and spray the first of every month for five months and the result, until last season, has been clean, healthy trees and bright fruit. Last spring we had purple mite enough to damage the trees and drop a large part of the fruit, therefore about the first of January of this year, seeing

the mite starting again, we sprayed once and intended to continue it to keep them in check, but have found it unnecessary. The spraying destroyed a large per cent of the mites and this, followed by the cold of January 25th and later by an unusual amount of rain, has almost destroyed the mite.

One of the finest groves in our section, well known as the "Pet Grove," property of Mr. J. P. Felt, is greatly damaged by what appears to be "foot-rot." We have many groves here which, like this one, are budded on sweet stock. In this grove a part of the bank was allowed to remain for two or three years, so that the earth close to the tree was six to ten inches above the natural collar even through the summer and I have no doubt that this was the cause of the "foot-rot." Mr. Felt is having this earth removed now and the trees will probably not be banked next winter to give them a chance to heal.

Grape fruit trees have been damaged some by scab and the fruit made unfit for market. Spraying with Bordeaux Mixture appears to entirely prevent this, as trees badly affected two years ago were sprayed last spring and last season produced fine fruit and the new growth was free from disease.

My idea of combating diseases of trees is, first to prevent it if possible; then, if it appears, cure it if you can. Study the requirements of the trees and make the conditions suitable as far as possible and above all give them plenty of food of the very best quality, then watch your trees closely and be ready to meet trouble when it comes.

Report of A. B. Harrington.

Mr. President, Ladies and Gentlemen:

I confine myself to my own locality and citrus trees only.

There has been nothing new to develop during the last year, therefore shall have to go to our subject in a way that many of us are already familiar with.

We are beyond the worry of the common scale, as this is easily kept under by use of fertilizer and an occasional spraying with Hammonds Thrip Juice. This is the best, cheapest, and most convenient to use of anything in my experience for scale.

It is usual to have a visit of the Red Spider during the Spring months. The Rust Mite is nearly ever present. For these insects I use the Sulphur spray. I have used the sulphur and Thrip Juice mixed and the combination seems to give equal results as when used separately.

The rust mite is the worst of all our troubles, causing more expense and time than all other insects and diseases combined.

I do not believe it is possible to have ten percent bright fruit without spraying; but by being persistent, observing carefully the conditions and following it up each year, we have about ninety percent bright fruit. As proof of this, trees, that have never been sprayed, (a few miles distant and all other conditions apparently similar,) have scarcely any bright fruit, so little that no attempt is made to classify or grade it and it is marketed from the

trees without grading. These groves that are badly infested with Rust Mite seem to produce fruit one or two sizes smaller than do the groves thoroughly sprayed. The White Fly, I am thankful to say, has not appeared here.

As to disease, we have none. While we have some insects that cause us trouble, I do not think there is as yet a disease of any description in our locality.

Die back shows up occasionally but this is a condition rather than a disease, as I took upon it. There seemed to be some confusion on this subject of die back last year. My own experience is such that I am confident it is not so very easy to overcome. I have read where treatment showed an improvement in a few days and a cure in a few weeks or months. Trees can be helped in a year but I say three years is required for a cure if the case is anything bad.

My views are to thoroughly understand your soil and fertilizer, as this is where the complete recovery is to start from. Much benefit is obtained by the use of Bordeaux.

I have not tried the insertion of Blue Stone myself but have observed good results where others have used this method of treatment. An orange tree will exist under the most adverse circumstances yet to grow and produce well, paying a profit each year to the owner, requires care, cultivation, and fertilizer.

I use for applying spray, a good hand power pump, a double line of hose, requiring three men and a pair of mules to run

the outfit. It depends very much on the size of the grove as to what the investment in machinery should be. Begin with a bag of fertilizer and a hoe increasing with the number of trees.

DISCUSSION.

Mr. Blackman—Mr. President, it seems that some legislation is at present pending at Tallahassee on the white fly and insects. A copy of the pending bill has been called for but it appears that none of the members have it, nor have many of them seen what the measure is. I am not personally interested in the white fly, as it has not yet appeared with us, but I am deeply interested in behalf of the society in this pest and believe that if something is not done to stop its ravage the state will be overrun. However, we should be careful as to what character of measure is enacted. We should see that it shall be a measure as will not work a burden or hardship upon the growers. Yet, I conceive it to be essential that some measure be enacted that will control the ravages of the white fly.

Dr. Richardson—I heartily concur in the remarks of Mr. Blackman. The white fly is a most destructive, pernicious pest, still we should carefully watch any measure of legislation that is proposed, and should not endorse here any measure to be enacted unless we know what that measure is. It has been said that the measure purports to provide that if the grower does not comply with the law that his property shall be taken in charge by the county commissioners and the expense of dislodging the white fly taxed upon it by the county. This would in my judgment be very unwise and would work a hardship in many instances to a grower

who was financially unable to protect his property and who was wholly irresponsible for the introduction of the pest upon his property. It is well known that the white fly infests not only grove trees, but other trees, and shrubbery as well, especially hammock growths, and if we are going to legislate we ought first to legislate them out of the swamp before we tax the property of the grower for dislodging it from the grove property. I think this matter should go to our legislative committee with power to act in the premises, and with plenty of time to look into remedial measures of legislation. This is a very important matter and should receive the very best consideration, in all of its phases and in its operation after enactment, before we give it an endorsement upon the floor of this society.

Dr. Kerr—This is a very important matter touching the interest of every grower in the State. It should in my judgment go to our legislative committee, who should be granted plenty of time in the premises, bringing in its report to this society for further consideration.*

Mr. Gillett—Mr. President, as a member of the legislative committee I agree with the gentlemen who have preceded me on this subject. I think the matter should go to the legislative committee and that it should have plenty of time to act in the premises. I have had some experience in formulating measures for enactment into laws and it requires time to look carefully into proposed measures of this kind, to calculate the effect of the operation of the law upon its enactment, comparing and weighing similar measures in other States, so as to get the greatest good to the greatest number as far as we can.

The President—The matter of this

preventative measure against the ravages of the white fly will go to the legislative committee with power to act. If any enactment is to be had at the present session of the legislature, no doubt the special legislative committee, which has been heretofore appointed at this session, will be of service to the committee in this regard.

COTTON BUG.

Dr. Richardson—I have been very much interested in these papers. I desire to call the attention of the society to an insect that I have so far been unable to find in any of our society literature, scientific or otherwise. He is a bug and is, I have lately learned, known to the cotton planter as the cotton bug—and if any of you have never met him, I hope you never may. In markings and color he is beautiful, brown, green, red and gold with a diamond in the center of his back, his shape is something like a common pumpkin bug but not so large. In numbers and rapacity he is a devastator. His appearance is sudden. I first met him in about 1892 I think it was, with very disastrous results as I lost some 10,000 or 12,000 boxes of oranges through his depredations in the course of a few days' time. I thought, as he had not appeared again, that I was free from his kind, and had nearly forgotten all about him until last fall, when my manager telephoned me he had found a strange bug on my tangerines. I went over and found the ground, the fruit and trees literally covered with the bugs so thickly in fact that you could scarcely see the fruit—there were millions of them—and I lost probably 40 or 50 boxes of tangerines. Having met him before, I determined upon heroic efforts to get rid of him. After trying

almost every insecticide known without success, I finally made a carbolinium whale oil soap mixture, rather as an experiment than anything else, knowing the virtue of the carbolinium on account of the percentage of carbolic acid it contains. The mixture or emulsion was made of one quart of carbolinium to seven pounds of whale oil soap boiled and stirred into three gallons of water, pouring the same into about fifty gallons of water, making a solution with which I sprayed the fruit and leaves. To my agreeable surprise this completely routed and destroyed Mr. Cotton Bug. I mention this for what it may be worth.

Mr. McCarty.—The gentleman's experience is very interesting and valuable. The bug he has described, is what is known as the common cotton stainer. They are a very prolific pest, but I think Dr. Richardson might modify his numbers to myriads instead of millions. The thanks of the society are due the doctor for his solution, the component parts of which the society will in all probability profit by remembering.

Dr. Richardson—Myriads may be all right, but anyone having experience with cotton bugs will agree to millions. Modern scientists tell us that microbes reproduce by binary division at the rate of sixteen or more millions from a single specimen in twenty-four hours. The cotton bug will in the old-fashioned way of egg and hatching, it almost seems, do pretty nearly as well. I have a neighbor who examined his grove in the morning and found not a bug, but at four o'clock in the afternoon his large seedling trees were covered with them, and by the next day he had lost some four or five thousand boxes. This was Mr. Rogers, of Sutherland.

Mr. Boggs—The discussion in regard to insects reminds me of an experience I had a year or so ago with grasshoppers. It is well known that the grasshopper or locust in numbers is very voracious and on occasions he will attack a fruit tree as quickly as he will grass. Finding myself menaced by grasshoppers in such numbers as to cause some alarm, I wrote to Washington for a culture which had been experimented with for the extermination of the hopper. Receiving the same, I took an old darkey out with me to catch some of the hoppers, dip them and let them go on this way of self-destruction, as well as that of their ilk. After this performance was over, and we had dipped I suppose some 200 hoppers, I noticed the darkey in deep meditation. Finally he said to me:

"Boss, is yer after killing dem hoppers?"

I assured him that was the desired end, he then said:

"Well, boss, why didn't yer mash dem we kotched instead of dippin em and turnin' 'em loose? (Laughter.)

I was never annoyed to such great extent after the experiment, and think it was of some benefit. I am informed that the Department at Washington has several cultures and that this was not what is considered by the department the best. I do not think the experiments, however, have proved entirely satisfactory, though to some degree helpful. I will here also say that the Department of Agriculture is also extensively engaged in the study of insect extermination by fungus. These fungus experiments have proved very satisfactory in a great many instances. While it is not claimed for the fungus process that it is a total eradicator or exterminator, it has proved to be of positive benefit.

Mr. McCarty—I have followed the experimentation reports of the fungus process of extermination of insects for several years with a great deal of interest, and I am always glad to hear anything concerning it. It seems to me that it has already proven to be of great assistance, and I trust scientific research and experiment will further demonstrate its value as against spraying, which is always accompanied with more or less deleterious effects, unless the utmost precaution is observed and followed. I believe there are many instances in which great harm has been done by ill advised spraying, which occurs both ways, sometimes through the strength and character of the solution, as well as the age and condition of the tree and fruit at times of application.

Mr. Hampton—I have been very much interested in these discussions upon insect extermination and especially with reference to the cotton stainer. I first met the cotton stainer in 1897 and for the past several years I have seen him occasionally. In numbers he is voracious and devastating, he is a sucker, and usually when you find him you have got to do something so quick that he has gotten through with his business before you get your solution mixed. I have never been able to find anything to kill him, and my previous efforts to get a preparation which would kill him were ineffectual for the reason that not knowing anything myself that would kill him off, I had to write to some one for information, and by the time I could get a reply to my inquiry he had finished up his business and gone. I am sure the society is much indebted to Dr. Richardson for his experiment in this direction and that they will profit by it should this pest show up upon their premises.

Mr. Hart—I do not think sufficient at-

tention has been paid to blight, I am very much interested in the solution of the question of blight. Being desirous of seeing an effective remedy for this tree disease, I offer the following resolutions which I trust the society may see fit to adopt.

The resolutions were adopted and are as follows:

WHEREAS, The orange growers of Florida are annually suffering the loss of many thousands of dollars in the reduction of their fruit crop and still more in the market value of their groves through a disease known as orange tree blight, which usually selects the largest and most productive trees for attack; and

WHEREAS, Though the disease has been carefully studied for many years by very able Department experts, it is not yet well enough known to allow of its positive identification, in many cases, before the second or third year after its appearance, while investigations pretty surely prove that the disease is contagious, which makes each diseased tree a nucleus from which it is carried to others when caring for or working the grove; and

WHEREAS, Progress has been made that encourages the belief that if additional help with special fitness can be sent here and allowed to devote their whole time to assisting in this select work, we have reason to hope that the cause may be found for it; therefore, be it

RESOLVED, That the Secretary of this society be instructed to correspond with the Florida Representatives in Washington and earnestly request them to call upon the Secretary of Agriculture, Hon. Wilson, and urge upon him the importance of this work and the pressing need that we feel for further assistance from his Department. Be it further

RESOLVED, That each member of this society exert his or her influence as an individual to secure increased appropriation for this work and its more vigorous prosecution.

Member—If I am correctly informed, and I believe I am, the Department of Agriculture at Washington has always been able, ready and willing to lend any assistance within the power of the government to promote the interests of like societies in the various States, in never-ceasing scientific experiments to exterminate insects and eradicate disease from useful plant life. I think it all comes under the generic head of forestry preservation. However that may be, I know that the National Government has always met the various States half way in the matter of expense in this direction. that wherever the State will spend a dollar the Government will spend one in intelligent effort to this end, it therefore seems to me, Mr. President, that we should have the benefit of this National aid in this State, in order that the horticulturist of this State may have the benefit of all blight preventatives, the culture spore and fungus processes, scientific spraying as well as all known scientific research to stop the ravages of these diseases and insects of whatever kind. I trust that our legislative committee will hold this matter in mind and use their best endeavor to secure for the State her pro-rata share of this experimental scientific work.

The President—The remarks of the member are timely, the chair has no doubt the special legislative committee will take the matter in charge and secure for the State these considerations.

A Steam Boiling Plant for Insecticides.

By H. A. Gossard.

Where the lime-salt-sulphur wash, bisulphide of lime, resin spray, or any insecticide requiring prolonged cooking is needed the most economical method of preparation is by boiling with steam. I prepared the accompanying diagram by combining the best features of two or three different Ohio boiling plants. By courtesy of the Ohio Experiment Station I give it to the Florida horticulturists before having used it in our own publications.

A is a water tank into which water is raised by wind or steam power. In the plant from which the diagram was taken it is a 1,500 gallon tank of galvanized iron, sitting on the upper or haymow floor of the barn, and water is pumped into it through the water pipe x by means of a windmill. The stopcock b is closed when the tank is full. A is a faucet from which cold water is drawn at will to meet the miscellaneous needs of farm and household. D is the boiler reservoir and, being connected with A by means of the water-pipe X is kept filled. In the plant represented, the boiler reservoir was a galvanized iron cylinder, perhaps eight feet high and one foot in diameter, having a capacity of nearly 50 gallons. It was a discarded gas chamber, having once been part of a gas supply plant. Its bottom end sets just a few inches behind the boiler so that the water is kept moderately warm and can be safely turned into the boiler without additional heating. H is the boiler, the pipes

w leading from it, being steam pipes. The stopcock v opens and closes a pipe leading from the reservoir D into the boiler H. When it is desired to fill the boiler with water, the stopcocks v and u are both opened; the steam, passing through u into the top of the reservoir D, forces the water through v into the boiler H, doing away with the need of an injector. The steam in D soon condenses and water is drawn into the reservoir through x to fill the vacuum which would otherwise be produced. V is a platform upon which sets the hot water tank B and the boiling cask X. B may be of either iron or wood, likewise X. In the plant diagrammed, X represents a 50 gallon barrel and B a 100 gallon galvanized iron tank. Opening the faucet c fills the tank B with water; opening the stopcock d lets steam into the water, which escapes through the three openings at m. On the opposite side of the arm at r, are three openings, letting out steam in an opposite direction, thus setting the water in a whirl. l is a faucet from which warm water may be drawn at pleasure. h is a stopcock letting the water into the diluting tank O, which sets on the platform I. By opening the stopcock e, steam is conducted into the boiling cask X where it escapes through three openings at n and three on the opposite side of the other arm at o. This arrangement gives constant agitation or whirling during the cooking process. g is a stopcock to let the boiled product into the diluting tank O. g must be located as close as possible to

the boiling cask G, otherwise the pipe will be sure to clog with sediment in cooking lime and sulphur together. The pipe or hose on which g is located should not be less than one and one-half inches in diameter. The stopcock k closes the pipe conducting the diluted spray into the tank on the spray-wagon. f is a stopcock ad-

mitting steam to the diluting tank for the purpose of keeping it warm. y and t are the orifices through which steam escapes and are arranged like those in the other tanks.

The diluting tank O is not an absolute necessity, since B may be used for the same purpose.

Report of Committee on Citrus.

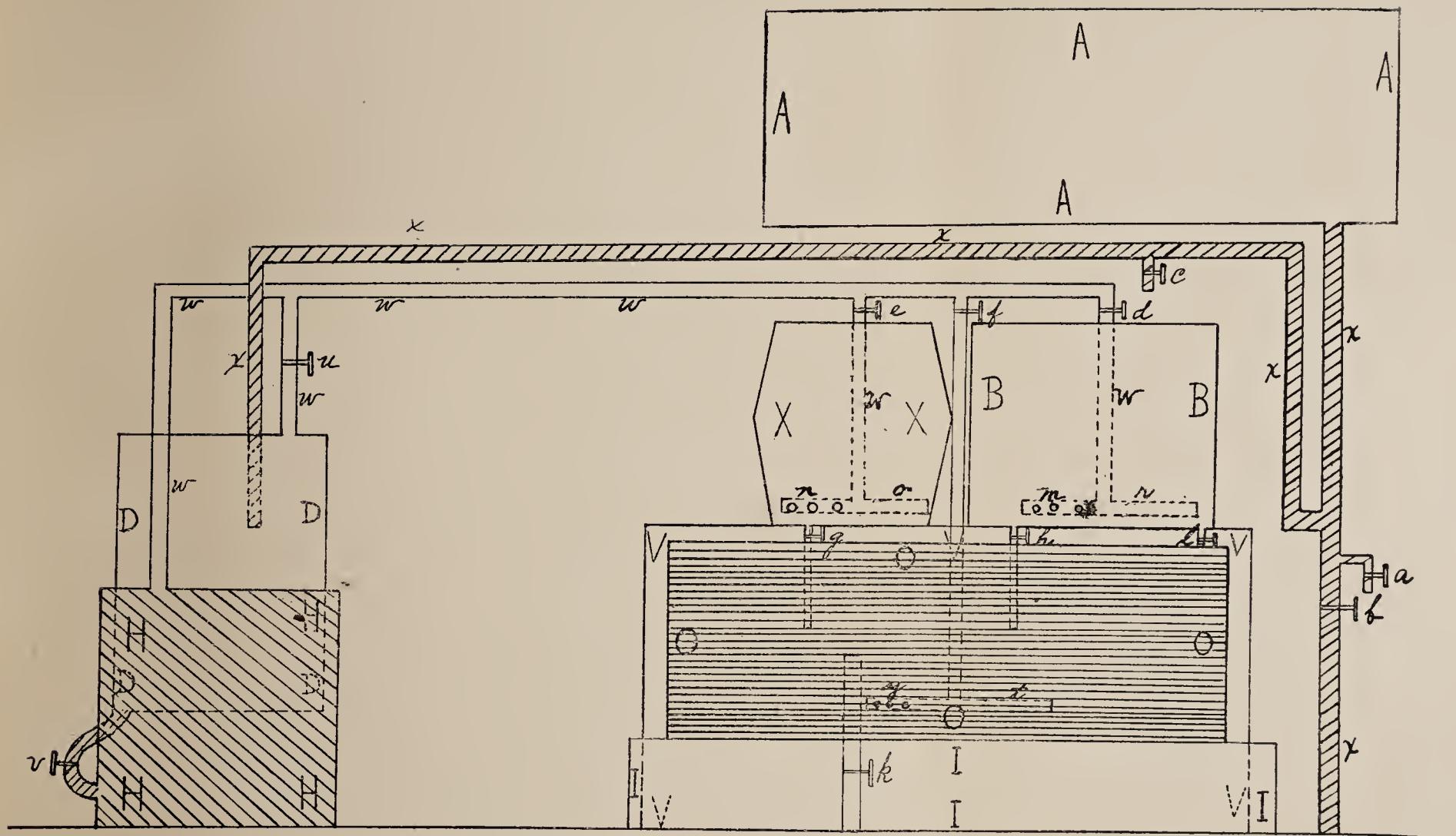
E. E. Hubbard, Chairman.

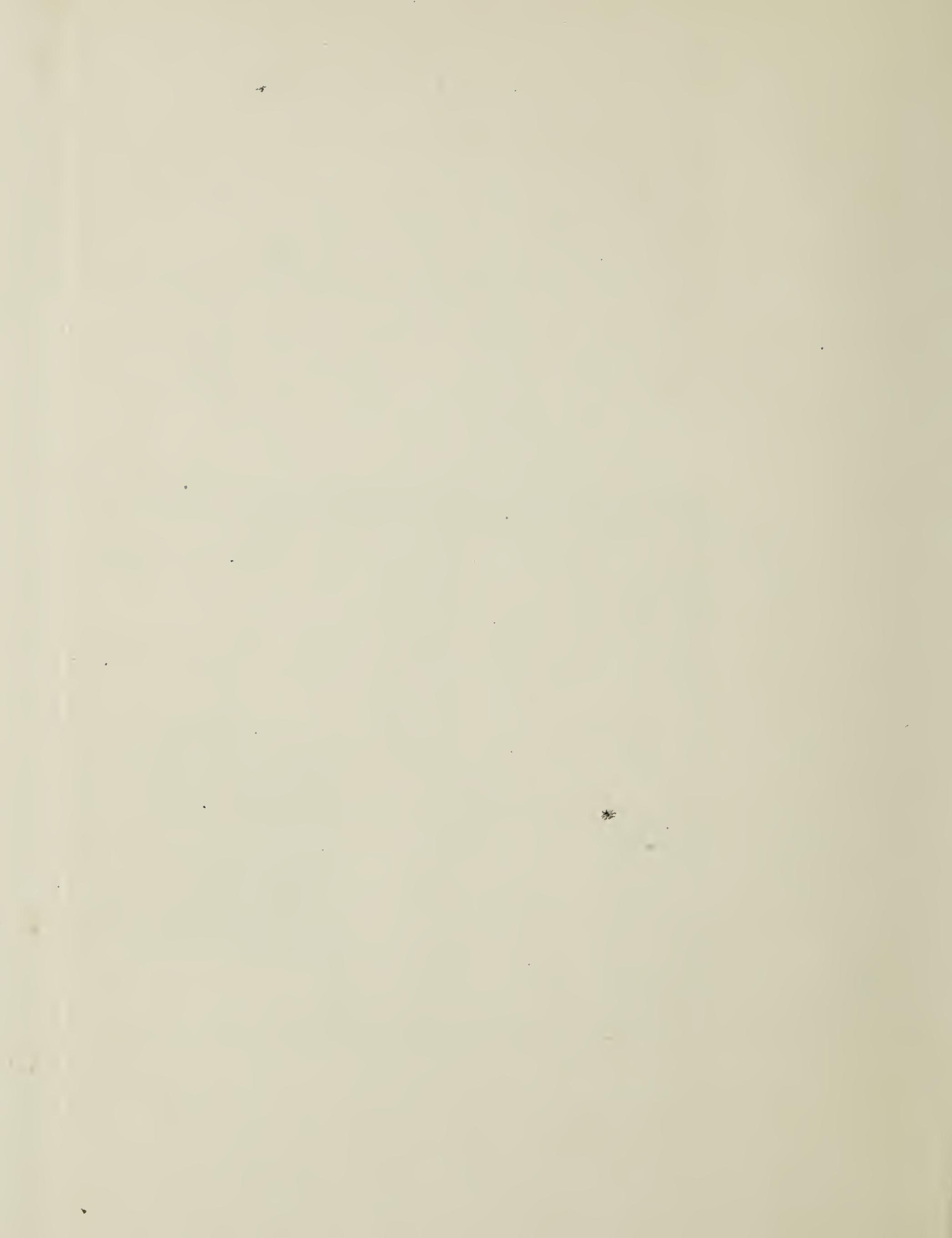
Previous reports of this standing Committee have pretty well threshed out the questions of commercial varieties, propagation, fertilization and culture, but there is still room for improvement in varieties, especially of early oranges, and I have thought it well on this occasion to review the work and conclusions of some of the foremost plant propagators of the country, with the view of stimulating observation, selection and improvement of varieties by every intelligent fruit grower. As all know, the U. S. Department of Agriculture is working to develop early, hardy, oranges from hybrids and in this connection I will quote from Luther Burbank the foremost living authority on hybrids and crosses:

"The main object of crossing genera, species or varieties is to combine various individual tendencies, thus producing a state of perturbation or partial antagonism by which these tendencies are, in later generations, dissociated and recombined in new proportions, which gives the breed-

er a wider field for selection; but this opens a much more difficult one—the selection and fixing of the desired new types from the mass of heterogeneous tendencies produced, for by crossing, bad traits as well as good are always brought forth. The results now secured by the breeder will be in proportion to the accuracy and intensity of selection, and the length of time they are applied. By this means the best of fruits, grains, nuts and flowers are capable of still further improvements in ways which to the thoughtless often seem unnecessary, irrelevant or impossible."

"The plant breeder before making combinations should with great care select the individual plants which seem best adapted to his purpose, as by this course many years of experiment and much needless expense will be avoided. The difference in the individuals which the plant breeder has to work upon are sometimes extremely slight. The ordinary unpracticed person cannot by any possibility discover the ex-





ceedingly minute variations in form, size color, fragrance, precocity and a thousand other characters which the practiced breeder perceives by a lightning like glance. The work is not easy, requiring an exceedingly keen perception of minute differences, great practice, and extreme care in treating the organisms operated upon, and even with all the naturally acquired variations added to those secured by scientific crossing and numerous other means the careful accumulation of slight individual differences through many generations is imperative after which several generations are often but not always necessary to thoroughly "fix" the desired type for all practical purposes.

The above applies to Annuals, or those plants reproduced by seed. The breeder of plants which can be reproduced by division has great advantage, for any valuable individual variation can be multiplied to any extent desired without the extreme care necessary in fixing by linear breeding the one which must be reproduced by seed. But even in breeding perennials the first deviations from the original form are often unappreciable to the perception, but by accumulating the most minute differences through many generations the deviation from the original form is often astounding."

"By crossing different species we can form more variations and mutations in half a dozen generations than will be developed by ordinary variation in a hundred or even a thousand generations. The evolution of species is largely dependent on crossing the variations contained within it. Forms too closely bred soon run out, because generally only by crossing does variation appear.

It is of great advantage to have the parents a certain distance apart in their

hereditary tendencies. If too close together, there is not range enough of variety. If too far apart the developed forms are unfitted for existence because too unstable. Radical changes of environment for a series of generations will produce a tendency to sport, but hybridization will bring it about far more abruptly and for practical plant or animal breeding or for scientific study of all these variations, far more satisfactorily."

Mr. Burbank asserts there is a close analogy between hybridization and grafting. An instance is cited in which *Prunus myrobalana Var. Pissardi* was imported from France and grafted on the Kelsey plum, a variety of *Prunus Triflora*. The graft did not bloom, but its presence on the tree brought about a cross between the two species. Many hundred descendants of this cross are now living.

These remarks of Mr. Burbank's on other plants show how slow and difficult will be the process of developing early and hardy oranges from hybrids and crosses. The chances are very small of anything of market merit in the first seedlings and selective crosses of the improved hybrids and testing of hundreds and even thousands of their successive offspring may be necessary before the object is achieved.

I therefore turn to the work of another Californian whose work was described some time ago in the "Citrograph" in part as follows:

"It has long been the popular feeling that the Washington navel orange is "good enough." Consequently when Mr. A. C. Thomson, of Duarte, announced his Improved Navel there were many who doubted such a possibility. And when he told the modus operandi of its origin the doubters said "Oh, fie!" To produce a

new hybrid by splitting buds and inserting a half bud each of two varieties in the slit sounds implausible; and yet that is just what this ingenious Scotchman says he did.

There is a diversity of opinion as to the merits of Thomson's Improved Navel, but all who are acquainted with it frankly concede that it is a distinct variety. The manner of its coming is immaterial, although there is no good reason for doubting the narrative of its sponsor. Having placed the new orange in the race with its progenitors, both as regards earliness and quality, it occurred to Mr. Thomson that the next thing to be desired was a late navel—one which should lengthen the navel season even unto the coming of the Valencia. With this important possibility in mind our Scotchman again split buds taking them from the Improved Navel and the Late Valencia. During a visit to his place recently he told me of the process and the difficulties involved. In the majority of cases the buds live and start, each half sends out an independent shoot, and not simultaneously. In other instances, even when starting at the same time, they fail to unite properly in a perfect shoot or stem. As proof that even a perfect union is not necessarily productive of an improved fruit, Mr. Thomson showed me a freak tree, with long curved leaves in which olive green and white seemed struggling for control. The few oranges on it were ribbed from stem to blossom end and were scarcely edible. Out of the many buds inserted in conjugal fashion from the Improved Navel and Late Valencia there came one tree which, as it stood in the nursery row, showed distinct characteristics and habits of growth. Mr. Thomson relates that Alexander Craw visited his place at this time, and,

being told that there was a tree of a new variety in the nursery, he went in and pointed it out. In due season it was set out in the orchard, where it now stands in one of two rows of its kind, these two rows of Navelencia extending through an orchard of Thomson's Improved Navels of the same age. The Navelencia trees average about a foot higher than the Improved Navels. In the half-dozen years since it first fruited, it has become the parent of many trees, its progeny including the two rows in which it stands, as well as orchards and individual trees in nearly every orange growing section throughout the world." "As regards lateness, it should be stated that the conditions of the fruit on the young trees about Highland and Redlands indicates that in this climate it promises to partially make good Mr. Thomson's original claim and to lengthen the navel season by at least a few weeks." As further evidence of the feasibility of split bud grafting I will quote from an address delivered by Professor N. F. Murray before the annual meeting of the Kansas Horticultural Society:

"Several years ago we began to experiment in hybrid grafting. We worked on apple, pear, and plum, root-grafting in the usual manner, except we cut out all the buds from the scion to be grafted, then split from end to end and with a sharp knife cut through the center of the top bud. Then taking two half scions of two different varieties we spliced them together, knowing full well that the desired union or cross of the two varieties must be accomplished by a union of the two buds. In part of our work we simply split the buds, always using a very sharp knife and a magnifying glass, and taking great care and pains, wrapping with fine thread and

then waxing. We operated on in this way, making quite a number of apple, pear, and plum. In the apple we used Ben Davis as a foundation and to this variety we united Johnathan, Wine sap and Grime's Golden, our object being to infuse better quality into the Ben Davis. We planted all with care and watched results, eight per cent grew, and from the appearance of the leaves we think we have at least three crosses out of 100 in the apple and we are awaiting their fruiting with interest. We are much encouraged from the fact that one plum tree out of twenty, crossed with Wild Goose and Abundance, fruited last year and shows a hybrid, or cross between the two.

We shall continue our experiment, feeling confident that in hybrid grafting and budding we have the means to greatly improve our fine fruits, flowers, and shrubs. We shall select our scions and buds only from the most healthy and vigorous trees and plants and those that produce the largest and best fruit. Our fine American herds have been brought up to their present high standard by the most careful selecting and breeding for generations. We believe that in a similar manner our American horticulture must be improved."

I think it will also be of interest to consider the experience of Mr. O. W. Blacknall of Kitterell, N. C., with natural variations of fruits. He says: "I will give my experience as to variation during the past forty years of three well known fruits, those are the Winesap apple, the Scuppernong grape, and the Wilson's Albany strawberry. Forty years ago the Winesap apples grown in this neighborhood were comparatively uniform in size and color. Since then a great many trees have been brought in and planted from widely

separated nurseries in different parts of the United States. The result has been a wide variation in the size and color of the fruit; probably this variation has extended to the flavor and also to the shape of the apple. But of this I am not sure. I am only stating what I know to be positively true. Then as to the Scuppernong grape: A very few if any Scuppernong grape vines have ever been brought into this neighborhood. It is fairly certain that nearly if not all, of the many vines now fruiting have originated from a few old vines growing in the neighborhood time out of mind, many of them certainly a century old. Still there is a variation in the size, quality, and time of ripening of the fruit of different vines which is most striking. Some bear fruit fully twice as large as others and that when growing side by side, some have thick hulls, and some thin, some ripen at the beginning of September and some not till the last of October. Now it is barely possible that the most dissimilar vines may be seedlings. But this is extremely improbable, as according to my experience when the Scuppernong seed is planted it reverts to the black grape similar to the Muscadine or Bullace, the wild parent of the Scuppernong. But even admitting that the widest variation is the result of vines grown from seed, there is still such a wide variation in the fruit of vines known to be grown from cuttings that it fully establishes the case in point."

In order to give a comprehensive view of the field, opportunities and principles of fruit improvement I have given these brief extracts from the writings and utterances of men who are acknowledged to be authorities and experts in their several lines of effort. In the Citrus it seems to me there is great range for variations, and I would call attention in particular to one

phase of probable variety variation that cannot occur in deciduous fruits.

The graft of deciduous fruit trees must be taken and put in when dormant, though buds of the peach for instance like the orange are put in during the growing season. Before blooming in the spring or late in the fall when the summer growth is used, for budding oranges, I think we may expect the new trees to be true to the parent, but budwood taken just after blooming in the spring is liable to show variations if taken from twigs on which the bloom has been cross pollinated from other varieties. Rev. Lyman Phelps worked on this line before the '95 freeze with artificial pollination and produced several modified oranges of which all were lost so far as I know except Tephi, a Jaffa improved with Malta Blood. The first example of this kind I discovered was Botelha navel, a bud sport from May budding about 1885, a round, nearly seedless, midseason navel that overbore so persistently as to be undesirable. It was lost in 1895. I think most orange growers have noticed variations in standard varieties and I think if these could be traced they would be found to result from effects of cross pollination on bud wood used just after blooming.

All will concede that the foreign pollen cells are the only cause of hybrids and crosses in the seeds of fruits. The pollen cells are the only motile cells in the higher orders of plants. A single grain attached to the pistil of an orange flower for instance sends its cells down that pistil into the ovary or embryo fruit and the mature

seeds of that fruit make trees with fruits differing from the parent tree.

Mr. Phelps contended that the influence of these motile pollen cells not only affected the embryo fruit and seeds, but for a short time, at least, affected a leaf axil bud or two adjacent to the flower.

For any person who has the time and patience the method of taking a bud next an artificially pollinated bloom offers a short cut to variety improvement. I am also of opinion that the split-bud and cross pollination bud methods offer quicker and surer means of obtaining thin skinned, fine grained, seedless or nearly seedless fruits of high quality, by combining varieties that are already high bred or superior, than the growing of crosses from seed.

In conclusion I would call attention to a difficulty in producing high grade, early, hardy oranges. The hardy trait must be derived from the Citrus Trifoliata while the sweetness of juice and tissue with fine flavor must be derived from fruits that have derived these qualities from the tender citron. In my experience the Tangerona and Early Oblong, for instance, are not so resistant to cold as the Satsuma and Mandarin which clearly show traces of Trifoliata ancestry. The Citrus probably more than any other fruits have the predisposition to throw to excess in crossing, some one characteristic of form, structure, color or flavor, with the odds enormously in favor of monstrosities, and a happy combination of desirable qualities will be as much a matter of chance as of scientific management.

By O. W. Conner, Tangerine.

Mr. President, Ladies and Gentlemen:

There are so many subjects that must be taken up, in making a report on "Citrus Fruits" that I hardly know where to begin, but I trust you will be patient with me, and that what I have to say will be of some benefit, to the beginners, if not to those older in experience. The cultivation of Citrus Fruits in Florida has, within the past few years, advanced to first place, of all Horticultural pursuits, and vast amounts of capital have been invested in large, and small groves all over the state, but most particularly, in the central and southern portions. And where ten or twelve years ago, a grove of fifty, or one hundred acres was considered a big thing, we now have many groves planted, that cover anywhere from one hundred to five hundred acres, and more going out every year, so I feel well assured, that in a very short time, we will enjoy the distinction of having the largest acreage of citrus groves, of any state in the Union and perhaps of any area of equal size in the world, and as the success of citrus fruits depends largely on these new groves, I trust you will pardon me for giving them so much attention in this paper.

With the increase in acreage, it becomes a necessity to so distribute the varieties planted as to reduce to a minimum the chances of overproduction, in any one class of fruit. And by reviewing the Grapefruit situation, we can surely learn the disadvantage of even partial overproduction. There is no question in my mind, but that there have been too many Grapefruit trees budded, and planted in

Florida in proportion to the fruits of other varieties, and we have seen excellent fruit drop from almost fabulous prices three years ago, to about cost of production, the past season, and it was chiefly due to the fact that the demand was not sufficient to clean up at any time, the excess of fruit shipped. It is true that in some cases, good prices were realized, but this was not a rule, and the average was far below what the leading growers expected to receive. The demand is certainly limited. If the Pomelo was such a fruit as it is customary to eat out of hand, it would be different. But its uses are almost entirely limited to table, or dessert purposes, while the round oranges are eaten by almost everyone, on all occasions, from one end of the world to the other. And even when making up the lunch for outing parties, this delicious fruit almost invariably finds its way into the hamper.

It is true that the demand is in a small way increasing, for Grapefruit, but not rapidly enough to keep up with the increasing output of Florida, California, Cuba, Jamaica, and Porto Rico, all of which, except California, produce nearly the same quality of fruit that we do.

I have no way of determining the exact proportion of Pomelo, that are already planted, but believe that fully one third of the whole number of Citrus fruit trees now growing in this state, are Grapefruit, and as the *majority* of these trees have not as yet come into bearing the results of overproduction have not as yet been felt, and I feel perfectly safe in saying that ten years hence (if all the Grapefruit now planted come into bearing, and barring freezes)

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that the price will be so low, that it will be a difficult matter to find a market for this fruit that will pay for production, and packing, to say nothing about transportation charges, to market.

Citrus fruit groves, if properly arranged as to variety, and intelligently cultivated, and fertilized, and in other ways scientifically, and methodically managed, are now, and will continue to be a good investment in Florida, and I do not want to say anything, that will have a tendency to discourage anyone from making such an investment, for I believe that the future holds many gratuitous results to reward intelligent labor in this vocation, but Horticultural progress has made many rapid strides during the past few years, in the way of determining the best thing to have for good results, and getting it, and to those who are beginning, I would most earnestly urge the necessity of getting the right thing, particularly in the way of variety, as a starter, and then to be sure to take good care of it.

There is no question but that in all sections where citrus fruits are grown, there are some varieties, that do better than others, and in planting new groves in any of these localities it would invariably, be the better to consult those who have already planted and fruited budded trees, before deciding on what you will plant, and not depend on something that you knew as a fine fruit which was grown a hundred or more miles distant.

I believe one of the results of "The Freeze" was to weed out many varieties that had been propagated extensively in the early days of citrus fruit growing in Florida, because they were not profitable, and we now have in our list of good varieties as compiled by our committee, and published in last year's yearbook, a

catalogue of Citrus fruits, each with its distinctive marks, and so arranged, that even a novice can pick out the winners, with a little local aid, and research, as to adaptability to location, etc. and I believe every variety listed, is a good one for *some* locality, and among the best of them, for *universal* use, I believe the following are entirely safe: Early Boones, Parson Brown (Carney) Satsuma; Midseason: Pineapple, Homosassa, Majorca, Ruby; Late: Hart's (Tardiff) Valencia Late; Very Late: Lamb's Summer. Novelties: Dancy (Tangerine;) King, Mandarin, Kumquats. I prefer the Parson Brown, to all others on the list of early varieties. The Boone will color up earlier in the season, but its appearance is against it, and it is inclined to roughness, and a thick rind, and is of a very uninviting color, even when fully ripe.

For midseason varieties, there is nothing on the list, that quite equals the Pineapple, and it differs from other varieties, inasmuch that it can safely be depended on, in any, and all localities, where any kind, or varieties of citrus can be grown. It is the most profitable sort for high pine lands, and is perfection on hammock and other rich, or heavy soils. This variety, like the Parson Brown, has made a reputation for itself, on the different markets, and I believe I am perfectly safe in saying that it has netted the growers fully a dollar a box more than any other variety, the past season. Next to the Pineapple, is the Homosassa, and as a midseason, to medium late variety, I believe there is a good chance for the Ruby. Ruby should always be classified, and shipped as a Blood and it should be put up in as attractive a manner as possible. The Hart's and Valencia Late, I have found to be of about equal merits as to quality of fruit.

However, if there is any variation, it is in favor of the Valencia Late in evenly coloring up, and smoothness, and texture of peel. The Tardiff will hang on the trees a little later in the season, but I am not sure that the quality of the fruit improves as it is apt, especially so on lemon stock, to get greener after rainy season commences. I have noted the past winter, that late varieties, owing to their immature condition probably recover from the effect of cold weather better than any of the midseason, or early varieties. A neighbor shipped in good condition April 15th Tardiff oranges that were seemingly ruined by a temperature of 22 degrees, two nights about January 20th.

I believe, too, that there is a good market waiting for a good navel orange. This variety, when of good quality, has always brought good prices, and as there have been some improvements made on the old Washington Navel during the past five or six years, there is good reason to believe that we will yet be able to produce the best navels to be had anywhere, and if the new varieties prove to be prolific bearers on sour, and sweet stock, and of good quality on lemon, and generally successful in most sections of the state, instead of certain restricted localities, as heretofore, they will be a most profitable variety to plant, and propagate.

By planting the varieties as listed above, or others of equal merit, and so dividing the different classes of fruit, as to give early, midseason, late, and novelties, about an equal share, or area in the new groves, one could pretty well cover the entire shipping, or marketing season, and in this way get an average of season's prices, which ought to bring the account out on the right side of the ledger.

The subject, Stocks, was pretty well covered by Prof. Rolfs, in his paper "Relation of Science to Horticulture" See pages 56 to 66 last year's year book; but, I want to say that there is probably no other state in the Union that shows such a diversity of soil, as Florida, and while I agree with most others here, that the sour orange is the best stock to use and that it is this stock that has been used to produce most of the prize winners at various exhibitions etc., there are soils upon which it would hardly produce a leaf, on account of their extremely light, sandy composition. If we, in the larger portion of Orange county, on our high sandy, hilly lands depended altogether on the sour stock, we would not have a very good show for the money invested, and a large portion of our groves are on sweet, and rough lemon stock. The sour stock is a favorite in all localities, where a good quality of soil is to be had, and there can be no doubt, that fruit will carry longer, in good condition, on this stock than on any other, but on light, or high thirsty pine lands, it would be cultivated chiefly, at a loss. The Citrus Trifoliata stock has been tried, and proven an absolute failure, and the pomelo, or grapefruit stock grows off well until it has been budded to some variety of round oranges, and after that it usually loses its thrift, and does not do any better than the sour stock. Therefore, about all that we have to depend on is the rough lemon as a stock.

This stock is a very rank feeder, and rarely suffers from the effects of dry weather, as other stocks do. It is healthy, and will thrive with us, under most adverse circumstances, and can always be counted on to produce a good crop of fruit, when treated fairly, and properly

fertilized. It is folly to expect that trees worked on this stock over-supplied with nitrogen, will produce good fruit, and especially is this true, if organic materials are used, with an excess of nitrogen, and a deficiency of phosphoric acid, and potash. This is not only true of lemon stock, but it has been my observation, that every grove so treated will produce a poor grade of fruit, and sooner or later, develop that most trying disease, "dieback," which might truly be called indigestion of the orange tree. There are many growers who have fine looking groves, that are bearing large quantities of a poor quality of fruit, who blame it all to the stock, when they might by taking into consideration the fact that this stock is an immense feeder, and does not require the same amount of nitrogen that the sour stock does, nor the same methods of cultivation as other stocks, and cultivating, and fertilizing them accordingly, produce a good quality of fruit.

I do not advocate the use of this stock on any but light soils, and by those who have had experience in cultivating citrus fruits, and who understand the requirements of their soils but those who have this stock already planted, and developed to a bearing stage, can do much to improve the quality of their fruit by regulating their formula of fertilizer in such a way as to most accurately meet the requirements of their soils as, well as their methods of cultivation, etc.

I would like to add that the late D. W. Adams, who was for many years president of this Society, and during his residence in this state one of our most practical Horticulturists, and one who was noted for his success with citrus fruits, had before his death, decided in favor of the lemon stock for all his new groves, not because it

was the best stock for universal use of course, but because he had solved the problem of its successful cultivation, and fertilization. His methods of cultivation are too well known to make mention of here, except to say that they mainly consisted of very light working with hoes, and plenty of mulching. I think his *plan* of mulching might have been improved upon, but the fact remains, that he produced the best fruit grown in the state, and it was seldom that a box of his Navels, or Tar-diffs went out of his packing house, that he did not get back from \$5 to \$10 for it. No matter where the lemon stock is used, it cannot be cultivated, and fertilized in same manner that other stocks can, without producing coarse ungainly fruit, and if kept highly cultivated, and fertilized with a formula containing over 4 per cent ammonia, and less than 7 to 8 per cent Phosphoric Acid, and 10 to 12 per cent potash it will naturally follow, that the fruit will be insipid, flavorless, coarse, and of light weight.

In localities where sour stock thrives, no other stock is to be considered, and the less fertilizer required, the more gratifying will be the success of the grower, but in all cases I would warn you to beware of, and fight shy of a fertilizer formula, consisting of any but pure chemicals, and if once you are tempted, and fall into the use of a cheap source of the different requisite elements, or an organic form of fertilizer, you at the same time put yourself into a position to regret it later on, when your trees begin to bear, if not before. I am sorry to have to say that in many portions of Florida the balance will show up on the wrong side of the account this year, for with the condition of our markets, and the general falling off in quality of fruit produced, the net earnings of our groves have

fallen many thousands of dollars behind what most of us confidently expected to receive for our fruits, and in the main, I fear it is the growers' fault this time in many ways. First, in quality of fruit produced, Second, in poor packing, Third, in rushing green fruit to the market very early in the season, with the result of hopelessly glutting the markets with slow selling fruit, and so demoralizing the market, that there was no settling to real values, at any time during the season; and added to all this, was the effects of the cold of January and the consequent loss of large quantities of fruit, waiting to be shipped, when the market once got settled. Such good fruit as was left on the trees in many localities has brought very low prices, in consequence of frozen, or partially injured fruit having been shipped, usually at a loss, but I trust all these hard luck experiences, have carried with them their little lessons, relative to properly sorting, and packing fruit, etc., as well as bringing to the minds of all growers, the necessity of *producing a good article to offer to the consumer if good prices are expected in return.*

I trust I will not be encroaching on the privileges of some other committee, if I say a word or so about insects, and spraying, for I believe a great deal depends on spraying, that is essential to producing good fruit, for good fruit must have a good appearance, as well as a sweet, aromatic interior. From the time the bloom drops off the young fruit in the spring, there are enemies lying in wait to prey upon it, during every stage of its development, and while there are many locations, where soil, and atmospheric conditions are at enmity with these insects, and fungus diseases, and work wonders as preventives of damage to the fruit and trees by

their effects on them, I believe the rule is that these insects, and fungus diseases do a great deal of damage, and spraying becomes a necessity, in order that a good quality of fruit may be produced, notwithstanding opinions held to the contrary. However, I have learned of cases during the past season where beginners (at spraying I mean) had done as much damage, with their spraying, or more perhaps, than the insects sprayed for would have done, if left alone. This was because they did not use the spray at the right time, or used it too strong, or too often. While I believe that it is absolutely necessary at all interior points, to spray, I would caution those who do it, to be sure they are right, before they go ahead. Use the right thing, at the right time etc. As there are numerous bulletins to be had for the asking, from the Experiment Station at Lake City, besides which advice will be gladly furnished by the Station director, Dr. Sellards, I would recommend that growers avail themselves of all the knowledge these sources afford and thus equip themselves with perfect knowledge of their enemy before entering the arena.

White Fly.

I believe the mention of this little insect is sufficient cause to make every grower, who has the well being of his grove nearest his heart, look himself over, and brush his clothes well before thinking of entering his grove again, and if we were all as careful as this assertion would indicate, I believe it would be a simple matter to keep the insect in check. During the past two or three years we have all begun to realize what a serious menace this insect is to our orange groves, and many plans have been suggested, for fighting it successfully, and keeping it in check, and

we cannot afford to get careless. If you would keep free of their damage, keep free of them. Never go near them and then into your own grove, without first making sure that you carry none with you on your clothes, in your carriage, etc., and insist on the same consideration of anyone else who enters your grounds. The benefits to be derived from local protective organizations are too manifest to need more than a passing remark here, and those neighborhoods that can do so, would be more benefitted by this method of protection than by any other. It is cheaper to keep this insect out of a community than it is to fight it after it has gained a foothold. We have kept it out of our neighborhood for several years by spraying it at the nearest points, and cutting down all food plants in its path, and now the fly is not as near us, as it was at the beginning of our fight to keep it out.

There is not much danger of getting the fly from any of the leading nurserymen, for I believe they have a scruple in the direction of spreading so damaging a pest, but there is danger of shipping nursery stock through the country, either by express, or freight when the fly is on the wing, unless it is packed very tight, and no chance for the insect to get to the contents of the package. The express and freight cars gather them up, when passing through infested places, and often carry them many miles from their original breeding places. I have seen flies at Wildwood, which came all the way from Orlando, in the express car, a distance of fifty miles. You can imagine what would have occurred if there had been an open top case of citrus trees in that car.

And now in conclusion, I want to say that if we bend all our energies to the point of breaking, and strive to keep our pro-

duct up to its known standard of excellence I can see no reason why we cannot succeed in keeping the reputation of Florida oranges at the head of the list, believing that there is only one thing that we *can* do, one that will be of lasting benefit to our organization, and that is, to strive every way possible to make our product better each year, until we have well earned the reputation that we now enjoy, that of producing the best citrus fruit grown in the world, and then by untiring effort keep its reputation right there. Regretting that I cannot give you anything better in the way of a report, as an aid in that direction, I am,

Yours respectfully,

O. W. CONNER.

Tangerine, Fla., May 1, 1905.

Mr. President—I have a letter that was intended to have reached me in time to have been incorporated in my report, but it did not do so and I beg to have the same received and attached as a part of report of the Committee on Citrus Fruits.

On motion duly seconded and carried, the following paper referred to by Mr. Conner was received as a part of the report on citrus fruits:

May 9th, 1905.

O. W. Conner,

Jacksonville, Fla.,

Dear Sir :

I have your letter of recent date stating that you are preparing a paper on citrus fruits, and that you would like me to write you something regarding the situation in Cuba, knowing that I am entirely familiar with it while you are not. You also say that you would like to have a gen-

eral statement from me as to my opinion as to the future of the citrus and nursery business. I fear very much that it will not be possible for me to attend the meeting at Jacksonville much as I would like to do so. I had expected to be in Cuba, but was able to get away somewhat sooner than usual, but find that I must go to New York at once, which will prevent my attendance at the meeting. I do not suppose you will have much time for a lengthy statement from me, and will therefore endeavor to make it brief.

Orange growing in Cuba, up to comparatively recent date, was merely incidental. None of the groves had ever been planted with the idea of shipping fruit to market, but such fruit as was grown came from trees which happened to be planted in one place or another by accident. These trees are found growing all over the Island, and have never received any care worth mentioning. In many parts of the Island there are many wild trees growing in the forest, just about as they did in the hammocks around Orange Lake, excepting that they are not quite as plentiful. There are also a great many bitter sweet trees growing throughout the Island, and the fruit on these trees, as well as that on the sour trees, seems to be identical with the fruit grown in Florida. In regard to the quality of the sweet orange I will say that there is as wide a range as there is in Florida, and while I have eaten oranges in Cuba which I consider to be as good as any I have ever tasted, I have also eaten many which were very poor. There is nothing very surprising about this, however, when the circumstances under which they were grown are taken into consideration. The trees are generally standing where there is no chance whatever to cultivate them, and in many instances the

entire ground surrounding the trees is choked with a dense growth of other trees and plants. Many of the trees are growing in what is called Guinea grass land, and this grass grows very rank, and often attains the height of eight to ten feet. During the many wars which have prevailed on the island, either one army or the other persisted in setting fire to anything that would burn, in order to burn out or smoke out the enemy. This was, of course, pretty tough on the orange trees, as many of them were burned to the ground, while others were badly injured. A great many people who have been to the Island have told me that they never saw a large orange tree, but had the trees in Florida been burned as they have in Cuba, the same statement might truthfully be made here. If we were to have a freeze which cut our trees to the ground about every four years I doubt if anyone would ever see a large orange tree in Florida. There has been practically no shipment of oranges from the Island of Cuba for many years. The entire product of these scattering trees being consumed at home. Within the last two or three years, however, several American Syndicates have planted large groves of oranges and grapefruit in Cuba, and the prospect is that within a very few years Cuba will be known as a factor in the citrus fruit business. While it is true that oranges will grow in any part of the Island it is also true that a great deal of the soil of Cuba is not well adapted to citrus fruit culture, owing to the fact that it is very heavy and almost impossible to cultivate. Such land will produce magnificent sugar cane, as during the rainy season they do not expect nor is it necessary to cultivate sugar cane, and at such time as I have described it is impossible to work a horse for the

reason that it would soon sink out of sight. The lands with which I am most familiar are located at Ceballos in Porto Principe, Province. Here I found the soil very similar to that in our best Florida Hammocks, except that it is red instead of black. The land is covered with a dense growth of hardwood timber, and it stands so thick that a cat can hardly crawl into it. When I went to inspect this land for the Development Company of Cuba I found that where wells had been dug the soil was twenty-six feet deep before they struck sub-soil, and it seems to be just as good at the bottom as it is at the top. There is 29 per cent of silica in the soil and this makes it porous enough so that when a heavy rain falls it soon soaks through it. I have seen it rain steadily for nearly twenty-four hours, and within two hours after it stopped I could ride a horse all over the well-cultivated field with out any discomfort whatever, and the ploughs and cultivators could be operated next day. I think all things considered this is the finest soil for orange growing that I have ever seen. The time may come when we will have to fertilize, but I think it is a long way off. The Development Company of Cuba, of which I am the General Manager, determined to plant oranges on an extensive scale, and we began operations there two years ago. Our first planting was about 10,000 trees and we finished on the fifteenth of February, 1903. To anyone who has not visited Cuba, it would seem almost incredible if they were told that trees planted at that time are now, many of them, 12 feet high, and the stocks three to four inches in diameter with a corresponding spread of branches, that they bloomed in March, and that many of them are now carrying three to four boxes of fruit. Whether this will

shed or not I cannot say, but I never saw healthier looking fruit in all my life. Thus it was when I left there a week ago. I do not wish to convey the idea that every tree is twelve feet high, or that every tree has three to four boxes of fruit, but I believe the grove will average nine feet in height, and unless they drop very badly, the present indications are that we will have more than an average of one box per tree. It must be taken into consideration, however, that these trees grow the entire season, and there is never a day in the year but what you can go into the grove and find plenty of new growth on them. In Florida, you are all aware that there trees generally rest for three or four months each year, and then if they have been fortunate enough to escape Jack Frost, they continue to increase in size, but you can readily see that this is a much slower process than when the growth is continuous, and where the land is so rich that they never lack for a square meal. The Development Company in connection with the colonists who have settled there have now planted about 2,000 acres to citrus fruits, and these will probably be increased from five to eight hundred acres per year for several years, as it is the intention of the Company to plant at least 3,000 acres.

I never saw trees anywhere that seemed to be in any more healthy condition, and I can see no reason why the production of citrus fruits in Cuba should not be carried on successfully, and on an enormous scale. We have had some little trouble with gumming, but this has entirely yielded to treatment and the affected trees seem to be in perfect condition at the present time. We have also had more or less scale to contend with, but I do not anticipate much

trouble on this score. We were never troubled much on the rich Hammock lands here in Florida for the reason that the trees grew so rapidly that the scale could not seem to do much damage. I had several hammock land groves before the freeze, and do not recollect ever having sprayed one for insects, but on the pine lands we always had troubles of our own. The soil in Cuba being so very much richer than any in Florida, I do not apprehend much trouble from scale insects for the reasons above given. We have not, as yet, had any white fly to contend with, and I sincerely hope that we will be able to keep them out. Judging from the growth the trees already planted have made, and by the prospect we have for fruit this year, I think I am safe in saying that the present planting at Ceballos in the course of five or six years ought to yield easily one and a half millions of boxes. We are located on the line of the Cuba Railroad, and this Company is building enormous docks at its terminus at Nipe Bay, which will be our shipping port, and we expect to deliver fruit from our packing house to the wharf in New York in five days or less. There is one great advantage in shipping from Cuba, and that is, after the fruit is loaded onto the vessels, there are no way stations or side tracks, but it goes direct to its destination without stopping. I am satisfied that thousands of trees will be planted in unfavorable locations in Cuba, and do not believe such trees will ever amount to anything. I have seen trees grown on heavy black lands which produced beautiful fruit, but upon examination I found them badly creased and would not stand shipment. This land is very similar to some I own at Silver Springs Run, and while my fruit was very handsome to look at it was al-

ways badly creased, and it put me to lots of trouble to market it, as I could never sell the crop to the same man twice, for the reasons above stated. There are bound to be failures in Cuba just as there have been in Florida and California, but in my opinion where careful and intelligent selection of land and location has been made there ought to be no trouble to succeed in growing as good citrus fruit in Cuba, as in any other place in the world, and I believe when our improved budded varieties begin to fruit there will be no question about its quality. Many people in Florida have an erroneous idea that good oranges can not be grown anywhere else. I think, however, that you will all agree with me that there are some mighty poor oranges grown in Florida, especially on lands which are not well adapted and which are not properly fertilized. It is doubtful if any better fruit than is grown in some parts of Florida will ever be produced anywhere, and it would be an unreasonable man who would ask for anything better, but with the experience I have already had in Cuba I feel perfectly satisfied that we will produce a great deal of good fruit that will compete with the best in Florida and California.

In regard to the nursery business I do not suppose this will interest your hearers, but will say briefly that I have never yet seen any trees grown in Cuba which compared to those produced in the sandy lands of Florida. Any one who is at all familiar with the propagation of trees or plants knows very well that a light sandy soil is much more desirable for the reason that it will produce a much better root system. In the rich lands of Cuba there is so much plant food always present in the soil that the young plant does not find it necessary to throw out any

large quantity of roots as a comparatively few seem to suffice for its needs, while in the sandy lands of Florida the young plant must hustle for food as soon as the seed sprouts, and this continual hustling gives our trees the magnificent root system for which they are so justly noted. In planting our trees if proper care is taken by the nurserymen in digging and by the planters when setting there should not be a loss of one per cent, and I have known several instances where several thousands of trees were planted without the loss of a single one. On the other hand with the Cuban grown tree, if the same precautions are used as in the other case there is often a loss of from twenty-five to fifty per cent, owing undoubtedly to the lack of roots on the tree grown in the rich soil. I have seen nursery stock grown in California, Jamaica and Cuba, but have never seen anything that could "hold a candle" to the tree grown in the sandy soil of Florida. A great many of my friends have talked with me on this subject of orange growing in Cuba, and seem to fear that Cuba would soon put Florida out of business. I do not think we need to have any fears on this score, as there will be but little competition. I have always advocated the planting of late varieties in Cuba, claiming that we should take advantage of the climatic conditions there and grow something that could not be grown in Florida. About 90 per cent of the orange trees I have sold in Cuba are of the late varieties, and will not get into the market until after the first of February, at which time practically everything has left Florida. I have advised against planting the early varieties for the reason that we can not get them into the market any earlier than can be done from Florida, and as our growers

have a bad habit of rushing their fruit into the market regardless of the fact that it is green and unfit for use, and without any reference to the demands of the market, I thought it would be bad policy to get our fruit in at the same time, as we would all go down together. There will of course be some fruit shipped during December and January, but I do not think these shipments will have much effect on the market, as the bulk of the fruit will come later.

There is much more that might be said, but I have already made this letter much longer than I intended.

Trusting that it may be of some interest to your hearers, I remain,

Yours very truly,
M. E. GILLETT.

DISCUSSION.

* Mr. Boggs—Mr. President, there is especially one important point in my judgment contained in the committee report that should be fully discussed by the society. That point is the question of overproduction of grapefruit. There has been a great deal of complaint this season of the prevailing low price of grapefruit and it behooves us to inquire into the cause. While I must admit that I have myself seen but a small portion of the state and am not entirely familiar with the acreage or output of grapefruit, I have gained the impression from the press throughout the state that it is now large and still growing; in fact, it seems that everybody is planting grapefruit. Mr. President, this is a very important subject to this society and to the citrus fruit industry of this state. The market conditions on this crop are decidedly bad. There seems to be no let up in the planting of grapefruit trees and there seems to

be no let up in depression of prices, so far as my observation goes and I would like very much indeed to have the views of other members of the society upon this very important matter.

Mr. Carroll—Mr. President, before I could entirely agree with the gentleman I think we should first look to the marketable condition of the fruit, picking handling, packing and shipping and the proper distribution before we come to the conclusion that we are approaching an overproduction in this handsome new fruit. Grapefruit, Mr. President, is a new fruit, a comparatively new citrus product. There are thousands of people in this country who do not know what grapefruit is. They never saw the fruit, and when they see it they have to be educated how to eat it. Further than this my observation is that the condition of the marketable crop up to this time has been positively bad. The handling and packing has been bad, shipment and distribution has not been the best. I believe I can safely say, Mr. President, that fully one-third of the fruit shipped out of the state this season has been shipped out in a green, immature and decidedly unmarketable condition. Such conditions as these will make the market slump on anything. Another thing, Mr. President, the hue and cry was raised some years ago that we were on the verge of overproduction in oranges. We do not hear any more about it now. The proper handling, picking, packing and shipment of the orange crop secures good prices on the market. I believe it will be the same with grapefruit. Let us rather make improvement first in these important conditions, Mr. President, and give the great markets of this country a taste of the delicious grapefruit before we

indulge in the pessimistic views of over-production. I am an optimist in the matter of the grapefruit industry, as I am with regard to almost the entire family of Florida citrus fruits. Give us some legislation if it is needed in the matter of crateage and package and rates. Let us send our fruit to market in prime condition and I believe the low prices will abate and vanish.

Mr. Connor—I think you will find, Mr. President, that attention is called in my paper to marketable conditions. These conditions must be bettered before we can expect to realize better prices. The matter is a very serious one and we must seek the cause. I am inclined to believe myself that there is now a partial over-production of grapefruit, or to put it transversely, under-consumption. The conditions exist and they should be met if it is possible to meet them or suffer disastrous consequences.

Mr. Blackman — Mr. President. I heartily concur in the remarks of Mr. Carroll. During my travels last summer I came across scores of people who had never heard of grapefruit and did not know what it was, and didn't know how to eat it when they saw it, but who were all delighted with the fruit when it was offered them and they had once tasted it. If this be true, and it most assuredly is true, how can we apprehend overproduction in this comparatively new citrus fruit? The great majority of the people of this country as yet do not know what grapefruit is. They have never seen it. It has never been offered to them. It has never been placed upon their market. In my judgment, Mr. President, we certainly should not apprehend overproduction until we have at least put the fruit

properly upon the market in good condition. I found this state of things at the St. Louis Exposition. There wasn't a man in ten who had ever heard of grapefruit. I had some of the fruit with me. I induced a commission merchant to take a shipment of it, and exhibiting the fruit there, I told the people where it could be procured. The consequence was, the merchant sold out his entire shipment in a few days. Mr. President, we have not overproduction of grapefruit at all in my judgment. It is rather a lack of systematic marketing. I do not fear overproduction. I have always been able to dispose of my fruit on the trees in many instances at good prices, and I believe with proper systematic management, the same good results can be had now from the fruit of every grapefruit tree in the state. You can not get good prices for an inferior, green, immature, badly handled, packed or shipped fruit on a glutted market. The grapefruit in my judgment has as bright a future before it as the orange. I therefore can not believe that there are any grounds of apprehension or fear of overproduction of this delicious, comparatively new fruit, which as yet has barely been introduced to the markets of this country.

Mr. Boggs—I feel unwilling to leave the subject without another word or two. The comparison has been made here between the grapefruit and the orange. There is no comparison, Mr. President, in my opinion, between the two fruits—at least so far as market results are concerned. In the first place, the grapefruit has to be eaten at the table after preparation in the culinary department. It therefore requires too much handling before it reaches the point of consumption. It

is a large fruit and can not be handled in the same manner as the orange. Therefore, it will never have a very large sale, as a notable instance on trains, which alone is an important channel of consumption. It is well known, or if it is not it is time it was becoming known, that the average patron of the fruitstand, where the two fruits are displayed, the orange and the grapefruit, will buy ten oranges to one grapefruit. He can eat the one on the spot, if he chooses; the other he has to take home with him and have it prepared before he eats it. I want to say here and now, Mr. President, that those of us, and I believe there are many, who indulge the delusion that the grapefruit is ever to rival the orange on the market, are doomed to disappointment and despair. That can, in the very nature of the two fruits, never be. It is, in my opinion, the utmost folly to entertain such a thought. The gentleman from Miami, Mr. Blackman, is the only person that I have heard of who has this season received what he thought he ought to have gotten for his grapefruit. Let us, for a single moment, consider his conditions. The grove of which he speaks is within a short distance of the Royal Palm Hotel, and situated upon a favorite driveway for tourists. The owner sells entirely to this class of trade, and gets twice as much per box in his grove as the fruit could be bought for in New York City. How many of us have a grapefruit orchard in the shadow of a palatial winter resort hotel, where the fruit may be picked from the trees for the breakfast table? The gentleman is to be congratulated upon his situation and upon the fancy prices he has obtained for his fruit, but that situation, Mr. President, is a very different one from the average grape-

fruit grower in this state. In conclusion, I must reiterate that my observation is, that we have even now, or we soon shall have in this state, a very large overproduction of grapefruit. I would not be un-

derstood as discouraging its culture entirely, but it should certainly be made subservient to the real condition of things as regards its scope and its market.

Tropical Fruits.

By Mrs. E. E. Ankney, Eldred, Fla.

Mr. President, Ladies and Gentlemen:

In the recent reports of this committee I find that those reporting gave you a wide outlook upon the pineapple industry, its history, increase and desirability as an investment. One committeeman says: "To go into the details of pineapple culture would be entirely foreign to this report," and another says "I should hate very much to feel called upon to relate * * * the details * * * and I take it that people generally care little for such information." As I have neither a wide experience nor extended observation, I must necessarily confine myself to my smaller knowledge which covers only the methods of culture employed by myself and some others in my own vicinity.

I have been a member of this society and read its reports for six years past, but have never had the pleasure of attending a meeting where I could ask questions; so that when I read that Mr. Porcher has found a new bug on his orange trees, which he got rid of by spraying, I am glad if he describes it so that I may know it should it come down our way; or when Mr. Hart says there is a fungus which

will take care of that bug just as well, and does not tell what that fungus looks like, whether green, brown, or yellow, or where it grows, how shall I know that I have the panacea on hand when the dread enemy appears? I am sure the facts and minute details are what make the Annual Reports of this society valuable.

PINEAPPLES.

Pineapples have as yet only one great enemy and he is the, hitherto, unconquerable Jack Frost. He has laid them low several times but, like Truth, though crushed to earth they rise again and grow and grow. In the hope of making my paper practical, therefore, to those newly starting in the business, I will tell you how some of us grow Red Spanish pineapples out of doors at Eldred on the East Coast.

Our land is spruce pine and high hammock. It is cleared, grubbed deeply and raked as for a garden. The slips which form around the base of the apple are allowed to grow after the fruit is picked until mature, and are considered the most desirable to plant, although suckers usually bring a higher price per thousand.

Good plants should be eight inches or more in length. These are cut off slightly at the base and enough of the leaves or boot peeled off to expose the root system and planted with a dibble or trowel, twenty inches each way and in beds twenty to forty feet wide being found most satisfactory. At this distance it will require about twelve thousand per acre, more or less, according to the space given to paths. Some, immediately after planting, put a pinch of cottonseed meal, or cottonseed meal and tobacco into the heart of each plant, but generally this is not done until the plant begins to root. From this time till the plants bloom, the scuffle-hoe is the grower's best friend, and its constant use without fertilizer will make better plants than the fertilizer without the scuffle-hoe. Neither should be used sparingly if the best results are to be secured. When well rooted an application of five hundred pounds to the acre of cottonseed meal and tobacco or of high grade blood and bone will keep them growing nicely. If the weather does not become cold enough to check growth, still another application of the same kind, say one thousand pounds per acre, may be applied in the late fall or winter though this may be delayed till February or March.

By mid-summer the plants should be nearly full grown and stocky at the base. Until recently it has been usual to apply at this stage simply an ammoniated fertilizer and if they are at all backward that will be best, but otherwise I prefer to add a slight percentage of phosphoric acid and potash to the ammoniate. One hundred pounds of fertilizer to each one thousand plants is sufficient. The plants will then need nothing further until they are ready to fruit and this is applied any time between September and March, owing to the

condition of the fields, the weather or the ideas of the individual grower. A formula for this last application often used is 3 to 4 per cent of ammonia, 7 to 8 per cent phosphoric acid and 10 to 12 per cent potash.

I have thus outlined as briefly as possible one system of cultivation which has given good results, but of course there are many variations from this, both in the amount of fertilizer, proportions, and time of application. The pineapple is tenacious of life and lives to fruit so it does its level best with whatever comes to it, but repays richly for good feeding and care. An acre well cared for will, if the plants were vigorous and all conditions favorable, produce 90 per cent or from 300 to 400 crates the first crop, but as neither slips nor suckers are uniformly good and some years are all below par, the average yield is not so high. After plants cover the ground, cultivation ceases and fertilizer is applied broadcast, two applications a year being considered sufficient in our locality. Formerly cottonseed meal and tobacco dust was the universal summer fertilizer, but recently a more or less complete one of high grade materials is growing in favor, especially when there is much fall fruit.

Believing that those who have never seen a pineapple field or seen the fruit handled would be interested, the writer takes pleasure in showing some pineapple views taken in the East Coast pineapple belt in St. Lucie county. The packing of the fruit will be of especial interest to many.

The growing of pineapples is no longer an experiment. The problems remaining to be solved are largely economical and commercial. Increased production means smaller profits and must induce better

INSIDE PACKING HOUSE.



A "LITTLE" PATCH OF PINES.



PACKING HOUSE AND RIPE FIELD OF PINES.

business methods by the growers; less waste and the obtaining by combination or otherwise, wholesale prices on needed supplies. We need a wider distribution and cheaper rates, particularly to near-by markets; and above all quicker transportation and more careful handling. Six days to New York, and eight to Boston, will never enable us to compete with Havana fruit should our seasons be identical.

The freeze of January 25 to 26 left our fields brown as stubble fields in Autumn. But the wonderful vitality and recuperative power of the pineapple plant has again been demonstrated and our fields are rapidly renewing themselves. The yield from the older fields will be cut down 60 to 70 per cent but those coming into bearing for the first time will produce almost as many pines, but unless weather conditions are perfect, they will average much smaller than if they had not been frozen. A strange characteristic of this freeze was, that the newly planted fields were practically uninjured. A white frost has often done more damage to young plants than did those two nights of freezing weather.

We have no sheds in Eldred so I cannot

report upon their efficiency, but suppose that now, if ever, their owners will realize upon their investment.

At your last meeting the question most persistently pressed was: "Do pineapples pay?" To which I answer, "If they do not, why do we grow them?" For pineapple fields unlike an orange grove do not appeal to the sentimental side of one's nature. When I look over their green slopes I involuntarily begin to figure on the number of crates and probable profits, but when I turn from these and walk down through our small and not very productive orange grove, which has cost much pains and money, and has never brought a dollar of profit, there is a fascination and a compensating satisfaction in the beauty of the trees alone, and a certain charm of mystery and expectancy, as well. The late Mr. Joseph Jefferson is reported to have remarked to a caller at his Palm Beach home that one of the disadvantages of old people was that they had nothing to expect, so this winter he has been *gardening*. In the spirit of this bit of philosophy I grow orange trees, that I may cherish expectation and so keep ever the enthusiasm of youth, but I grow pineapples because they are profitable.

The Government Viticultural Experiment Station.

By H. von Lutichau.

Mr. President, Ladies and Gentlemen:

Two seasons have passed since my last report on Viticultural Experiment Station in my charge at Earleton. The time allotted to this experiment has now passed and we are in a position to recommend a few successful varieties of this class of finest table grapes. Not much difficulty will be experienced by a careful grower to get a good supply of excellent fruit, superior to any native kind.

Varieties recommendable are:

White Grapes.—Admirable de Courtiller, Chasselas Besson, Florence, Montauban, Dore, Parc de Versailles, Satin Blanc, Muscat Saint Laurent.

Black Grapes.—Black Alicante, Frankenthal prexose.

Red Grapes.—Chasselas rouge, Rose de Fallowx, Tsien-Tsien, and Chasselas rose.

By application I think the United States Department of Agriculture, Mr. Husmann in charge of grape investigations, will supply a few scions of these varieties for grafting. For stock, our wild blue bunch grape is likely as good as any and easy to get; otherwise Rupestis in different forms. Personally, I like the Taylor, a small cultivated grape Riparia X.

It is not advisable to plant these grapes on a large scale for distant markets; but for home use, for the lover of beautiful fruit, they will prove most satisfactory and a great enjoyment.

I have raised the best crops in the

third, fourth and fifth year—after that a decline is noted—but this may yet be prevented by different forms of pruning, governed by variety, as well as soil and locality. A good plan would be to graft and plant new young vines every six or seven years and the old vines may be kept or discarded accordingly. After planting, let vine grow at will first year—by winter cut back to two eyes—permit but one to grow—the strongest—pinch leader when about 3 to 4 feet high—let all laterals grow and next winter trim to two eyes spur system. I say “two eyes” for I have found this preferable to the short one eye spur trimming. Too close trimming should be avoided, as well as the growing of long spurless canes—and short ones as well, which would at best only bear fruit on the end, even when a hundred feet long. Summer pruning must not be done, except shortening in a very strong and long growing cane. For fertilizer blood, bone and potash is best applied March or April; if possible nothing but the cultivator should be used; if plowed, then very shallow, keep clean culture all the time.

Guard against overbearing. This will ruin a vine quicker than anything else. The wonder stories I used to hear occasionally at our meetings testify but to the ignorance of the grower. It is better for the grower and especially better for the vine to have a reasonable number of fine large bunches, than a display of a great number of “berries.” Localities where Anthracnose, rot or mildew is

found, Bordeaux spraying has to be done; begin early, as soon as bloom is over, not forgetting one spray just before buds are swelling. Preventive is better than cure.

Bagging the bunches is necessary. Birds and wasps prefer such sweet grapes to all others, and if done as soon as berries are formed, will almost prevent rot and mildew on the fruit. Common paper bags are used, large enough to hold the full grown bunch, and fastened with copper wire. A small hole or slit is to be cut at the bottom.

Of insects, the steel blue beetle will do the most harm, their destructive work comes in when buds are first swelling, even before, and should be picked off by hand.

I have often seen growers cut their grapes when they should have remained two weeks or longer on the vine; let fruit hang as long as possible. Sweetness and aroma will then come to perfection.

DISCUSSION.

Mr. Painter—I would like to know if any member of the society has any information he can offer on what is known as the St. Augustine Grape. I know of one or two vines, one of which has been bearing for the last twenty years. I know of but the two vines. The grapes are small, something like the Delaware, though not quite so large, and grow in very large clusters. I think it a good grape to get better acquainted with.

Mr. Hampton—I have seen this grape quite frequently in St. Augustine. It is a prolific grape, growing in large clusters, somewhat smaller than the Delaware, which it resembles. It is a hardy vine long lived and a good bearer. It is a nice table grape and is a grape that ought to be and could be without trouble grown anywhere in the state. I agree with Mr. Painter that it is a grape that we should get better acquainted with.

Mr. Hart—I should like to ask the gentleman what measures, if any, are taken to prevent the depredations of birds, or if they are subject to such deprivations in his experience.

Mr. Hampton—I suppose they are to some extent, but depredations of birds are very easily remedied. I have been bothered by birds in times gone by, but am not any more. I have found that an easy matter to remedy. Simply take a small looking glass, tie a string to the edge of it and fasten it up in the top of the tree or vine where it can have some room to whirl or turn, and I can guarantee that that particular vine or tree will never be troubled with birds.

Member—I would like to ask if that applies also to lady birds? (laughter).

Mr. Hampton—I regret to have to inform the member that it does not. This will be found to be a cheap but most effective remedy against depredations by birds.

Report on Figs and Kaki.

By J. H. Wylie.

Mr. President and Members of the State Horticultural Society:

Having been made one of the committee on Grapes, Figs and Kaki, I feel it my duty to contribute what I can. The other two members of this committee are well known to this society, and their practical experience in the past has been of an instructive character in this state. Hence my little report will be confined to our section and county. In grapes we have fruited several varieties of the Muscadine class quite successfully, and believe them perfectly at home in any part of this state. We consider the following kinds the best, viz.: Thomas, Scuppernong, James and Flowers. We find that the James at two years old will begin fruiting at the same time not retarding the growth, the fruit holds on until late in the season. We have also succeeded in getting very fine specimen bunches of some of the trellis varieties, such as Niagara, Concord, Moore's Early and Delaware.

Figs.

My experience with figs has been mostly with the native varieties of Celestial, Lemon and Brunswick. These seem to be the leading kinds. While these all do well in our section I consider the Celestial the most valuable, as the tree seems to be hardier and is the most prolific and regular bearer. The fruit, though not so large, is very sweet and excellent for preserves.

One of my neighbors, Mr. Charles Francis, has succeeded in working up

quite a trade on fig preserves. About two years ago he began in a small way putting them up in fancy glass jars, and sending to friends in the North. The result is that his business has increased so until now he is unable to fill his orders; he finds it profitable and is thinking of going into the business on a larger scale.

If we can succeed in producing an abundance of fine fruit I believe there will be great possibilities in canning; also in fresh fruit for nearby markets. I feel sure that if we would give the fig culture as much attention as we do other fruit trees, the time will not be far distant when we will have as good figs in our market here as any that we can import from any other part of the world.

Kaki.

The Kaki or Japan persimmon is certainly a fine fruit for home use, and also has considerable market value, as they are found in all our large fruit markets in their season, and practically all of these are raised in Florida.

In conversation with a man not long ago, who has been the means of establishing a colony in Putnam county, he remarked that the different varieties of the Japan persimmon were grand, and after testing the different kinds as to flavor, quality, etc., has become so interested in the matter that now he intends to plant quite an orchard, at least 40 acres to begin with, and in the future work up a special trade on the fruit.

The right soil for persimmons is quite an important thing to consider, for while

the native persimmon seems to thrive well in almost any place, we have noticed that the Japanese varieties on sandy soil last much better.

For home use there is no better variety than Zengi, the most of its fruit is good, while hard, and improves as it gets soft, it makes the best tree and is the most prolific, and regular bearer. The Hyakume, Hachia, Tane-Nashi, Yemon, and Okame, are the favorite

market sorts; they must be thoroughly ripe and soft before they are good to eat.

We must all agree that the Kaki is most delicious fruit, beautiful in coloring and shape, has fine keeping and curing qualities and is sure to become a favorite in this country when our people become educated up to its peculiar characteristics.

The Kaki.

By Mr. Wm. Macklin, Dinsmore, Fla.

Mr. President, Ladies and Gentlemen:

Mark Twain tells of himself that he was once suddenly and unexpectedly, introduced to President Grant, and the only thing he could find to say was, "Mr. President, I am embarrassed, are you?"

That describes my case exactly, as it is only a month since I sent your secretary my initial subscription to the Florida Horticultural Society, and, before I could get my breath, he launched upon me the news that I must prepare a paper on the Japanese persimmon. I wilted immediately and wondered if there was any way by which I could get that dollar back, but decided it was gone beyond recall, and that I must do my best with regard to the paper, so I hope my immature effort will taste better than an immature persimmon.

The Japanese Persimmon.

From all the information I have been able to gather I believe that I have the

largest orchard of Japanese persimmons in America. It consists of about 2,500 trees, planted in the years 1899, 1900, 1901, and 1902 and the remarks that follow are confined to observations of my own trees.

I have found the persimmon a very interesting study, as it has qualities not common to any other fruit tree with which I have had experience, and a knowledge of its habits is not widely disseminated, or very easy to obtain, as in the case of the more familiar fruits.

To begin with the matter of cultivation: I have long ago come to the conclusion that the persimmon is better without what is generally understood by that term. For the first two years after I started planting I kept my trees clean cultivated, but as they grew I found that the entire surface of the ground was literally full of very fine hair-like roots, and that no matter how lightly the ground was scratched quantities of these were torn up

so I abandoned tillage altogether and for several years past merely run the mower through the orchards during the late summer and again in the fall, using the cut-grass weeds to mulch the trees. During the first season or two there was not sufficient grass to make a heavy enough mulch, and I had to cut over some twenty acres or so of old fields and haul in sufficient to make up a coating about six inches deep and cover an area as large as the limbs of the tree. I found this more expensive than cultivation, while it lasted, but now that the sod in the orchard has become older and produces heavier grasses, such as broom grass, there is enough to mulch heavily. The ground under this mulch is looser and more friable than it could be made by any system of cultivation, being protected continually from the packing effect of rains, while at the same time the fibrous roots remain undisturbed. The trees are vigorous and healthy and make a good growth each season. No other fertilizer except this rotting mass of vegetation is given, and its slow and continuous effect as a fertilizer seems more suitable to bearing persimmon trees than any other I have tried, for reasons which I will explain later.

In large quantities for commercial purposes I have only three varieties. The "Hyakume," "Tane-nashi," and "Hacheya," though I have also a few trees of "Yemon" and "Taber's No. 129." Of these "Tane-nashi" is the best market kind; of good size and appearance; nearly always seedless and holding its fruit better than the others.

The "Hyakume" produces larger fruit, is more juicy and of a better flavor than "Tane-nashi" but not so clean and bright in appearance, and sheds its fruit badly. "Hacheya" is also very large, with a fine

flavor, but must be kept till very ripe, as the astringency common to nearly all unripe persimmons is more marked in this variety than the others.

The persimmon seems very free from diseases and insect pests. I started planting my first trees in peach orchards that were badly infested with "San Jose" scale and although the persimmon tree is classified among those on which this scale can exist, I could never find the slightest trace of any attack by the "San Jose" from the surrounding peach trees. Twig girdlers and borers give them some attention but I have not had sufficient trouble from them to make treatment necessary. My orchards are on pine land. In hammock districts where there are probably larger quantities of these insects they would perhaps work more injury. The greatest evil that the persimmon grower has to contend with is the extraordinary propensity that most varieties have for shedding their fruit. The cause is unexplained in any existing literature on persimmons that I have seen, but I have formed my own conclusions on this subject and whether correct or not they may be of interest. The varieties having a very deep cavity at the stem and a hard stiff calyx, such as "Hyakume" shed much more than those with shallow cavity and thin more pliable calyx like "Tane-nashi." I frequently have "Hyakume" trees which after setting thousands of fruits, shed them all, while the "Tane-nashi" bears a fair crop. The preliminary shedding just after the fruit is formed is common to most deciduous trees that habitually set more fruit than they could possibly bear. It is not to this that I refer, but to the continuous dropping that takes place afterwards during the growing season right up to the time the fruit is mature. After

shedding it will be found that the stem and calyx is always left on the tree, or in other words; separation takes place only between the fruit and calyx. In the deep cavitated kinds the calyx will always be seen to be dragged down into the cavity before the shedding occurs. My theory therefore, is, that the strain produced by the resistance of a very hard calyx against being dragged into the narrow, deep cavity, tears the fruit off. Whether this solution of the mystery is correct or not, I am not prepared to say, but after several years of close observation, it is the only one I have been able to arrive at and it is borne out by the following reasons:

1. The deep cavitated and hard calyx-ed kinds shed most.

2. Any sudden stimulus, such as a heavy rain, or an application of commercial fertilizers, causing a rapid expansion of the fruit is immediately followed by greatly increased shedding, and

3. A sickly or unhealthy tree on which the fruit makes slow growth will invariably hold a full crop and vice-versa a very vigorous tree will strip itself of every specimen.

It is for the above reasons that I abandoned the use of fertilizers on my trees. If applied at all it should only be done during the winter, so as to give the stimulus time to abate before the fruit is set.

The Hyakume has a peculiarity—a good one too—that I have never seen in any other fruit tree. The larger the crop on the tree, the greater the size of the fruit, and, on the other hand, where a tree has only one or two specimens, they are usually under the average size.

Regarding picking, packing and marketing fruit must be clipped from the tree like oranges, and should be fairly well colored but still quite hard. A suitable pack-

age is hard to find, as the fruit varies so much in size. When possible, the six basket carriers should be used, and are best liked by the trade, but some of the fruit runs so large that more than two or three cannot be packed in the four quart basket used in these crates. For fruit of that size I use the crate without the baskets or sometimes the square cucumber crate. Fruit should be wrapped and in each crate I always put about a dozen copies of plainly printed instructions as to using the fruit only when perfectly ripe. These instructions I now have printed on paper bags, which the retailer can use in delivering the fruit to his customers.

Japanese persimmons are slowly making headway in Northern markets, New York taking them a little more freely than other places, but the demand is still very limited and large plantings would easily glut the markets. In London, England they are coming into considerable favor and one small shipment I made there by express, sold well, but the express rate was prohibitive. The following season I shipped fifty crates, in two lots, by freight, and they arrived in bad order which can only have been due to bad handling on the Atlantic steamships as I kept samples of both lots here, till two weeks after the bulk had arrived in London, and they were still in perfect condition, though packed the same as the others and kept in our ordinary September temperature. I can see no reason why persimmons, should require refrigeration, even on such a long trip. Moderately good ventilation would probably be far better. Specimens will keep for several weeks while the temperature is still in the seventies and eighties.

A point in favor of the Japanese persimmon is, that it will exist and thrive on

flat-woods land underlaid with hard-pan, where other fruit trees fail.

Their handsome appearance is another great recommendation. An orchard when in full leaf, outshines in beauty, even the far-famed orange grove.

I believe I have covered most of the points necessary to a grower, but I will be pleased to answer questions, or give any information in my possession either now or by correspondence with anyone who is interested.

Report of Committee on Vegetables.

By C. G. White.

Mr. President, Ladies and Gentlemen:

Hastings is in the last quarter of shipping a one-hundred thousand barrel crop of potatoes. The biggest day's shipment reached over thirty-nine cars, all heavily loaded.

It has been a season of big yields and low prices. Prices have been kept no worse than they are by the distribution of our association. The potato crop in this state is too large to be dumped into the North hit or miss fashion. Every barrel that leaves the state should have its proper destination and must have if the grower is to have the full reward of his labor and risk.

It takes a big yield to pay expenses when New York prices are under four dollars a barrel. Two days last week the quotations touched three dollars. This price means a net return of about one dollar and a half per barrel as the crop runs, and requires a yield of sixty barrels to the acre to make five dollars profit. However, prices have so far run better than this, and the majority of the growers will probably clear up even or better.

There are many yields of fifty barrels

and some of seventy and eighty. These are field runs, not favored corners, and are unusual with us.

The railroad service has been bad. Day after day, when there were empty cars on an inaccessible track, hauling has had to stop to the demoralization of our working forces, and barrels have been piled up on the platform because all the cars on the switch were overloaded already. Finally, these cars have gone forward at irregular times, and it was a lucky shipper that got his car out of Jacksonville short of twenty-four hours later than the time taken last year. The railway "shares our prosperity" as the officials put it, at the rate of sixteen cents per barrel to Jacksonville.

The potato methods are much the same as of old. An effective machine digger is much needed. And another railroad.

Late blight made its general appearance too late to be of material damage to the yield, and the resulting rot has not set in because weather conditions have not been suitable for its development in that way.

So there are many people claiming that it is useless to spray. Some that have sprayed will spray more efficiently next year than this.

Prof. Conner has just dug some successful experiments with fertilizers and varieties. Prof. Rolfs is conducting for the government a test of fifty-one foreign varieties, hoping to find a disease resistant variety on which to build a new and healthy sort. The foliage on some of these varieties is immense and peculiar.

One or two varieties cost large sums. None of us wanted the responsibility of knowing which these are, for fear it would get out and the patches be raided. It is interesting to know that the European taste is for a yellow-fleshed potato.

Concerning other vegetables I am not conversant, having but lately returned to the state.

This is my busy time, or I should appear with you at the meeting.

Celery and Egg Plant Report.

By F. C. Armstrong.

As the Florida State Horticultural Society has placed me on the Standing Committee to make a report on vegetables, I will confine my remarks to the growth, culture and marketing of celery and egg plants, only, thinking that my brother committeeman, Mr. C. G. White, of Hastings, would tell us how to cultivate, grow and dispose of the Irish potato to the best advantage and that Mr. E. V. Blackman of Miami, would give us the methods used on the East coast.

Now, in Manatee county, we have thousands of acres of land well adapted to the culture of celery, it requiring a rich, moist loam for the best results.

The culture of this crop bids fair to become one of the leading and staple crops in the county. We have been especially favored by having had not

enough cold to injure our crop or in marketing it.

The seed of the celery is very small and delicate, requiring, when young and tender, to be protected by a framework to keep the young plants from being scorched by the hot rays of the sun.

Seeds must be planted very shallow, beds must be kept wet daily; and otherwise properly cared for, that they may develop early and be good and thrifty plants.

In setting plants we put about forty thousand plants to the acre, double rows, four or five feet apart, using from one to two tons of best fertilizer to the acre according to the nature of the soil, which necessitates moist, well drained land. To insure a good crop we must have irrigation, which can be had at a very small cost from artesian wells.

The average crop per acre is about

from five hundred to one thousand crates per acre; some instances going much higher.

The plants must be boarded at a certain growth and kept there till well bleached, and ready for market. It requires about thirty-two thousand feet of lumber per acre to board it properly. After the celery crop is marketed, the land is then followed by egg plant. In the meantime the seed of the egg plant has been placed in the hot beds and is now ready for transplanting. Here again irrigation is very desirable, although not absolutely necessary. The cultivation of the egg plant is much like the cultivation of any ordinary plant, move the soil frequently, and keep clear of grass and weeds.

Under ordinary circumstances and conditions by May 15th the fruit is ready for

shipment and continues till up to July, when the Jersy crop comes in.

From six hundred to one thousand crates of egg plants are produced per acre with us.

What we need most is a uniform package for celery. As it stands now, we have three different sizes, one 12x18x22, and the Sandford 8x20x27 and one 10x20x25, this last, we think, should be the state standard.

California uses standard barrel crates, and of course it is regulated through the association of that state, and they have secured a rate which is equal to ours, we having the small poney crate.

I therefore, recommend that this association take some action looking to the procuring of a standard crate, and that a better and more equal freight rate be obtained.

Vegetable Report from East Coast.

By Mr. Blackman.

Mr. President, as a member of the committee on vegetables, I will submit an informal verbal report from my section of the state, the lower East Coast. Taking it all in all, we have had a most successful season in our section of the state, the truck growers in better condition generally, and have gotten more for their truck than ever before in the history of the lower East Coast section. Mr. President, I desire to emphasize this great and important subject, the importance of the vegetable traffic in this state

It is, or it ought to be, a matter of common knowledge that the truck industry of Florida is the greatest industry in the state. It is, or ought to be, a matter of common knowledge that the truck industry of Florida amounts to a great deal more than all of the citrus fruit crops combined. Vegetables are the staple products of Florida, and an industry that should receive at all times the highest consideration and attention. I could, Mr. President, give you instances of enormous yields and fancy prices for this sea-

son's vegetable and truck crop from our section of the state. This traffic is taken from our section of the state by the train-load, to say nothing of the other sections. The tomato crop this season has been the best in the history of that section and tomato growers as a rule have made lots and cords of money. There has also been good money made in Irish potatoes. I recall one notable instance where a trucker made nearly \$2,000 from his Irish potato patch. Altogether, the lower East Coast country has enjoyed an unprecedented season in the vegetable business. Of course, the early cold snap set some of the truckers back but replanting soon recuperated them and

they got their crops to market ahead of everything else, and sold at good prices.

I would particularly call the attention of the society and the truck growers of the state to the Bermuda onion. It was at one time thought that this onion could not be grown successfully in Florida. This is a great fallacy, as has been demonstrated by later experiments with this crop, especially with last season's crop. It was also contended that it would compete with the Bermuda crop and this has also been dispelled. The onion thrives well on the lower East Coast. It gets to market before the Bermuda crop of the Bermuda Island and is a big money maker.

Report of Committee on Ornamentals.

By Mrs. C. T. McCarty.

Mr. President, Ladies and Gentlemen:

In our school days, long ago—so long ago that I dread counting the years which have since passed—we learned that one proof of man's superiority over all other animals lies in his ability to rise above the limitations of locality. To the far ends of the earth, north, south, east and west, he reaches out, and brings unto himself, what is called for, either by his fancy or by his complex needs. Looking about with a critical eye he grasps the suggested possibilities of nature and turns the knowledge to his own account; he sees on one hand a scarcity which he makes abundance; on the other a su-

perfluity which he modifies. He, of course, puts forth the greater effort for material return, but at the same time labors, faithfully and continuously to express, in an alliance with Nature, the artist love, in-born in human hearts; that desire to create "a fairer creation than we know," to omit the prose, the details of nature and produce the spirit and splendor.

It has been truly said that "he who knows the most, he who knows what sweets and virtues are in the ground, the waters, the plants, * * and how to come at these enchantments—is the rich and royal man. Only so far as the masters of the world have called in Nature to

their aid, can they reach the height of magnificence. This is the meaning of their hanging gardens, villas, garden-houses, islands, parks."

Before us in this fair southland, lie stretched out upon all sides, materials for attaining easily to a degree of that magnificence, for which these masters have struggled. It is my privilege to speak to you concerning certain of these materials, and to lay before you such facts as a non-professional can glean from the ups and downs of several years' experience with ornamentals. What I have to offer may not be new to you, neither may it seem of value, but if such be the case I can only comfort myself with the saying of Daniel Webster, that "What is valuable is not new, and what is new is not valuable." The territory concerning which I speak lies on the west side of Indian River from Wabasso on the north, to Palm Beach on the south. Other localities will be covered by other papers, and moreover I wish to be quite certain of my statements, that my words may carry conviction, as did those of the old German who invariably clinched every argument with the emphatic remark: "I knows vot I knows, und dats vot I knows."

I shall also call things by their good, common, every-day names, not, of course, that I may be the more readily understood, but that I may save myself some embarrassment. The foundation for all successful ornamentation is, of course, grass, and it is a very difficult foundation to lay. For the grass goes, "creeping, creeping, everywhere," except in Florida. Here it must be coaxed, pushed, and carefully nurtured, and then perhaps it may not creep far. I can with the clearest conscience, recommend St.

Augustine grass. It grows readily in shade as well as sun, is a brilliant green all the year, and makes a velvety sod when close-cropped. Can be cut with a lawn-mower. St. Lucie grass is a finer bladed grass, but is much shorter lived. Of Bermuda grass I will not speak, because I am peaceably inclined, and know full well the war-like possibilities of the Bermuda grass question. No doubt there are some among you who fully catch my meaning when I say that there is always doubt, when you plant Bermuda grass, as to whether you have the grass or the grass has you.

Passing on to the fencing-in of the grass covered lawn, nothing is prettier than a well-kept hedge. If you want a low, thick, square-trimmed hedge, you will find satisfaction in the Amoor River Privet. It stands, untouched, a temperature of 24 degrees above zero, is evergreen and grows rapidly. It can be planted in single or double rows, plants being from 12 to 18 inches apart. The time for planting is between November 1st and February 1st. The hedge must be worked in spring and fall, and orange tree manure used for fertilizing. Some good results have been obtained with Arborvitae, but it is of slow growth, and while, according to Longfellow, "patience is powerful," it is not equal to an arborvitae hedge in Florida.

A row of *Philanthus*, bright-hued and graceful, is good to look upon, but it is with you today and gone tomorrow, if the thermometer takes a tumble in the night. *Bignonia*, sometimes despised because of its cheerful contentment under all sorts of conditions, can be made effective either in clumps, or trained over a frame to form a hedge or screen. Its bright scarlet flowers smiling from their

background of dark green leaves, all the year round.

For windbreak, or tall hedge purposes, the camphor tree is a friend indeed, while, grown apart, and trimmed to tree shape, it is a joy forever, because it is a thing of great beauty. The ocean winds can not blast it, nor the cold, such as we have, shrivel it. It grows in poor soil, not even disdaining our white sand, which some say is no soil at all. It is neither a great eater nor a great drinker, and is graceful, glossy, and evergreen and moreover can more than pay its way by furnishing the camphor of commerce.

Mango and avocado pear trees can be made to please the eye as well as tempt the palate. Both can be raised from seed, provided you plant the proper end of the seed down, the pear preferring to stand where planted, the mango yielding more gracefully to change of location. Both can get along without fertilizer, but they do eat when they are able to dine with friends, the mango preferring to eat with the pineapples, the pear liking better the fare of the orange trees. Neither tree can stand our cold weather, so when your thermometer has registered 24 degrees and the "eager and nipping air" has been "biting shrewdly" take your little saw and go out and saw off your mangoes and "alligator" pear trees—short—if you ever want to see them again.

Judging from the frequent recurrence of the name Royal Poinciana in Florida geography and literature generally, the outsider might reasonably expect to find this famous tree as plentiful as golden rod. But the fact is, that while many are planted, but few are seen, in the gorgeous perfection possible to the tree. The Royal Poinciana is hedged about with enemies. The cold is fatal to it. In

1895 I saw a tree having a trunk twelve inches in diameter and a spread of sixty feet, go down in a temperature of 28 degrees; and while a temperature of 28 degrees is rare, the winds we have always with us, and a strong wind makes a Royal Poinciana tree look like "Polly" after her celebrated tussle with the monkey. The Dwarf Poinciana is less of a trial than its Royal kinsman, yet carries much of the family beauty. It reaches the height of twelve feet, and, planted in a hedge or in a circle, with the red and yellow alternating, produces a truly gorgeous effect. An every-day acquaintance which can be used with telling results is the Kumquat. It is hardy and grows rapidly, and in two years' time its glossy foliage will be dotted here and there with those miniature oranges which never fail to elicit admiration and arouse curiosity.

Palms, of course, are the distinctive and characteristic glory of this section, and the natural impulse is, to plant them in profusion regardless of everything but the dictates of fancy. This is especially the case among those who are fresh from the land where a palm is a possibility only to the millionaire or the florist. My advice to palm enthusiasts who are just starting on their mad career is this: "Stick to palmettoes, date palms and sago palms." If, in this latitude you rely upon cocoanuts, royal palms, and other fancy varieties, for yard effects, some real cold, wintry day will leave you with nothing of beauty whereon to rest your eye, after it tires of contemplating the frozen emptiness of your pocketbook.

In order to enhance the tropical charm of your home be sure to leave a corner for the giant bamboo; a corner where the gracefully waving outlines may be

seen, in true Japanese relief, against a clear green-blue, western, evening sky. Toward this corner your glance will often stray. The bamboo can be rooted from cuttings, buried about two inches beneath the surface of the ground, in the month of January. But, as you value your bamboo corner, don't let it have one dry moment for two years.

Like the children, I have kept for the last the best of all the game, and in closing will say a few words concerning my favorite ornamental—the rose.

Queen of the garden, she is yet within reach of all, for any one who has a pump can have at least half a dozen vigorous, flowering rose bushes. That is, provided the pump is united with muscle, patience and a high resolve to rise above the pleasantries of an unbelieving family. I have had roses on my breakfast table for fifteen years, during the greater part of which time they were the result of the aforesaid combination of pump and patience.

A rose bed 9x14 feet will hold ten bushes and do well. In preparing the bed, first dig out the earth to a depth of from 2 1-2 to 3 feet. Over the bottom of this excavation lay a floor of old boards; fill in above this, for two-thirds of the depth, a mixture of old chips and leaf mold; then finish with about one foot of well rotted stable manure and sand mixed. Soak down thoroughly.

The best time for planting is December. I have never lost a plant set out in this month.

Never let the rose bed get dry and hard, yet do not keep too wet. Remember that one soaking is better than a dozen sprinkles; and, when bushes are well established, one weekly soaking is better than seven soakings.

I always set out two-year-old budded

roses. Some of my friends prefer roses grown on their own roots. We do not argue the question—I just keep on picking roses!

Once a month I give my 9x14 foot bed eight quarts of hard wood ashes. Once every month I also give two tablespoonfuls of Painter's Special Rose fertilizer, to each bush, working it carefully into the soil and wetting down well. Once a year, in the fall, I cover the bed with a 3-inch mulching of tobacco stems, bought by the bale. In picking the flowers cut every rose stem so as to leave one leaf next the parent stem from which the flower stalk has sprung. Leave one leaf, not more and not less. Then the new growth comes quickly, and new growth, with roses, means flowers. There are no pests, in particular, to be feared, but there is no harm in an annual spraying with either water and whale oil soap, or water and pearline, using one package of pearline to ten gallons of water. Generally speaking, tea-roses give the best satisfaction; that is, they bloom most continuously, in this climate, though certain others, such as Chromatella and Clothilde Soupert can always be depended upon. The following list comprises the names of those roses which I hold as "tried and true":

Chromatella, a climber which can be cut back.

Clothilde Soupert.
Marie Van Houtte.
Bon Silene.
Catherine Mermet.
Souvenir of Malmaison
Helen Gould.
Duchess of Brabant.
James Sprunt.
Bridesmaid.
The Bride.

WASHINGTON PALM.



ANGELONIA.

Minnie Francis.
Safrano.
Marie Lambert.
Devoniensis.

Cut your roses early every morning
and you will begin each day well; neither
can summer's heat nor winter's frost
deprive you of that sweet solace.

"God might have made the earth bring forth
Enough for great and small,
The oak tree and the cedar tree,
Without a flower at all.
We might have had enough, enough,
For every want of ours,

For luxury, medicine and toil,
And yet have had no flowers.
Then wherefore, wherefore, were they made,
All dyed with rainbow light,
All fashioned with supremest grace,
Upspringing day and night.
Springing in valleys green and low,
And on the mountain high,
And in the silent wilderness
Where no man passes by.
Our outward life requires them not—
Then wherefore had they birth?
To minister delight to man,
To beautify the earth,
To comfort man—to whisper hope,
Whene'er his faith is dim,
For whoso careth for the flowers,
Will care as much for him."

Report of Mrs. P. H. Rolfs.

Mr. President, Ladies and Gentlemen:

In selecting a subject, for the paper in hand I have not been as partial to the East Coast of Florida as were the gentlemen who made up the program for this meeting when they selected the entire committee on ornamentals from among the East Coast members, but will briefly mention a few plants that can be successfully grown in any part of the state.

Angelonia Gardneri, Hook.

This plant is generally, but incorrectly, known in the trade catalogues as *Angelonia grandiflora*. Although there is a species, *Angelonia grandiflora*, this is quite rare. The plant has been in cultivation for many years in the green-houses of the North, and has, to a limited extent, been introduced to the South, especially in Florida. Its original home is in South America. In the green-houses of the

North it is planted out in pots and then placed on benches, where it blooms continuously and profusely.

I wish, however, to speak of this plant more especially as a border plant, and bedding plant for outdoor work in our state. It is one of the hardy and very promising recent acquisitions that will come into general favor very rapidly. It is unusually free from disease and stands all difficulties which ordinarily surround decorative plants remarkably well. The color of the flowers is dark purple with white spots in the throat. This makes it a very handsome, attractive bedder. It blooms profusely, and rarely attains a size higher than a foot or eighteen inches. It is better, however, to keep it cut back so as to have it from eight inches to a foot high. Side shoots are constantly being produced, from which new flower spikes are thrown in.

Propagation.

Where plants can be secured from some other bed or by purchase, it is better to get them in this way. If this is not practicable, seed may be obtained from reliable seedsmen at about twenty-five cents a package. The difficulty in securing plants in this way is that which usually befalls seedlings, especially when planted in a small way. If one has merely a package of seed, these are often placed in flower pots, carefully attended and watered for a few days, and possibly before one knows they are over watered, and the soil becomes water-logged. Then again, in the busy rush of the ordinary day, with fruit growers, there will be some days when the seed are forgotten. By the time one returns, the seed bed will be found as dry as sawdust. Even if the seed should not really be overlooked or forgotten, when the seedlings come up there is always the constant danger of damping off. All of these difficulties are avoided by securing large plants, which can be set directly into the bed.

By taking cuttings from a hardened wood, they may be struck and grown from cuttings. A much more preferable way, however, is to divide the old plants. In this way little difficulty is experienced in securing a good start.

Planting in Beds.

In preparing a bed it should be thoroughly worked over and a generous supply of compost spaded in. There is really no danger of getting too much of it, or too much vegetable matter into the bed. After this has been thoroughly incorporated into the soil, it is well to wet it down, so that every particle of it is thoroughly soaked. The ground may then be firmed down by treading over the

bed, and left for some time, possibly ten days to two weeks. This will give the fertilizer in the compost an opportunity to become thoroughly incorporated with the soil, and avoid the danger of scalding the roots. The top of the bed at the end of this time can be worked over with a garden rake or small tool, and the plants set into place. If abundance of plants are on hand they may be set in rows six to ten inches apart. If one has but few plants, they may be set a foot, or even two feet, apart. Then as the bushes grow large they may be divided and the spaces between filled in.

During extremely dry weather it is desirable to give them an application of water once a week, or at intervals as the bed becomes somewhat dry.

Protection of the Bed.

This plant is of unusual interest to us because it will stand slight cold weather. It has been known to pass, practically uninjured, through thirty degrees Fahrenheit. Where there is danger of the cold becoming more severe than this it is necessary to provide some protection. This would be especially so in northern, middle, and western Florida. The protection can be given by banking the soil about the plants to a considerable height, so that a large number of the lower buds are underground. Then during severe cold weather, a covering of straw mat or with straw will tide them over the severe weather. In central and south Florida the plants will need protection only rarely if at all.

This plant begins blooming very early, even when only a few inches high, and from that time on it continues without intermission until the beds are exhausted which may be a year, or even longer. For

this reason a bed of *Angelonia Gardneri* is always a beautiful sight.

Hibiscus (Hibiscus Rosa Sinensis Linn).

There are a number of varieties belonging to this species, the single flowered, double flowered, pink, magenta, salmon-colored, and even nearly white. In some cases the foliage is variously mottled, in others the corolla is of varied shapes. To the average fruit growers in Florida only a few of these varieties are known. They are all, however, equally decorative and equally easily grown. Cuttings of mature wood strike very readily so that they may be propagated in endless numbers.

I wish particularly to call attention to one fact that is very generally overlooked by people who live north of South Florida, and that is that it is quite as easy to have these beautiful blooming plants in the dooryard during the summer months as many of the other forms, such as geraniums, fuchsias, etc. The difficulty has been that they have not been considered pot plants, consequently after growing during the summer, they have been allowed to freeze in fall. On the other hand, those who have considered them pot plants have not been aware of the fact that they may be set out of doors during the summer time, and then taken back to cover for protection during the winter. This is a point I wish to bring out especially. The Hibiscus plants should be grown in large pots, say about eight or ten inch ones. These pots are then set out in summer, "plunged," as the gardeners say, and the pots covered with garden soil so as to protect them from being broken, and to hide their unsightliness. The Hibiscus will then grow and bloom profusely during the summer. It will do no particular harm for the roots to run through the bot-

tom or over the sides of the pots. In the fall when there is danger of frost or freezing weather, the pots with the plants in them should be lifted and the plants cut back to within a foot or two, and then placed in a moderately dry house. Here the plants need but little protection. They should be watered sparingly, but not permitted to dry out. Then as soon as the danger of freezing is past, the pots can be plunged again in the bed, and the plants will go merrily on blooming as before. When the next winter comes the same operation may be repeated.

The Hibiscus which is usually called the Chinese Hibiscus, that is *Hibiscus Schizopetelous*, is grown to a very large extent in pots throughout northern and central Florida. It requires a great deal of petting and many times as much care as the common Hibiscus, and does not give one-tenth of the return in bloom and pleasure.

I would not be loyal to my home place, Palmhurst, did I not include palms in this paper.

Palms.

Biologically speaking, the palm trees are among the highest of the plant creations. They are, likewise, the most beautiful and aesthetic of plants. A fine palm adds more value to the selling price of a place than any other single tree, not excepting the fruit-bearing ones. Of course we should not expect a grove of palm trees to sell for the same price as a grove of grape fruit trees. A reasonable number of palm trees, however, distributed at the proper locations about the home place, adds immensely to the desirability of the location. In fact, very few palms come to their grandest stature before twenty-five to fifty years of age. They, however,

show off remarkably well at four or five years old, and at ten or fifteen years of age they will cause many a passer-by to wish that he "owned that tree."

The difficulty heretofore experienced in planting palm trees has been that we have not known just what to select, nor how to set them out after they have been selected. We are apt to treat a palm tree very much as we would a jardiniere of ferns, that is, sticking it in some house corner where it can get only a peep of sunlight now and then. The palms about which I wish to speak later are such as can stand the full glare of the sun without injury; they can be left out in the most tempestuous winds that we have; they can stand months of neglect, and come out smiling from this course of treatment. Like every other cultivated specimen, they, however, take very good naturally to kind treatment. They differ from most trees in that the position of their leaves permits the free circulation of air, and the broad leaved, fan palms afford a good and cool shade.

With all these good qualities they have the still further excellent ones of being remarkably free from fungus and insect attacks. In addition to this, they do not harbor that most annoying pest with which we have to deal at times, the Florida mosquito.

In setting out these trees due regard should be had for the landscape effect. One of these trees when once set out is almost never transplanted. Not that they are so exceedingly difficult to transplant, but their beauty being once realized, they are so valued that no one has the courage to hazard the chance of losing a fine specimen. If the trees are planted with a view of avenue setting, they should be placed far enough back from the road to allow a

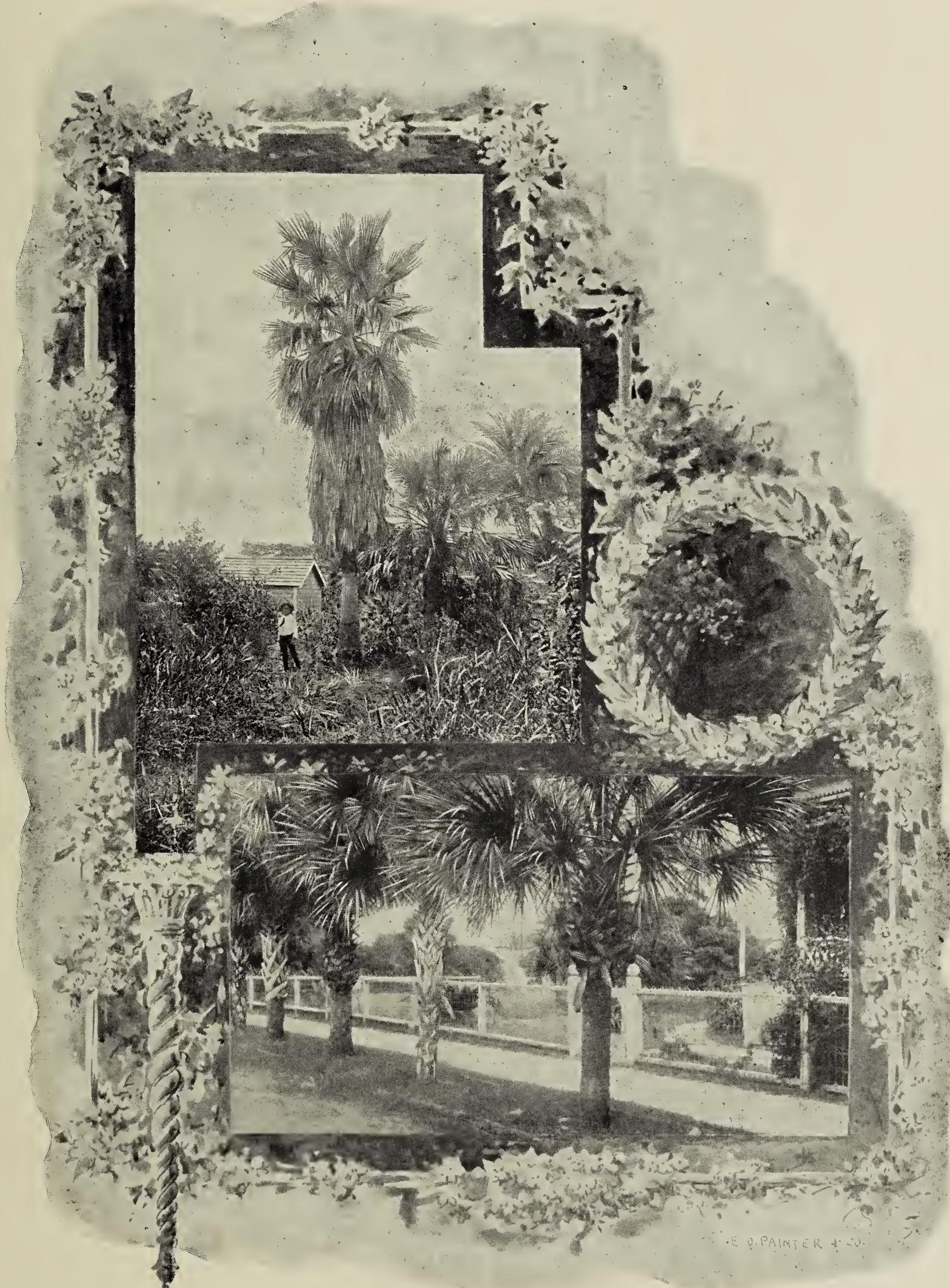
full development of the leaves without the necessity of cutting back. For planting about the door yard or open lawn due regard should be had for the point of view, so that when these have grown to be tall trees the view may not be obstructed. The contour of a piece of land should also be had in mind, and the general character of the trees and other ornamentals about the door yard.

In discussing these trees I have confined myself to a very limited number, and have taken those that will be perfectly hardy in all parts of the State. A few nice plants of hardy species, well selected, will be found more pleasing than a great variety jumbled together in a sort of horticultural museum.

The three palms that I wish to consider are able to withstand freezing temperatures, and live out of doors on the Atlantic coast as far north as Charleston, and on the Gulf coast to New Orleans. Consequently, every land owner in the state of Florida should have one or more of each of these palms in his possession.

In general it may be said that palms need an abundance of sunshine, and an abundance of fertile soil although they will thrive remarkably well on sandy soils that have been moderately fertilized.

Cabbage Palmetto (*Sabal Palmetto*). —I mention this one first because it is a native. And here I may be permitted to digress a moment and preach a curtain lecture on the fact that we do not appreciate our native decorative plants sufficiently. We have in our flora many specimens which make the handsomest of decorative specimens, but simply overlook them and cast about us for something that has been imported from distant and little known lands. I see that illustrated constantly at my own home, where many



THE PALMETTO AS A STREET TREE.

native decorative plants grow in profusion, and our visitors pass these by without any particular attention or commendatory remark. We are growing here, also, quite abundantly, a plant known as Australian pine, although it is not a pine at all. It, however, in a way resembles that group of trees. It is a straight, ugly, sprawling tree that scarcely throws a shadow, and litters the ground with needles, and when it is done littering the ground with needles, it scatters the cones or burrs all over the ground. This tree, because of its want of decorative qualities, intrudes upon our vision constantly, and because it happens to be from Australia, it elicits many commendatory remarks.

The Cabbage Palmetto has been used to some extent, but not at all sufficiently, as a decorative plant for avenues and for the home grounds. Sometimes transplanting has not proved successful, in other cases the transplanting has been uniformly so. It is one of the handsomest trees that can be used for avenue planting. It will stand an unusual amount of abuse after it has once been established, and has been put to all sorts of purposes, such as a hitching post for horses, stringing telephone and telegraph wires, and various other barbarisms that might be perpetrated upon it. Properly cared for it casts a very delightful shade and is always green.

Trees of this species can be obtained everywhere in the state of Florida. The most certain way of transplanting them is to prepare for transplanting six months or a year in advance. The tree being chosen that is to be transplanted, the laborer is instructed to cut away all the roots on one side of it, so as to sever about one-half of them, permitting those on the other side to remain unharmed. In the course

of six months numerous new roots will be formed on the side where the old ones have been cut. Those on the other side may then be cut, and the tree transplanted. At the time of transplanting it is well to remove all of the foliage, leaving only the bud leaves.

The best size for setting out is one with a trunk only a few feet tall. A great many cities and individuals make the mistake of transplanting trees that have a trunk of twelve or fourteen feet. When this is done the tree has become pretty well set in its habits, and it fails to produce as fine a top as a small tree would. When a small one is planted it adapts itself to the surroundings much more quickly, and large leaves and longer petioles are produced.

In preparing the place for one of these trees it is well to use as much well rotted compost as your conscience will permit, and then have some one else come and add as much more.

George Washington Palm (*Neowashingtonia filifera*). —This palm is known by various common names other than the one given above. Among them are California Thread Palm, Weeping Palm, etc.

Even scientifically it is not always called by the same name. In nurserymen's catalogues it is usually listed as *Prichardia filifera*. Bailey's Cyclopedie calls it *Washingtonia filifera*. It is a native of California, where it is one of the most striking and characteristic of trees. In Florida it grows remarkably well for an introduced species. It is especially desirable from the fact that it will stand severe cold. Fine specimens of this species may be seen in Charleston, S. C., and in New Orleans, La. It, therefore, goes without questioning that it will survive any degree of cold which may be experienced in our state.

The photograph which I present herewith is taken from young specimens that are about six years old. These have been grown under fairly favorable conditions, but specimens fully as beautiful are produced in many other places, at the same age. From this it will be seen that this makes a very handsome ornamental very early in its history. When grown to full size its trunk reaches up to fifty or more feet.

These plants can be obtained from nurserymen at so reasonable a cost that no one need be without several specimens. Small seedlings can be had at ten cents each, while large plants, showing character of leaves, cost only thirty-five cents each. It is, therefore, most desirable to secure the largest sized specimens and plant these out directly where they are to grow, so that they may become established and grow up with that portion of the door yard.

They should be planted in a rich, moist place, where the leaves can have a spread of at least twenty-five feet. In planting palms most of us are apt to be a little niggardly about the space. This is probably due to the fact that we have been brought up to regard palms as conservatory plants, where we see these specimens in a pot-bound and dwarfed condition.

Before setting out, the place where the plant is to stand should be dug out and a liberal quantity of compost or rich soil placed in the holes unless, indeed, the soil is already very fertile, as occurs in a few of the hammocks and along our water courses.

When the plant has become thoroughly established, it should be regularly and liberally fertilized with a brand of good nursery tree fertilizer. As the foliage of these plants is the desirable portion, the

fertilizer formula should be high in ammonia. Liberal applications of compost continue to be advantageous after the plant has become thoroughly established, and even after it has grown into a large tree.

Canary Date Palm.

This palm is technically known as *Phoenix Canariensis*. I take the following quotation from Bailey's Cyclopedia of Horticulture: "*P. Canariensis* is the noblest of all *Phoenixes*, and one of the most majestic palms in cultivation. Its rate of growth is astonishing; a tree supposed to be only ten years old had a trunk four feet high, three feet in diameter at the base, with about one hundred leaves, forming a head twenty-five feet across. Another specimen of about the same size bore eight bunches of fruit, each weighing about fifty pounds." This is one of the very best of the palm family for planting in the open lawn. When two or three feet high it begins to make a very pleasing and pleasant object, and never lessens in attractiveness. If the plant be well cared for and grown to its proper proportion it will increase in beauty from year to year, and we need have very little or no fear of losing it from the incursion of occasional frost or cold weather.

This plant adapts itself remarkably well to the various locations in the state. Fine specimens of this species are growing on Cape Florida, open to the direct wind from the ocean, and only a few feet above the tide. In spite of the fact that the sea breezes constantly sweep across these plants they are always looking most healthy and beautiful. It has been reported that during the recent hurricane the sea water was driven entirely around the roots of these trees, and yet they show no

signs of injury from the inundation. I learn also, from trustworthy sources, that President Taber has some fine specimens growing on his lawn. As Mr. Taber knows a good thing when he sees it and always secures his share of the good things as they come along, we should take a hint from his example. Specimens of this species are growing also on high, sandy land, which is ordinarily considered to be very low in the elements necessary to plant food. In the pineapple belt of Florida we find these plants very frequently used. It is probable, therefore, that there is no portion of the state in which they cannot be grown successfully and beautifully.

Like all members of the palm family, it is particularly partial to locations with rich soil. When planted out it should be put in such a place that it can have a spread of at least thirty feet. Plants may be secured from nurserymen for twenty-five to fifty cents, each. These, when well treated, will soon be out of the way of the ordinary dangers that are apt to be met with on lawns or in front yards. The roots should be given plenty of room to spread, and if the soil is not already fertile, an abundance of compost should be put in the hole before the tree is set out. After it has become thoroughly established, regular applications of a brand of good nursery fertilizer should be applied.

Report by George A. Purdy.

Mr. President, Ladies and Gentlemen:

Having been requested to prepare a paper on Ornamentals for Florida, I have complied, though with some misgiving as to my adequacy for a subject so wide in its scope and one which has already been so ably treated in previous meetings.

My actual horticultural education in this state having extended over but a few years and in one location, I shall not attempt to give any general account of ornamentals, but will only describe my success or failure with a few shrubs and trees that I have experimented with on a very poor, sandy soil at Ormond Peninsula.

To you who have had years of experience and success on fertile lands, these

notes will sound trite and commonplace, but they may be suggestive to some who are wrestling with the problem of how to beautify their surroundings under adverse conditions.

To begin with roses: To make these grow with any vigor in such a location, I dig holes about four feet in diameter and two feet in depth. A floor of clayey, marsh mud is put down, building up on the sides with the same, giving the bush what may be described as a large clayey bowl to grow in. This is filled with a mixture of surface soil, marsh mud and well rotted barn or stable manure when available, or with any good all around fertilizer, the surrounding bowl keeping within reach of the roots much of what is apt to leach away on our light lands. Planted in this way and with

abundant water through droughty seasons, the bushes grow strongly with vigorous foliage and bloom.

Besides the usual insects, powerful enemies are the roots of the Live and Water Oaks. With some labor these have been measurably kept out by annually cutting a trench about the bowl, but this is an onerous task and some careless year I fear the roots will break in and strangle the roses. Therefore, plant roses many feet from any oak tree. I wish to say a word here for one of the most beautiful garden roses, one rarely seen in our Florida gardens, Fortunes Yellow. There has been some confusion about its nomenclature. It is the famous rose of Pasadena, California, that has long been the admiration of tourists, popularly, but erroneously called, Gold of Ophir, the true Gold of Ophir being the old French rose, Ophirie, a more nearly perpetual bloomer but with comparatively insignificant flowers.

Fortunes Yellow is perhaps better known in California by its synonym, Beauty of Glazewood, but by the law of priority the first name is entitled to precedence, this rose having been found and sent home from China in 1845 by Robert Fortune. It is of a pale yellow, shading into delicate salmon pink and quite unlike any other rose I am acquainted with. Unfortunately it is almost deciduous in winter and it blossoms once a year, just as the Cherokee is going off, but it makes such a unique and lovely display of color—for it is a profuse bloomer—that it is worth taking any reasonable amount of pains to possess.

Speaking of the Cherokee Rose, one of its seedlings, originating in Europe a few years since, is said to be a worthy companion for it.

I only know of this novelty by hearsay, but *Rosa sinica Anemone* is described by the eminent rosarian, Edward Mawley, as promising to be even more beautiful than the Cherokee, being of a bright rose pink, unlike any other climber and, like its parent, a profuse bloomer, of clean, strong foliage and a good grower.

As to Conifers. We have had but limited experience with these. The Deodar Cedar is said to grow well about Jacksonville and would probably succeed at Ormond on good soil, planted on the usual sand, a tree lived for a few years, tried to look well, but finally starved to death.

Cupressus Knightiana, a Mexican evergreen Cypress of vigorous growth and elegant habit, with drooping, fern-like, feathery branchlets and bluish-green foliage, grew about twenty-five feet high in ten years and looked well for a long time, but when cut down to make room for a building, showed signs of starvation.

Cupressus excelsa, a Cypress native of the mountains of Guatemala, grew much the same way, but succumbed to the winter of '94.

Cupressus torulosa, a Himalayan Cypress, grew rapidly but was finally starved out.

Cupressus funebris, an elegant, drooping Cypress from China, promised well, but gave out in a few years, probable cause, poor soil and perhaps cold snaps.

We need for landscape effect in Florida, a tall fastigiate tree like a Lombardy Poplar but evergreen, possibly *Cupressus sempervirens*, the Cypress of the Orient may serve our purpose. Those who have visited Mediterranean regions, or noticed pictures of Italian and oriental scenery will remember the stately effect

of these trees either isolated or in groves. A group of three, indifferently planted in poor soil at Ormond, only lived a few years, attaining a height of ten feet, but Prof. Nehrling of Gotha, Florida, informs me that he has several beautiful young specimens, perfect columns of dark green, the tallest of them at least twenty-five feet high. They require good fertilization.

Evidently a number of the evergreen cypress will grow well in Florida if planted in good ground or soil made good.

Retinosporas or Japan Cypress do not flourish, probably we are too far south.

Oriental Arborvitae, of which handsome specimens may be seen in Jacksonville parks and elsewhere, have grown well at Ormond on well prepared soil, especially the variety known as *Aurea Nana*. Rosedale Arborvitae, said to be a hybrid of Retinospora and Oriental Arborvitae. Though planted in half shade, does no better with us than the Retinosporas.

Some species of the genus *Podocarpus* may do well in Florida. They are evergreen trees and shrubs, yewlike in their appearance.

The late Edmund H. Hart, of Federal Point, had a fine specimen of the broad leaved *Podocarpus*. With its dark green foliage it was strikingly ornamental. He reported it as very hardy against sun and frost. *Podocarpus Japonica* and *Podocarpus Koraensis* were planted November, 1903, at Ormond, in well prepared soil and partial shade. They have grown slowly but thriftily and look healthy and happy.

Of evergreen shrubs, I have had experience with but few and those quite well known.

Pittosporum Tobira—the dark green and the variegated varieties grow well

with us as throughout the lower south, making the air heavy with fragrance the latter part of March and early April. A strong grower, the root area of a large bush extending fifty feet from the plant. It is perhaps our best exotic shrub, growing rampantly on a rather poor soil with Oaks in close proximity.

Jasminum humile or *revolutum* from Northern India, puts forth its yellow fragrant blossoms early and often and grows well in spite of rabbits which gnaw the bark occasionally.

Rhaphiolepis ovata. This Chinese shrub, with almost circular coriaceous leaves and white blossoms—not fragrant—blooms in March and April. It grows slowly but surely and promises well.

Viburnum odoratissimum, makes a dense, compact bush, with leaves of a light, vivid green and white, fragrant flowers in April. A specimen growing here for many years was badly scorched in freezes of 94-5 but does not appear to have suffered since with plenty of clay in the soil it is one of our best ornaments.

Illicium anisatum or Anise Seed Tree, native of Japan, makes a tall, stately shrub with fragrant leaves of sassafras odor, the small saffron-colored blooms are not conspicuous. This shrub threatens to become naturalized, some specimens more than holding their own in the midst of oak scrub.

Illicium Floridanum is mentioned in English publications as the finest and most showy of the *Illiciums* said to be a native of Florida, but I have never happened to meet any one who had seen it. Prof. Nehrling had a fine specimen planted on the shore of Lake Audubon, but it was destroyed a few years since by overflow from the lake.

Acacia *Farnesiana*, the well known

Popinac. As frequently seen this is a lanky, straggling little tree or bush, but if carefully pruned and stimulated with fertilizer, it may be made a very handsome small tree, suitable to overhang a footpath. Looking up from under the branches its delicate pinnate foliage, outlined against the blue of the sky, has a fairylike effect. This effect is enhanced by its yellow flowerballs, which are not only very fragrant, but are put forth several times a year. In hard freezes the foliage will scorch, but it rapidly recovers. We should make the most of this tree as it is absolutely the only one of the Acacias that thrives here. The long list which appeared in Reasoner's first catalogue is now reduced to two or three. The famous *Acacia dealbata* of the South France, with masses of yellow bloom, will grow but poorly in Florida. At Federal Point, the late Mr. E. H. Hart had a specimen twenty-five feet high, but it never blossomed and never seemed satisfied with its environment. It was finally lost. Acacias it is said will

not grow in a calcareous soil. Lime seems to poison them.

This paper has about reached the time limit and yet I have only briefly touched on a very few of the ornamentals for Florida. I have said nothing about the herbaceous perennials, annuals or bulbs, having had but little experience with them. The subject of Palms and other tropical and sub-tropical plant-life is a large one. Something has been learned as to the most suitable species or varieties since the time years ago when those earnest workers and pioneers in Florida ornamental horticulture, E. H. Hart and P. W. Reasoner, now passed on, and T. L. Mead, still with us, gave those admirable essays on Palms, Yuccas, Agaves and Bamboos.

The interesting "message of the woods," brought by President Taber, emphasizes the potentiality for beauty of our native flora. Prof. Nehrling on his estate at Gotha has demonstrated the value of indigenous shrubs and much may yet be developed in this direction.

Home Grown Products for the Table.

By Mrs. H. H. Harvey.

Mr. President, Ladies and Gentlemen:

To one our state is a playground, to another a workshop, and again it is a haven of rest and recreation, where the soft winds, unlike any other on earth, soothe the tired nerves and give one that feeling of—

"Nothing to do in this world of ours
Where weeds spring up with fairest flowers."

that we all get after the proverbial ten years that entitles us to the name Cracker; but to the homemaker who must prepare food three times a day for appetites whetted by the health-giving ozone of our fair state—Florida is a reality.

The tin can is sometimes a Godsend. Let's not condemn it entirely, but let us see how much of a variety we can grow here, that with some careful preparation

can be made food fit for an American to eat. Milk, butter and eggs with all their accessories are to be had here in abundance and the best the world affords. The sweet potato is at home with us; aside from the ordinary methods of preparation, we have the sweet potato pone and the sweet potato custard pie, so nearly like the far-famed pumpkin pie, we scarce need raise that vegetable.

Cassava has many possibilities. Wash, peel, grate, wash in much water, use the coarse part for pudding, prepare the cassava the same way for griddle cakes, using only a small amount of flour, and it is a change to use one-half a cup of same in custard pie, using only two eggs instead of three.

Then the starch that settles in pan, when it is washed, can be dried and used for starch and for flour; for light bread, one-third cassava flour and two-thirds wheat flour make a nice bread.

Arrow root I am told can be used the same as cassava.

Both rye and oats raised in Florida are parched and ground and used in the place of coffee to the entire satisfaction of many.

The Yukon plant is raised and the leaves used for tea.

The Jamaica sorrel grows to perfection here. The calyx of the pods, when made into jelly, gives one of the finest products in this line.

The kumquat, after being soaked over night in soda water, makes a delicious preserve jelly and marmalade, and crystallized it is much sought.

The orange, the still unsolved problem in our state, is never so fine in any way as eaten fresh from the tree. Yet, there are a few months in the year when we can not have it fresh, hence we extract juice, bring to a boil and can. Oranges are

nice preserved and jellied, and a marmalade made of the juice and pulp is nice to eat with meats. A confection manufactured from the peel of either orange or grapefruit is relished by all. We must not omit the orange short cake and the orange pudding so nice in the orange season. Sliced oranges with pulp of grapefruit and sugar an hour before serving, gives a toothsome sauce; then adding to this sauce sliced bananas and pineapples and grated cocoanut we have ambrosia that truly is a dish for an honest American. A cup of grapefruit juice in a custard for cake-filling is fine. The grapefruit can be used in all ways we use the orange.

The loquats (if the freeze don't take them) are a great addition to the table, dried, preserved, canned with or without sugar they can be used for sauce, pies, short cake or jelly.

The peach is largely raised and all know its possibilities.

The Kelsey plums, peeled, halved and pitted can be canned so one can hardly tell them from peaches.

And the sweet, wild plum is used in many ways with us.

The fig grows in luxuriance in certain spots in our state and is much used for canning and preserving and the finest vinegar is made from the fig. Also yeast from the leaves.

Three months of the year we can have the Kaki or Japan persimmon, smothered in sugar and cream for breakfast.

Pineapples, we can preserve, make into marmalade and with the aid of yellow cattley guava juice make fine jelly; the peel washed and covered with slightly sweetened water will, in a day or two, be a refreshing drink that soothes but does not inebriate. The guava is so com-

mon that we scarce need dwell upon its uses—jelly, paste, marmalade, etc.

The Avocado pear for salads and again cooked a little and made into marmalade is highly prized by the cultivated taste.

The citron we only preserve.

Surinam cherries we can and jelly.

The LeConte pear is canned, preserved and dried here to quite an extent.

The grape grows in most healthy luxuriance, and could we but exterminate the mocking bird, bluejay and woodpecker we could grow the finest varieties such as Delaware, Concord, Brighton, etc., but the thick skinned scuppernong in several varieties gives us a chance for preserves and jellies and the juice of the grape brought to a boiling and sealed will keep indefinitely as a refreshing drink.

Honey is largely produced in the state.

Sugar and syrup from cane are manufactured extensively.

Bananas are raised to a limited extent (it is Jack frost who limits the extent) but we have enough for a delicious banana pudding once in a while.

The raising of strawberries is quite an industry in our section and who does not enjoy a strawberry short cake?

Our subject as you see, is too far-reaching—vegetables we have left for some one else to write about.

We are indebted to Mrs. Chas. Lewis, of St. Petersburg, for suggestions regarding fruits raised in that delightful part of the state.

With many misgivings have we prepared these few notes. You know much that I have omitted, but if you kindly say "She hath done what she could," we will feel repaid.

DISCUSSION.

(The discussion of Ornamentals was postponed to give way to the musicale tendered the society by the Ladies' Friday Musicale and was taken up Thursday morning.—Secretary.)

Mr. Blackman—I was particularly pleased with the postponement at our last evening's session, of the further report and discussion of the report of the committee on ornamentals. The society is to be congratulated upon the able papers prepared with so much care and presented at this session on ornamentals. We have heard here a great deal on the strenuous side of the many questions and topics engaging our attention. It is just and fitting now that we should

turn for a moment to the amenities of life, and to the ornamentation of our homes. I have been around over the state a great deal, and I am impelled to say and it is with much regret, that there is not enough attention paid to ornamentals. This committee deserves the thanks of this society for their endeavor and work. It is a great work, a lovely, beautiful theme and a woman's sphere. I am very much interested personally, I may be pardoned for saying, for there is no greater pleasure at my own home than the morning's stroll through my ornamental garden, where, in company with my wife and daughter, we gather morning after morning the lovely flowers, the mignonette for the

lapel of my coat, as I go to the busy cares of the day at my office, garlands for the vases of the festal hall and perhaps to the sick chamber of the invalid, carrying with them a fragrance and sentiment that can not be expressed in words. It would be impossible for me to enumerate all of our lovely flowers or the ones most dear to us. We love them all, as their sweet fragrance is wafted from waving branch or clinging vine. Personally, however, I do not consider that the vine, at least in our section, should be encouraged near the dwelling, as I have found them to be an harbor for the mosquito. For this reason, I have set all of my vines at a distance, ornamenting some old stump or tree for instance, on the lawn or away from the dwelling. Again, Mr. President, permit me to say that the women of this committee are to be congratulated by the society for their unceasing, untiring work and achievement in ornamental lawn and garden work.

Dr. Richardson—Mr. President, I can heartily second the sentiments of the gentleman for the lower East Coast. I do not think we pay half enough attention to the ornamentation of the home; the home is the haven of rest. In there we seek and enjoy the sweet companionship of wife, children and all of our loved ones. No time or money should be spared to make the home attractive, and there is no surer way of doing this than the ornamentation of the garden and the lawn. The thanks of the society is due the women of this committee for their noble work.

Mr. Blackman—Mr. President, this is a topic I am extremely interested in. I do not arise again to make any extended remarks, merely to say that we would very much like to hear from some of the

ladies present as this subject is one peculiarly their own.

The President—The chair heartily endorses the sentiments expressed on the subject of ornamentals, and begs to assure the committee on ornamentals that their noble work is most heartily appreciated and endorsed, not only by this society but by the state at large as well.

Mrs. Geo. S. Gates—Mr. President, on behalf of the women I can assure the society of our appreciation of the encomium on woman's work as also at all times of your co-operation. I must say, however, Mr. President, that I can not agree with the gentleman from Miami, Mr. Blackman, in regard to the ostracism of the vine. A vine is too near and dear to a woman's heart as an ornamental, to be permitted to receive such treatment without a protest. (Applause and laughter.)

I am president of a little village improvement society Welaka, Putnam county, and we have been for several years very much interested in the matter of shade trees. Our stand-by has been the Water Oak, but experience has shown that the Water Oak is a comparatively short-lived tree. It is, in my judgment, best to transplant the Live Oak and Water Oak alternately, the Water Oak, which is the quickest growth, will give the quickest shade, later resigning in favor of the long-lived Live Oak which in 15 to 20 years will have become a thick spreading tree with a great gnarled future before it, under whose grateful shade and luxuriant foliage, festooned with great strands of waving Spanish moss, our great grandchildren may play upon the village green. The prerequisite of the lawn is grass and shade. It is here again that I would urge the transplanting of the Water Oak and the Live

Oak alternately, as suggested for the roadside and lane. Where there is a will there is a way. We have found the following wild plants to give joy and gratification with small care. The Pawpaw a small bush, with greenish, poppy-like flowers transplanted in December and cared for and fed just a little will make a very showy plant especially in masses.

The coral plant (local name) a spike of coral blossoms with beautiful ivy leaf-like foliage.

A tall bush with blossoms like a lily of the valley sort of a huckleberry.

Wax myrtle beautiful for an evergreen. Shrub or a mass of greenery to shut off some unsightly object.

The beautiful Koontie a fern-like evergreen and many others with the treatment of the paw paw will at the expense of labor, make any abode a home.

To insure this atmosphere in our towns and villages we must urge women to take up this question of ornamentals. Men have never, as a man studied beauty—it is a woman's training to beautify and purify. You must have irrigation or you can not have flowers, and this is particularly true of the thirsty, sandy soils of Florida, but it has truly been said that "Where there is a will there is a way."

Mrs. McCarty—Mr. President, I only desire to be permitted to offer a word or two further upon this important work. I most heartily endorse the sentiments of the speakers who have preceded me. This work is (as it has truly been said) woman's work. It is woman's sphere, and (while we appreciate the strenuous side of the question, as much as we appreciate the full larder and wherewithal to buy things) yet it is but a matter of

right that we should have an occasional half-day of the hired man's time to help us in the great work of beautifying our homes. I wish also to endorse the protest of Mrs. Gates against the banishment of the vine. Mr. President, the home is not complete without a vine. As to the objection to the vine urged by the gentleman from Miami, Mr. Blackman, that they harbor mosquitoes, I would say that I do not think the vine offers more of an abiding place for mosquitoes than other shrubbery of the lawn or garden. They certainly do not at our home, for I have vines, and would not think of giving them up, and as for mosquitoes, we have them too, plenty of them, all sorts, sizes and conditions. Why, Mr. President, the mosquitoes we have are so large and so numerous that they "sit on a log and bark, and many of them weigh a pound." (Prolonged laughter and applause.)

Member—How many?

Mrs. McCarty—O, I don't know; never counted them. They are there though, and all over the state for that matter, but do not think they are any more partial to a vine for an abiding place than other foliage. We could never think of giving up the vine as an ornamental.

Mr. Blackman—Mr. President, I only desire a word—

Dr. Richardson—Mr. President, I rise to a point of order. The gentleman is out of order. It is the parliamentary right of the committee to close the debate.

Mr. Blackman—Mr. President, I only desired to capitulate and get as good terms as possible. The committee has entwined the vine around me, and I am ready to surrender. (Laughter.)

Peaches and Plums.

By J. P. Mace.

Mr. President, Ladies and Gentlemen:

I make this attempt with a feeling of inability to say anything new or worthy of record, after all that has been said heretofore in these meetings and printed in the transactions of the society on the subject of Peaches, Pears and Plums.

My experience with pears and plums is very limited indeed and what little I may have to say will apply almost entirely to peaches. In our section pears and plums are very uncertain, making a crop about once in three years. The Excelsior plum occasionally will do fairly well. I hope other members of the committee can give you more light on these fruits than I am able to do.

Beginning away back in 1886, the year in which I set my first three hundred peach trees, I have been growing and shipping peaches ever since these trees began fruiting—some seasons quite profitably, others a failure on account of severe freeze killing trees back to stump, or a late cold snap or heavy frost destroying the fruit.

Peach growers have their troubles as well as orange growers. In our section last season, severe drought through May and June greatly reduced the crop. Fruit small, cutting prices much below the usual figures on this account. Root-knot, root-gall, borers and San Jose scale we have had to contend with regularly for the past few years. This season's crop is not

regular with us—many trees full, others enough, some light, a few none, perhaps due to January freeze.

The warm month of March with good rains gave fruit a good send-off and at this writing (April 10th) prospects are excellent for fine fruit. Young peach trees set in January of this year have started off remarkably well. I am of the opinion that wider planting than is usually practiced is best. Most of my trees are set about 21×23 feet. The orchard set this winter I decided to try closer planting, setting them 18×22 feet, always planting the wide way of the rows, east and west. When possible to get them, take standard sized trees, four to six feet, cut back to about twelve inches. Cut off all lateral roots to not over two inches. Set, if any change, a little deeper than grown in nursery in land well broken, if possible, sixty to ninety days before setting time. Frequent cultivation, with light applications of orange tree grade, or No. 2 Simon Pure Fertilizer from three-fourths to one pound at a time every six to eight weeks, or say five times for the season. Keep all but three to five sprouts rubbed off and, if season is favorable, you will have trees six to eight feet high and spread in proportion by the last of November and these will be capable of giving you some fruit the following summer. I usually cut these young trees back from

twelve to thirty inches the following winter, deciding by character of growth and shape of tree how much to cut back. The second season I usually make two applications of fertilizer, in February and June. Cultivate land until June or beginning of rainy season, when middles may be allowed to grow beggarweed, keeping a good-sized circle hoed clean around trees.

For the past two years I have been using pure kerosene oil for San Jose scale, applying with small hand or mist pumps. As I have only an occasional tree affected, I find this method effective. When pruning or digging out borers, the men carry one of these pumps along with other tools and where a scaly tree or limb is found, use it. So far I have seen no bad effects from use of pure oil.

Some trees affected with root-gall, I carefully cleaned out, cutting away badly affected parts, and sprayed with a very strong solution of Whale Oil Soap, just as heavy as it would work through the pumps, then put about two quarts unleached hardwood ashes right about base of trees, where earth had been removed. This is an experiment. Present indications look favorable, but too soon to arrive at a conclusion.

I am growing principally Bidwell's Early, Suber, Maggie and Jewels, all early varieties. Have lately put out about two thousand trees of the new yellow varieties, such as Hall's Yellow, Dorothy, Coope's Golden Free and Hayward's Rival, as an experiment for the Florida summer markets.

Up to this time I have shipped by express only. We hope to be able to try a few refrigerator cars this season. For best results much depends on careful handling and packing. One of the problems is to get careful and intelligent help for pickers. A peach that should be picked to-day, if left on the tree until tomorrow will be too ripe for northern markets. Or we may err in the other direction and pick too green. Peaches arriving without color, tough and but little flavor, go begging and the grower will be fortunate if he gets back expense of picking, packing and shipping, to say nothing of the expenses of growing.

I believe peach growing in Florida, if carefully looked after, when orchards are planted in suitable location, will prove to be fairly profitable. And I also have no doubt that new and better varieties will be developed in time.

Report of Mr. H. Fred Hole.

Mr. President, Ladies and Gentlemen:

I approach the subject of Peaches, Plums and Pears with a great deal of diffidence. So much has been written on them, and as the soil on which they are grown varies, so also vary the opinions as to their treatment. Therefore, before reading this paper, I would like members to

bear in mind that my remarks are not to be considered as an infallible guide for others in any respect, but are merely the results of observation taken from our own orchards and similar lands adjoining.

We began growing peaches at Fulton on the lower St. John's river four miles from the sea-coast, in the spring of 1897 on moderately high Hammock land,

where the soil is of good sandy loam and rather dry, with a good proportion of humus, as the land was newly cleared for the purpose and trees were planted right away at a distance of 13 feet by 13 feet. An old five acre field was also planted in peaches—15 feet by 15 feet, and we consider this latter distance best, giving more room for cultivation and fruit picking than the former and still having a large number of trees to the acre. This seems desirable as the profitable life of the peach tree does not often exceed seven years, if as long. We would advocate pushing the young trees along the first two years by thorough cultivation and careful, though liberal, fertilization. Varieties planted in our orchards were Jewel, Waldo, Angel, Pallas, Oviedo and Dwarf Japan Blood. Of these we have been most successful with the Jewel, Waldo and Oviedo and, in a lesser degree the Pallas. The Japan Blood and Angel varieties have drawbacks which will eliminate them from any further planting on our part. The only recommendations to the Japan Blood are its late blooming and early ripening, in other respects it is unsatisfactory, being shy bearer, of 10 per cent flavor and a bad shipper. As to the Angel, it is an early bloomer, courting disaster, without the compensating quality of early ripening, of good flavor, but rather too acid to be a favorite on markets.

With regard to cultivation of the bearing tree, our practice has been shallow plowing during late fall and clean cultivation during spring, and especially during dry weather to conserve moisture, continued as long as possible without knocking off the fruit. After that time orchards are allowed to go to crab-grass for hay and the trees rest, after picking, till fall. Of

later years we have put off fertilizing, till safety of bloom has been assured, not because we consider this the best treatment for the tree, but because in growing peaches commercially one cannot afford to fertilize trees which will be unproductive that year, nor does it seem very necessary, as the trees are relieved, for that season, from the exhaustion consequent upon the production of a crop of fruit. The safety of the crop being reasonably certain, we have been accustomed to apply from five to ten pounds or more per tree of a well-balanced fertilizer.

As to pruning, the young trees had a careful and somewhat heavy pruning of, say a quarter of a season's growth, for two or three years. After several bearing seasons, we found it advantageous to cut back the trees heavily, forcing them to make almost an entire new head. This temporarily reduces the crop of fruit, but the following season a much finer quality is produced and the profitable life of the tree thereby lengthened.

The peach tree has about as many insect enemies and diseases as any fruit tree we know of and it unfortunately, seems to have a less vigorous constitution to resist disease than most of our commercial fruit, a peach tree succumbing entirely, when the orange tree will exist for years in a more or less healthy condition. Some of these diseases can be easily managed, others are difficult. I will only mention three or four of the latter. *San Jose Scale*—In our case this was naturally fully controlled by the orange colored *Spharostilbe Cocophila*, so we did not have to treat the trees. The crude oil treatment was very successfully used by Mr. Wm. Macklin of Dinsmore, nine miles north of Jacksonville. His orchards were on pine land. An extended report

of that treatment will be found in Bulletin No. 61, Florida Experiment Station, Lake City.

Curculis—For this enemy we tried jarring—without much benefit—then destroyed all stung fruit for two years, but gave that up, as not a large proportion was stung and it did not appear to increase or diminish, though showing more on a light crop.

Root knot—We have not been able to make much headway with this and so far it is only bad on land which has been cropped for years before planting with peaches. We have tried several remedies, but pruning and heavier fertilizing seemed to do most good, though not always effective.

Brown Rot is perhaps the most serious disease, interfering with commercial success. While we have not yet treated our trees for this disease, beyond destroying all affected fruit, what opportunities we have had of observing the results of the Bordeaux Spray lead us to believe that good results are not always to be relied on.

A less commonly known fungus disease, called by Professor H. Harold Hume, *Clitocybe Parasitica*, is worse still, as up to the present no cure for it is known. This disease is to be found in wild hammock, primarily on oaks of mature growth, especially water-oaks. It is much more rarely found in old cleared hammock land. Its first appearance on peach trees might easily be mistaken for borers, as gum is seen exuding from the tree just above the ground. On examination no borer is to be found, but from this point downwards dead bark and wood are in evidence and lead to one or more roots which are discovered to be completely dead. The disease soon spreads to other

roots and upwards into the trunk of the tree, the limbs being apparently the last to die. The tree appears to bleed to death from wounds caused by this disease. On our applying to the Lake City Experiment Station for a remedy, Professor Hume kindly came down to investigate. On examination of the roots of the diseased trees he found the fungus and pronounced it to be *Clitocybe Parasitica*. He explained that it traveled from tree to tree underground, spreading from the ends of the roots of one to the root tips of another. He gave us no hope of successfully fighting this disease, owing to the difficulty of treating the roots. We found that taking the soil away from the infected part of the root-crown and removing dead roots, allowing the sun to dry it out, together with heavy top-pruning, was sometimes helpful, if it could be done in the fall and when the disease was not too far advanced. We have had instances of trees bearing some fruit after above treatment, which generally fails to mature and the tree succumbs to the disease.

The peach requires very careful handling to put it on the market in good condition, and too much care cannot be taken to avoid bruises. Good grading, neat packing and well filled crates are most essential, but with these conditions fulfilled, to get it to its destination in prime condition, owing to its bad keeping qualities (in some varieties more than others) also to picking season being often hot and rainy. This is the time when Brown Rot gives proof of its presence, no sign of it showing when the crate is being packed, yet twelve hours later under favorable conditions, most of the fruit will be found specked. The most careful handling of the crate is also most important and there is much to be desired in that respect after

the crate leaves the packing house. This however, is practically beyond the grower's control and about all he can do is to take his medicine cheerfully. We have tried both express and refrigerator and do not find much difference to us. They both generally run a close race for the lion's share of the proceeds. Mr. Chas. Edwards Russell's article in the April number of "Everybody's Magazine" gives some interesting information on shipping peaches in refrigerator cars, which is especially enlightening to the grower and is well worth his reading and considering.

It does not appear that the peach crop will be heavy in our neighborhood this season. We account for it by the large

amount of fall bloom last year and the presence of Thrip in the bloom this spring.

In conclusion I would remark that the old idea of one crop of peaches in three years paying the grower is entirely exploded and further that unless he can put fruit on an early market and get the best prices, he will find it a hard task to cover the expenses of growing and marketing them. Perhaps the latter is the worst to contend with, for then the fruit passes more or less out of the ordinary grower's control and he must take what he can get. The fruit is moved very quickly, a good market will often go to pieces in a few hours and the grower is lucky if this does not happen to his heaviest and finest shipments.

Fertilizers and Irrigation.

By Dr. Wm. C. Richardson.

Mr. President, Ladies and Gentlemen:

The subject of fertilizers and irrigation are possibly the two most important matters connected with horticultural pursuits in the State of Florida.

Some years since the writer made a visit to California and from observations of the field there, reached the conclusion that the California grower had to pay as much for irrigation, which was an absolute necessity, as the Florida grower had to pay for fertilizers. Since that time it has been found that for success and best results the California producer must fertilize, and

the Florida producer must, in order to get the best returns, irrigate.

It seems that the merest tyro needs only to keep his eyes and ears open to learn all about the subject of fertilization. The ubiquitous fertilizer expert and agent is ever ready and anxious to impart all and even more than can possibly be known on the subject. The writer has no desire or intention to belittle or underestimate the fertilizer man who spends all of his time, and much of his money, to learn by study, experience and observation all that may be discoverable in his business, but at the same time it may be well to discount

his enthusiasm, as well as his bills, just a little. Any one who does not feel competent, after listening to the ever ready representatives of the numerous fertilizing concerns, to make the proper selection has only to refer to the state bulletin, furnished free, and he will find out all about it in the tables that have been published and republished from time immemorial, until they are, to some of us perhaps, more familiar than the writings brought down from Moses.

This committee cannot and will not undertake to lay down any rules of fertilization, believing that every intelligent grower, after a study of his soil and a consideration of his stocks, can make a proper selection for his own individual wants. It may be well, however, to say that the committee believes it is a well established fact that to fertilize abundantly, and to fertilize frequently with the right kind of fertilizer and at the right time is essential to successful and profitable production. Fertilizers containing a high percentage of ammonia during the wood and foliage growing seasons of Spring and Summer, and fertilizers having a high percentage of potash and phosphoric acid during the fruit maturing seasons of Fall and Winter, are requisite to the fruitfulness of all kinds of trees and plants.

Some very successful growers cling to the plan of applying fertilizers only twice a year, but a large preponderance of evidence is in favor of not less than three applications. By a judicious rotation and alternation of the ready-make mixtures offered by the various fertilizer concerns,

nearly all necessary requirements can be met. Sometimes, however, there are conditions arising from environment, soil, stocks, previous neglect, starvation or overfeeding etc., that may require special formulas, and in such cases the combined experience of the grower and chemical knowledge of the manufacturer are necessary to produce the best results.

Irrigation.

The matter of irrigation is not a new one in Florida, and was practiced by many progressive growers prior to the disastrous freezes of ten years ago.

With modern, up-to-date improvements in pumps and power, we can now irrigate successfully and economically. Notwithstanding what has been done and is now being done, irrigation is still largely in the experimental stage. Exactly what effect irrigation will have on insect plagues is not yet known to a certainty, but it is believed that it will be beneficial. The over-cautious, or hesitating grower reasons that there are in Florida only six or eight weeks in the Spring when irrigation is at all necessary, overlooking, or disregarding the fact that sometimes one or two rains during this period saves his crop. In the arid regions of the West intelligent irrigation has removed all uncertainty and the grower knows he can always year after year have uniform results. Plant growth and fruitfulness are so dependent on a proper supply of moisture that no one can question the usefulness of irrigation, and the only question in the whole matter is—will it pay? We believe it will.

Report by Cyrus W. Butler.

In the line of irrigation my experience amounts to nothing, and I therefore have nothing to say.

Fertilizers for Orange Groves.

It is customary to approach this subject with the remark that we "know nothing of it," which, though much nearer the truth than to say that we "know all about it," is still not in accordance with the just laws of Nature, who, we know, yields her secrets slowly but surely to all who seek her earnestly and faithfully. And who among us will deny that the orange growers of Florida have sought earnestly and faithfully for an answer to the question as to what my Lady Orange Tree will have for her breakfast this spring, her lunch this summer and dinner this fall?—and who among the growers, of all that portion of the world known to us, have been able to produce an orange so nearly perfect as the best of the products of our own sunny skies, sandy soil and carefully blended food. Not that we would ascribe the peculiar excellence of our Florida oranges to fertilizer alone, for some of our best fruit has been produced entirely without artificial food; but to produce this fruit in abundance and, at the same time, maintain its quality is the question that has taxed the brains of our orange growers for the last fifty years, with results that have placed the better class of our fruit upon the highest pinnacle of citrus fame. So, theoretically, we conclude that the orange growers of Florida should know something of an orange tree's food requirements, while, practically, the orange demonstrates the correctness of the conclusion.

Without going into the theoretically scientific, which is often more theoretical than scientific, I will give my present course, which is the result of twenty years of experience, involving some midnight oil reflection, but much more midday sunshine and observation—not to mention sweat and sandspurs; but the latter are forgotten as we recall the beautiful green trees, the sweet odor of the blossoms and the exquisite flavor of the golden fruit.

While soil analysis may give us some partial pointers, practically we may consider the average pine land of Florida as simply a lodging place for the tree, as its meals must be furnished from outside sources, that is, so far as the elements of nitrogen, phosphoric acid and potash are concerned; and, as these elements are generally considered the only ones necessary to purchase, the question of composition resolves itself into the best sources and relative proportions of these elements.

Proportion.

However widely the different brands of fertilizers varied twenty years ago, to-day nearly all of them will run between two to four per cent. ammonia, with six to eight per cent. phosphoric acid and ten to twelve per cent. potash; and it is probable that, within these limits, the necessities of the average grove, in normal condition, can best be supplied; but it has long been a question with me as to whether the same proportions of these elements should prevail in the three applications that most growers make during the year.

So I will give my present method, even though it contains nothing new to most old growers.

First Application.

Just before or about the time that the first blossoms appear we make a light application or not over one-half of the usual amount of fertilizer, containing about six per cent. each of nitrogen, phosphoric acid and potash—the nitrogen being from nitrate of soda and sulphate of ammonia, the phosphoric acid from acid phosphate, and the potash from a sulphate.

The object of this heavy percentage of nitrogen is that, while the trees need a maximum amount of this element during the spring months, owing to our usual drought during these months, they as a rule get less than during any other warm months of the year; hence, I apply more and apply it in a shape that is available at once—the nitrate of soda first and the sulphate of ammonia to last until the next application. I find that trees so treated with this extra amount of nitrogen at this time will hold their fruit better and stand the drought better than if only the usual amount of nitrogen was used. Nor do I find die-back to follow this plan, or fear it, provided that there is no excess of ammonia left in the ground when the rainy season sets in.

Second Application.

During May we make a liberal application analyzing from two and one-half to three and one-half per cent. ammonia, seven to ten per cent. phosphoric acid and twelve per cent. potash, composed of sulphate of ammonia, steamed bone flour and sulphate of potash. Whether the trees get the two and one-half or the three and one-half per cent. of ammonia depends upon their color—the lighter in color the more ammonia, and *vice versa*; also upon variety, as a tangerine will not only stand one-third more nitrogen than a

round orange on the same stock, but really requires it, in order to produce the highly colored fruit necessary to command high prices.

Third Application.

If trees are heavily loaded with fruit, by July we make a light application of equal parts of low grade potash and acid phosphate, but use no nitrogen unless leaves are light in color and fruit small, and even then a very light per cent., as all ammoniates in the ground during the rainy season are by the heat and moisture rapidly nitrified and carried into the tree. In short, the rainy months are the die-back producing ones, and hence all excess of nitrogen should then be guarded against. If trees do not have a heavy crop, omit this July application.

Fourth Application.

During November we use a liberal amount of fertilizer, running three per cent. ammonia, seven per cent phosphoric acid and twelve per cent. potash, composed of sulphate of ammonia, acid phosphate and sulphate of potash, which completes the bill of fare for the year. While the trees may not be able to use as high a percentage of nitrogen during November and December as during May and June, on the other hand, owing to the cooler weather prevailing during the former months, nitrification of the ammoniates also proceeds less rapidly and, therefore, the tree gets less, even though the same amount be applied.

Of course, the above is for healthy trees, abnormal conditions requiring modified formulas, and for rough lemon stock one-third less nitrogen than for sweet seedling stock. At all times we keep a close watch on the condition of the tree and vary the

percentage of nitrogen accordingly, using enough potash to combine with the nitrogen, which for the average of the year would be a little over three times the amount of the nitrogen, as all growers soon learn that, without the necessary percentage of potash, the wood is soft, the orange lacks juice and what there is is insipid, to say nothing of the probable die-back and possible gum disease and foot rot later on.

As to the indications for phosphoric acid, excepting so far as the thinness or plumpness of the seed are concerned, I must confess to being in the dark. Judging from analysis of tree and fruit, we are using more of this element than necessary, but at least, in some cases, we have evidences to the effect that even larger percentages are applied with good results, so far as amount of fruit is concerned; and as yet we have not met with any evidence of injury, even from its excessive use, though we think that it hastens maturity. The good results attending the use of more of this element than analysis of fruit and tree would call for, may in part be accounted for by the fact, that much of the free phosphoric acid applied to our soil is probably soon combined with lime, iron or aluminum, thus becoming, in the first case, of questionable availability, and, in the second case, non-available to the tree.

Source of Nitrogen.

With the exception of what nitrogen is contained in the steamed bone and the small amount of nitrate of soda used in the early spring, sulphate of ammonia is almost our only source of nitrogen. Guano, we find from repeated experiences, at least when applied during warm weather, will cause fruit to drop badly. Blood

and bone, cotton seed meal, etc., gives a thick bark with large pores into which the young scale easily get their sucking tubes and multiply rapidly; while later on comes die-back, to say nothing of the inferior quality of fruit. The same objection holds good for stable manure; but, as its possession has not been avoidable with us, and not wanting to waste it, we compost it with equal parts of low grade sulphate of potash and acid phosphate and allow it to thoroughly rot before using, by which time the ammonia is probably nitrified and combined with the potash, forming a nitrate of potash, or combined directly with sulphur, giving a sulphate of ammonia. When so treated, we have used the small amount of four shovelfuls per tree, scattered outside of the branches, with good results only; but care should be exercised in its use and a watch kept for an increase of scale.

We use at least one hundred pounds each of the sulphate of potash and acid phosphate per ton of manure.

The rotting process can be greatly hurried by keeping the pile moist and making holes with a crowbar for admission of air.

As for gathering a part of the nitrogen from the air by growing leguminoid plants in grove, we have given it a thorough trial, resulting only in financial loss and humiliation. Whenever we got a heavy growth of beggarweed, the rapid nitrification going on in the roots of the weed among the orange tree roots, has invariably caused the fruit to become ammoniated and split, regardless of our best efforts to balance the debt by use of potash and phosphoric acid.

Sources of Potash.

As the carbonates of potash are too expensive and the muriates contain so much

salt, we have confined ourselves to the sulphates using either the high or low grade, as percentage was indicated in the desired mixture, but usually the low grade.

Sources of Phosphoric Acid.

While we have not made any conclusive tests as to the relative merits of bone and acid phosphate as a source of phosphoric acid, we have been using and watching others who have been using both sources, and so far find no difference in value between the two when made available with acid. Moreover, we note that the prejudice against the use of acid phosphate is rapidly losing ground, especially with growers who are finding out that they have been using it for years under the name of "dissolved bone."

The pretended point against acid phosphate made by some fertilizer catalogues, to the effect that the sulphuric acid used in its manufacture sours the ground, is, we think, simply a matter of words, used to sell goods that contain just about the same amount of sulphur; the truth of which is easily demonstrated, but requires too much space to give here.

In conclusion, as the average Florida orange grower influences and largely governs by fertilization, not only the amount of oranges produced, but the size of fruit, thickness of peeling, amount of and character of juice, therefore, I repeat that he has learned at least a little of a desirable bill of fare for the orange tree; and speed the day when he can say as much of his own stomach.

DISCUSSION.

Mr. Pettigrew—Mr. President, in the matter of irrigation I have had considerable experience with artesian well water, I had a good strong flowing artesian well, with a capacity at the well of 150 gallons per minute. This would cover twelve acres an inch deep in twenty-four hours, but upon practical application I could not get half of it. I do consider that for practical purposes I got an inch of water on four acres from my supply in twenty-four hours. I have about three thousand feet of cement irrigation pipe, with a hydrant at about every 200 feet. I also have 100 feet of hose and with the supply of water I can get the water tolerably quickly on the land. This artesian water is a sulphur water, but I consider it very good for irrigation purposes if you can get a sufficient supply, but in the sandy soil of Florida you can not receive the benefit of the water to

anything like near the extent you could on hard lands, such for instance as in California. Iron piping is not best for irrigation purposes in my judgment especially down where I am it is too near the salt water. They rust out too quickly. I have some Giant Bamboo which would make good irrigating pipes if I could get the joints bored out, so the water would run through them. My longest bamboo is forty-nine feet after cutting off the top to where the hole is one and one-fourth inches in diameter. The question of irrigation is quite an important subject, and there is in some directions objections to it on account of the cost of a plant, yet there is no question but that a properly equipped irrigation plant will pay in the long run, for you are always thus sure of your water, and the water is what makes a sure crop.

Secretary's Report.

Mr. President, Ladies and Gentlemen:

Before reading my report, I wish to read (and I also wish to have printed in our minutes) the report of Mr. Aubrey Frink, who acted as Assistant Secretary last year and whose report was inadvertently omitted from last year's Report, which is as follows:

Mr. President, Ladies and Gentlemen:

As I had been appointed assistant secretary to serve during the last meeting of our society, at Miami, in May, 1903, I offered to assist Mr. Powers with the work in connection with the present meeting when he became ill a short time prior to his death. This I did by getting out a circular to members for last year. This circular was dated March 30th. On April 2nd, Mr. Powers died and I was then appointed by President Taber as secretary to serve until the present meeting. On April 14th, I sent out another circular to members for last year and also to a number of other parties. President Taber had also appointed Mr. E. O. Painter, of Jacksonville, assistant secretary. This last circular was signed by both myself and Mr. Painter. My account stands as follows:

| | |
|------------------------------------------------------------|--------------|
| Taken in for 1903 reports..... | \$ 5.00 |
| 3-life memberships at \$10 each..... | 30.00 |
| New annual members for 1904..... | 446.00 |
| Donation from Mr. Amos Wakelin, Philadelphia, Pa..... | 4.00 |
| Donation from Mr. Guilford M. Wakelin, Lane Park, Fla..... | 1.00 |
| Membership fees for 1905..... | 5.00 |
| Total | \$491.00 |

| | |
|---------------------------------------------------------------------------------------------|-----------------------|
| Stamps | \$ 33.00 |
| For printing first circular..... | 10.50 |
| For printing second circular, badges, programs, etc..... | 35.50 |
| Express charges paid..... | 1.75 |
| Sundry expenses (pins, pads, etc....) | 2.20 |
| For printing by Industrial Record Co., of circulars sent out by Mr. Powers.. | 2.25 |
| Postage paid by Mr. Painter..... | 2.10 |
| Total | \$ 87.30 |
| Check to W. S. Hart, treasurer..... | \$400.00 |
| Total | \$487.30—\$487.30 |
| Leaving balance in my hands..... | —\$ 3.70 |
| The Membership roll stands as follows: | |
| New annual members for 1904 for which I have received remittance as shown above..... | 446 |
| New annual members for 1904, remittance for which made to Treasurer Hart..... | 1 |
| New annual members for which remittance was made to Secretary Powers prior to his death.... | 29 |
| New life members..... | 3 |
| Old life members..... | 56 |
| Total | 535 |

Of the new annual members for which remittance is shown above as having been received by myself, 105 were turned in by Mr. Painter prior to the meeting and a few since that time. Mrs. C. T. McCarty, chairman of the Committee on Promotion of Society's Interests, Increased Membership etc., sent in 22 new members including 2 life members, making a total of \$40.00 remitted by her. Mr. F. D. Waite, of Palmetto, sent in 33 annual members, Mr. F. W. Campbell, of Largo, 7. There were several others of our members who kindly assisted in getting new members.

I have to acknowledge the receipt of several old Reports of our Society which were presented by Mr. J. D. Andrews, of Glen Saint Mary, Florida, for the Society's files. Respectfully submitted,

AUBREY FRINK.

Mr. President, Ladies and Gentlemen:

In making this my first report I regret to have to state that the Society has again sustained a loss through its secretary. We all remember what a lamentable loss the Society suffered when our worthy Secretary A. H. Manville ceased to meet with us as his service had been invaluable. We considered ourselves fortunate in securing the help of Mr. Stephen Powers, whose residence was unfortunate enough to be in the track of the resistless fire which destroyed the greater part of Jacksonville four years ago. Part of the Society's effects were burned during the fire at that time but this misfortune was small compared with the loss of Secretary Powers who passed to his reward on April 2nd, 1904.

Your present incumbent, on the 23d of last October, had the misfortune of losing his office and its entire contents through fire, taking all the Society effects then in my possession and leaving me without any record as to the memberships sent in after last year's report had gone to press. My cash book, however, shows that I had to the credit of the Society \$90.50 at that time.

I am glad to report that the library belonging to the Society is still in existence as it was in the office of the Times-Union at the time of the Jacksonville conflagration, and had not been removed at the time of my fire. So though we have been unfortunate we have some things to be thankful for.

The membership of the Society has kept up very well although we are somewhat behind last year. I take pleasure in reporting as follows:

| | |
|--------------------------------------------------|----------|
| Taken in for 1904 reports previous to the fire.. | \$ 90.50 |
| Taken in after fire of the same year..... | 30.89 |
| New life members..... | 10.00 |
| New annual members for 1905..... | 452.00 |
| Membership fees for 1906..... | 1.00 |
| Membership fees for 1907..... | 1.00 |

| | |
|------------------------------------------------|----------|
| Total | \$585.39 |
| Amount turned over to Treasurer W. S. Hart.... | \$585.39 |

The membership roll stands as follows:

| | |
|-----------------------------------------------------------------------------------------------|-----|
| New annual members for 1905..... | 452 |
| New annual members for 1905, remittance for which has been made to Treasurer Hart | 7 |
| New life members | 1 |
| Old life members | 59 |

Total 519

Of the new annual members for which remittance is shown above, 20 were turned in by Mr. F. D. Waite, Palmetto and 8 by Mrs. C. T. McCarty of Eldred. There were quite a number of our other members who kindly assisted in getting new members.

I would like to make a motion that the name of Mrs. A. H. Manville be added to the list of our Life Members. This is a small recognition of the services rendered the Society by our former Secretary. We all appreciate the work he did and I believe the Society will consider it a privilege to place the name of Mrs. Manville on our Life Membership list.

The Society is indebted to the Board of Trade who kindly paid the bill for the badges.

In response to the notices sent out to the editors of papers 27 responded by issuing notices in their papers about the meeting of the Horticultural Society. The same are as follows: Times-Union, Florida Sun, Metropolis, Florida School Exponent, Eustis Lake Region, Florida Index, Supplement, De Soto County Advocate, Pensacola Journal, Florida Agriculturist, St. Augustine Record, Nassau County Star, Jasper News, Cocoa & Rock-

ledge News, Tavares Herald Southern Fruit Grower, Ocala Star, St. Petersburg Star, Leesburg Commercial, Key West Adviser, Westville News, St. Andrews Bouy, The Green Cove Springs, De-Funiak Herald, Levy Times-Democrat, DeLand News, American Agriculturist.

The above report is respectfully submitted by,

E. O. PAINTER,
Secretary.

Note—The above motion of Secretary Painter was sustained and the name of Mrs. A. H. Mannville was authorized to be placed on the list of Life Members.

Treasurer's Annual Report.

W. S. Hart.

| 1904. | DR. | 1904. | CR. |
|-------------------------------------------------------|------|----------------------------------------------------|------------|
| April 28, To balance on hand.....\$ 441.80 | | June 22, By Sec. Painter, Draft No. 1.....\$ 30.00 | |
| Received in new membership fees during the year | 7.00 | Oct. 12, Noble Newspaper Co..... | 397.90 |
| | | 1905. | |
| 1905. | | May 11, Sec. Painter..... | 176.02 |
| April 30, Sec. Painter on the Powers' account. 80.00 | | May 11, Sec. Painter's salary..... | 100.00 |
| May 11, Sec. Painter..... 585.39 | | May 11, Balance on hand..... | 410.27 |
| Total\$1,114.19 | | Total | \$1,114.19 |

Report of the Executive Committee.

Meeting held at the Aragon Hotel, Jacksonville, June 2nd, 1904. There were present Mr. McCarty, Mr. Hubbard, Mr. Painter and Mr. Taber, and Mr. Taber held the proxy for Mr. Phelps.

Report of the Auditing Committee on settlement with Mr. Power's heirs, was received and Secretary Painter instructed to make settlement with them.

The members and personnel of the

Standing Committee were decided upon. In making up the committees we had alphabetical lists and also county lists showing members, to work from. It was the idea in making up these Committees that we should not only put on the Committees members who were acquainted with the subjects with which they had to deal, but that the counties and divisions of the State should be properly represented.

Secretary Painter was authorized to prepare special features for the next meeting. The number of reports authorized to be printed was one thousand, and Mr. Painter was authorized to print them, pay for the same to be based on last year's price per page, number of pages not to exceed those in 1903 report.

President Taber was instructed to take up the Kerr resolution with the respective railroads, toward procuring transportation for officers connected with the Experiment Station and Government in their work of Horticulture research.

President Taber took up this matter with the railroads of the State and was not successful in getting the desired annual transportation.

The Florida East Coast Railway had furnished Prof. P. H. Rolfs annual transportation for these purposes. The L. & N. Railway replied that they were prohibited from issuing this transportation; the G. S. & F., the A. C. L., and the S. A. L. Ry., offered to issue a limited number of trip passes on the application of the President of the Society some days in advance of its issuance. These latter conditions largely bar the usefulness of further pursuing this subject.

Meeting adjourned.

Minutes of the Meeting of the Executive Committee, May 11th, 1905, 10:30 a. m.

Present E. S. Hubbard, acting chairman, C. T. McCarty, G. L. Taber, President; E. O. Painter, Secretary; W. S. Hart, Treasurer; Rev. Lyman Phelps, by Geo. L. Taber, proxy.

Minutes of last meeting read and approved. Secretary and Treasurer's accounts were examined and approved.

Mr. Painter reported settlement with Mr. Powers' heirs as follows:

I wish to report that the committee appointed to take up this matter made out a statement as near as it could from the data obtained, which showed a balance of something over \$80 due the Society, after allowing Mr. Powers' expenses for postage, etc. This account was sent to Dr. Powers at Ocala and a short time ago received \$80.00 from him, which I receipted him for in full. The records which I had were all destroyed in the fire. The \$80 check was turned over to our Treasurer, which closes up this matter.

LYMAN PHELPS, per J. H. TABER.

E. S. HUBBARD,

C. T. McCARTY,

Committee.

Moved by Mr. Taber, seconded by Mr. McCarty that Mr. Hubbard as chairman of the committee be instructed to audit the secretary's and treasurer's reports upon finding them correct.

Carried.

Election of Officers.

The President—The regular order being the election of officers for the ensuing year, the chair will request Mr. F. D. Waite, third vice-president, to preside.

Mr. Waite takes the chair.

Mr. Taber—Mr. President, Ladies and Gentlemen: The hour has arrived to make nominations for your presiding officers for the ensuing year. I take this occasion to profoundly thank the Florida State Horticultural Society for the honor it has successively conferred upon me, in making me your chief presiding officer for nine years. I desire now to say that I believe the time has arrived when you should make another selection for your chief presiding officer, I believe it will be of benefit to the society to do so, and I desire to present to you, for your consideration and for your unanimous support, a gentleman well known to you as one of the strongest and ablest members of this society. I refer to Mr. C. T. McCarty of Eldred, Florida, and bespeak for him your hearty, royal support.

Mr. Blackman—Mr. President, this society would most reluctantly, in my judgment, consider the resignation of its president Mr. G. L. Taber, under whose guidance the society has prospered so long, and I desire to place in nomination the name of Mr. Taber for re-election to that office.

Mr. Jones—Mr. President, I wish most heartily to second the nomination of Mr. Taber.

Mr. Taber—Mr. President, I beg the gentlemen who do me the kindness to present my name, in the best interests of the

society to withdraw it. It is my belief that the time has arrived when you should make another selection, and I would ask the unanimous consent of this society to consider the nomination of the gentleman I have just presented to you, Mr. C. T. McCarty.

Mr. Blackman—It appears that Mr. Taber desires and wishes that his name be withdrawn and in doing so I will also move that the nomination be closed and that the secretary be instructed to cast the unanimous vote of the society for Mr. C. T. McCarty of Eldred, for president.

Mr. Waite—The nomination prevails, the secretary will cast the vote.

Mr. Painter—The secretary casts the unanimous vote of the society for Mr. C. T. McCarty for president.

Mr. McCarty—Mr. President, Ladies and Gentlemen: It is a great honor you have conferred upon me to succeed our worthy president, Mr. Taber, whom we have all learned to honor and to love for his untiring devotion to the interests of this society. If there had been an intention to urge my name before this society for any office in opposition to the interests of this society. If there Mr. Taber, and you should entertain the opinion that I would have permitted it, I wish to assure you that it is a mistaken idea. I could never have allowed my name to have been presented had I not known that the determination of Mr. Taber not to further accept this honor at your hands, was irrevocable. I shall endeavor to the best of my ability to make

you a fair and impartial presiding officer. My chief aim shall at all times be the advancement of the interests of your welfare and that of this society, at least for the year for which I have been elected for. I wish now to assure you that I have no ambition to serve for such a great length of time as has been the case with our esteemed ex-president. Again I thank you. (Applause.)

The names of Dr. C. W. Richardson, G. W. Wilson and G. F. Kerr being placed in nomination, the secretary cast the unanimous vote of the society for their election.

The name of Mr. E. O. Painter was placed in nomination for secretary and the assistant secretary was instructed to cast the unanimous vote of the society for his election.

The name of W. S. Hart was placed in nomination for treasurer and the secretary was instructed to cast the unanimous vote of the society for his election.

The names of Rev. Lyman Phelps, E. S. Hubbard and G. L. Taber were placed in nomination for the executive committee and the secretary instructed to cast the unanimous vote of the society for their election.

Next Place of Meeting.

Mr. Blackman—Mr. President, the next order of business must of necessity be the fixing of the time and place of holding our next annual session. I wish to extend to the society a most cordial invitation to hold its next annual session on the lower east coast, in that magic little city Miami. I am authorized and commissioned by the Mayor and Board of Trade of the city of Miami to urge upon your consideration this invitation. We want you to come down to Miami. We want to show you what we have been doing down there, and (as a measure of what you may expect) I stand here to assure you that your membership will be increased by this selection, and you will have more money in your treasury than you ever did have. This was the case when you held your session in Miami once and it will be so again. I

am here to promise you, in addition, the lowest railroad rates that you ever heard of to enable you to reach Miami, and to promise you one of the finest excursions on our bays and rivers, and through our deep sea channel out to the broad expanse of the Atlantic, besides many other good things too numerous to mention in detail at this time. I want to say though, Mr. President, that Miami wants this society to hold its next annual session within her hospitable gates, and I sincerely hope you will accept her invitation.

Mr. Richardson (of Miami.)—Mr. President, I rise to second the invitation of Mr. Blackman, we desire this society to hold its next annual session at Miami, and will use our utmost endeavor to make your session a pleasurable and profitable one.

The President—The chair would like to announce that we have with us Capt. Garner, president of the Jacksonville Board of Trade, who desires to offer a few remarks upon the question before the society.

Capt Garner—Mr. President, Ladies and Gentlemen. On behalf of the Jacksonville Board of Trade and business interests of the city of Jacksonville, I desire to extend to you a most cordial invitation to hold your next annual session in the city of Jacksonville, in the auditorium of the Board of Trade. Jacksonville has been in the past, as she will ever will be in the future, your sincere friend, a friend to your every interest. She appreciates the great work you are doing for our fair State, and we promise you the best and cheapest rates of transportation that can be offered. Jacksonville is the geographical center of the state; as in ancient days it was said that all roads led to Rome, so it is with Jacksonville, all roads of Florida lead to Jacksonville. It is the most central point you could select, we extend to you always a hearty welcome; Jacksonville is essentially a convention meeting city. When the time arrives that you can consider the adoption of a permanent place for your annual meetings we would gladly welcome you, and rejoice with you should

you determine to erect for yourself a building in the city of Jacksonville and have your own permanent home with us. However, Mr. President, I wish to say that your best interests should first be considered. If (in the judgment of the society) its interests would be enhanced by meeting at some other of our sister cities, we should have nought to say detrimental to such a course, for we do not wish to appear selfish. All that we desire is for you to know and feel that we want you to meet with us, and we will at all times use our best endeavor to make your sojourn with us of profit as well as pleasure. Of one thing be assured; that the latch string of the folding doors of the auditorium hangs on the outside, and you are always welcome.

The President—The society begs to express its appreciation of the kind invitations extended for the holding of its next annual session. There are two candidates before you, Jacksonville and Miami, a motion to close the nomination prevails. You will prepare your ballots.

Mr. Painter—Mr. President, the ballots have been prepared, cast and counted. Jacksonville receives 41 and Miami 24.

The President—It has been decided by ballot that our next annual session will be held in Jacksonville. The date will be fixed by the executive committee.

Necrology.

BENJ. N. BRADT.

Born in Lowell, Mass., June 22, 1837.
Died in Jacksonville, Fla., January 4,
1905.

Early in the Civil war he joined the Union Army, 11th Battery, Mass. L. Art., serving nine months. Stationed at Arlington, D. C. Was detailed to assist at the Copper riot in Boston, Mass.

He was a member of St. John's Masonic Lodge, Boston, Mass., for over forty years.

Almost from a child he became self-supporting, forgetful of self and devoting his life to others. He was in the boot and shoe trade in Boston.

Active in philanthropic works and always studious he studied the needs of the unfortunate. As an active member of the Boston Young Men's Christian Union his advice was much sought and appreciated by the Board of Management to which he belonged.

He was connected with the Rev. James Freeman Clark's church from its earliest days in the little Indiana street Chapel.

Business cares becoming too great for his uncertain health he sought Florida in 1879 and henceforth identifying himself in her interests.

He joined the Horticultural Society as one of its earliest members. As member of the Florida Agricultural Society he took part in Farmers' Institutes as Volunteer Weather Observer. He studied Frost and Frost Protection with the same inter-

est he gave to Florida soil and the use of labor saving machines and possibilities of cultivation.

Earnest and thoughtful no measure which made for the best horticultural and educational interest of the State escaped his notice.

Unable longer to meet the demands of country life he came to Jacksonville in December 1892 thenceforth living very close to office work until released from this one by death.

A member of Pomona Pass. G. A. R. from Huntington, Putnam county, he sleeps with comrades in Evergreen cemetery, Jacksonville, Florida.

CHARLES BARTLETT CROCKET, Jr.

Charles Bartlett Crocket, Junior, was born at Medford, Mass., on October 31, 1877 and died at Cocoanut Grove, Florida, March 5, 1905.

He was a member of the Class of 1900 of Harvard University, but in his freshman year owing to a serious trouble with his eyesight was compelled to abandon his ambition to finish his college course and study law.

He came to Florida in 1897 and was for three years a partner in the Redmill Fruit Company near Miami. In 1900 he sold his interest there and purchased the Potter Grove three miles west of Cocoanut Grove.

His every interest and enthusiasm was

centered in horticulture and particularly in the opportunities that the climate and conditions in Dade county offered for horticultural experiment and progress.

His death was the indirect result of overwork and strain and his last illness was the culmination of months of strug-

gle for all that life means to a courageous young soul.

So is ended the life of one who had always stood for pure and upright living and who would have been a force for good and intelligent citizenship in the community in which he lived.

“Valete ac plaudite.”

Report of Committee on Transportation.

Mr. President, Ladies and Gentlemen:

Your committee begs to submit the following report:

First—Owing to absence from the state of one of the committee, and the inability to locate the other, there was no advisory action.

Second—We took up the matter of transportation by asking all the several roads centering here for a rate of one cent per mile each way for actual miles traveled. These several requests were all referred to the General Committee on

Transportation at Atlanta and was replied to by Mr. Jos. Richardson, secretary.

We spent two months trying to get some concessions to the members of our society, but all to no effect. We asked finally to make the rate available only to the members holding certificates of 1905, but this too was rejected. We are sorry that our efforts have not brought better results.

All of which is respectfully submitted,

T. A. CARROLL,
Chairman Committee.

Resolutions.

Mr. Blackman—The report of the Special Committee on our retiring President is submitted as follows:

“Resolutions Adopted.”

“WHEREAS, George L. Taber, who has served this society for nine consecutive

years as president, has declined to further serve in that capacity, preferring that another should have the honor and responsibilities of the office; be it

“RESOLVED, That the society heartily thanks the retiring president for his long and successful administration of the so-

ciety's affairs, his uniform courtesy and fairness when presiding, his earnest labor for the advancement of the society's interests at all times, believing that the high position attained by the Florida Horticultural Society among similar societies under his administration, has been largely, if not mainly, due to his constant efforts in its behalf.

The resolution was adopted unanimously by a rising vote of the members of the society.

Dr. Kerr, chairman of the Committee of Legislation introduced the following resolution which was adopted:

WHEREAS: The attention of the Florida State Horticultural Society has been called to the serious menace to the citrus interests of the State by the unchecked ravages of the White Fly in some localities and the danger of its introduction throughout the State; Therefore, be it

RESOLVED; that the Florida State Horticultural Society heartily endorses all reasonable measures for the eradication of the White Fly.

GEO. KERR,
M. E. GILLETT,
C. T. McCARTY.

Mr. Connor—I move that the Secretary be empowered to secure a copy of the pending law in regard to the White Fly and incorporate in his annual report of the proceedings so that we may know something of what this measure is. Carried. This law will be found printed in full in the last pages of this report.

Mr. C. T. McCarty—Mr. President, I have here a resolution which I have been

requested to offer which I hope the Society will see perfectly right and proper to adopt. The following resolutions were then adopted:

WHEREAS, The Cuban Reciprocity has had the effect of increasing the price of sugar to the American Consumer, and increased the price paid the Cuban Producer,—and

WHEREAS, The reciprocal treaty has had the same effect upon fruits and vegetables produced in Cuba, and sold in America, and

WHEREAS, Florida is largely engaged in the production of similar fruits and vegetables, and believing the Reciprocal treaty reduces the price to the producer of American or Cuban Agricultural or Horticultural products, and increases the cost of same to the American Consumer,

THEREFORE, Be it resolved: That we request our Representatives in Congress to use their best efforts and influence to repeal the Cuban reciprocal treaty.

BE IT FURTHER RESOLVED: That a copy of these resolutions be sent to each of our Representatives and Senators.

Mr. W. H. Jones offered the following resolutions which were adopted:

WHEREAS; Owing to the many complaints made as to the rough handling and delay caused by the employees of the Southern Express Company in handling the output of the shippers of this Society and State at large, therefore, be it

RESOLVED; That this Committee as a body do respectfully ask that The Southern Express Company take such steps as

may be required to furnish such equipment and help in their service as will enable them to handle with care and dispatch such fruits and vegetables as may be entrusted to their care.

W. H. JONES, Chairman,
F. D. WAITE,
B. F. CHILTON.

Dr. Kerr—Mr. President, your Legislative Committee to whom was referred the matter of pending legislation in regard to an Annual State Fair makes the following report in the form of a resolution which it asks to have adopted:

Be it RESOLVED: That it is the sense of the Florida State Horticultural Society now in session that there should be held annually a State Fair and that the Legislature should appropriate a liberal amount of money to aid this worthy object.

GEO. KERR,
C. T. McCARTY,
M. E. GILLETT.

The above resolution was adopted.

The following resolution was introduced by Mr. Boggs, which on being read and discussed was adopted:

WHEREAS: The proper regulation of rates of transportation is essential to the prosperity of Horticulture as an industry, be it

RESOLVED: That this Society express its appreciation of the support given by the the Florida delegation in Congress to the effort to confer rate-making power on the Inter-State Commerce Commission and does hereby urge our Senators and

Representatives to a vigorous renewal of their efforts in the next session and also in future sessions of Congress, until said Commission is granted full power to protect commerce from unreasonable charges by common carriers, private car lines and express companies.

RESOLVED: That the Secretary be instructed to forward copies of these resolutions to each of the Florida Senators and Congressmen and to the Chairman of the Inter-State Commerce Commission.

Dr. Richardson—Mr. President, the report of your Special Committee in final resolutions beg leave to submit the following resolution of thanks and ask that the same be adopted by a rising vote of this Society.

Jacksonville, Fla., May 11th, 1905.

To the Officers and Members of the Florida State Horticultural Society:

The undersigned, your Committee appointed to prepare final resolutions, respectfully submit the following:

RESOLVED; That the sincere and heartfelt thanks of this Society are due and hereby expressed:

To the citizens of Jacksonville and his Honor, Mayor Nolan, for their hearty welcome and courteous treatment since we have been in their midst.

To the Board of Trade and its President, Capt, Garner, for their kind reception and generosity in providing us a commodious place for meeting and many other favors so freely extended.

To the Jacksonville Ladies' Friday Musicale for the delightful entertainment given us.

To the several Transportation Lines

that have given us reduced rates to their meeting.

To the several hotels that have given us reduced rates.

To the fertilizer concerns that have given us attentions and demonstrations of their operations.

To the Officers of the Society, notably the President and Secretary, for their untiring energy, fairness and courtesy.

W.M. C. RICHARDSON,
J. EARLE BACON,
L. B. SKINNER.

For the Preservation of Our Forests.

Mr. McCarty—Mr. President, I would like to ask the unanimous consent of the society for permission to present out of the regular order, a matter now in the hands of Mr. G. W. Wilson, our second vice-president, pertaining to the important matter of forestry preservation. This is a matter that very properly comes before this society. It is an important matter upon which every State is seeking needed legislation.

The President—There is no objection, by unanimous consent the rules are waived. The society will hear Mr. Wilson.

Mr. Wilson—Mr. President. The matter of legislation upon forest preservation has been before the various legislatures of the several States for several years. The time has arrived when it is almost imperative that some needful legislation shall be enacted if possible in our State. The reason that I have asked permission to appear before you in this behalf at this time, is because the Florida legislature is now in session, there remaining only about three more weeks of the session, and it is important that this matter be pressed

as urgently as may be to the enactment of some measure into a forestry law. This matter is urgently pressed by the Agricultural Department at Washington in all States where there has not been a forestry law enacted. Some good measure is also called for in our State by the lumberman, the cattleman and the naval stores people. I will now read you this communication and proposed measure and ask for such endorsement by the society as the same merits.

Titusville, Fla., May 9, 1905.

*Pres. Fla. Horticultural Society,
Jacksonville, Fla.*

Dear Sir:

It seems to me that steps should be taken to urge the present State Legislature to pass laws to protect the pine trees and other trees from foolish destruction. It seems foolish to allow the turpentine men from other states, who have little real interests in the welfare of Florida, to come here and put more than one box in a tree and to box trees under 5 or 6 inches in diameter. We criticise other countries for allowing destruction of the rubber and

chincona trees, and at the same time we allow the destruction of our useful pines by turpentine and lumber men who are looking only to their present gains. All organizations interested in the prosperity of the state should combine in efforts to regulate these matters and protect the trees.

Very sincerely,
LOUIS A. LYMAN.

Address:
Melbourne, Fla.

The President—Upon discussion of this matter, it appears to be the sense of

of the society that the matter should be referred to a special committee on legislation, to be composed of the present legislative committee with two members added thereto, with power to act. The chair will therefore name as those additional members, Mr. G. W. Wilson and Mr. C. T. McCarty. The chair believes that this special committee of five, as now constituted, with Mr. Wilson as its chairman be able, not only to handle this measure, but any other effecting the interests of the Florida State Horticultural Society now before the legislature to the best interests of the society and State as well.

Grove Protection at Time of Cold Waves.

By W. S. Hart.

Mr. President, Ladies and Gentlemen:

Can we protect our groves, crop and trees, from injury when, as some one has put it, "a cold wave a thousand miles wide and ten miles deep sweeps down on us from the far Dakotas?" Can we do this profitably?

If so, how?

Nearly every orange grower of this state, except in the extreme southern portion, has asked himself and others these questions yet, until well within the present decade, the answer has been uncertain and accompanied with many "if's."

I believe it is now possible to cite a sufficient number of successful cases, under widely varying conditions, to warrant the

assertion that the first two can be answered with a single affirmative.

The third may be answered differently by different people but I feel sure that the method I shall advocate, though not perfect, may still be made to answer our needs until a better one is discovered. As evidence best known to me I will cite some of my own experience in support of the first two propositions.

During the winter of 1901-2 I saved \$2,000 worth of fruit at an expense of not over \$65.00 and during the past winter, fighting four nights in succession with mercury ranging as low as 18 degrees above, and a gale of wind from the north all the first night, a heavy wind from the south much of the second night and light

northwest winds the other two, I saved much of the fruit that still remained on the trees in a perfectly sound condition, to a still greater value at an expense of about \$160 as nearly as I can figure it.

Nor is this all as my trees were fully protected from injury and now bearing heavy crops of fruit while the unprotected trees lost all their foliage and some of their wood and are now but scantily covered and carrying but light crops, many trees no fruit at all.

I am satisfied that by firing my groves I have saved more of value in the coming crop than in that of the past season.

But, figuring on what has already been realized, I can safely say that after all protective measures up to date have been allowed for, and I still have fuel to last a week in case of cold spells, I have cleared at least several thousand dollars on ripe fruit alone.

Just bear in mind that comparatively few people save a surplus of even one or two thousand dollars in a whole lifetime of struggle and hardships, that the cost of protection is no more than any energetic man can easily meet in one, two or three years and he may do the work of preparation himself, bear in mind that the orange tree retains its leaves three years under normal conditions and that even if the wood and fruit could escape injury the loss of all this foliage at one time is a heavy shock that means less profit for the coming year, don't forget the peace of mind that comes of being prepared and the assurance that you may safely hold at least a portion of your fruit for the high prices late in the season rather than take desperate chances between the Devil of a cold wave and the deep sea of glutted markets that may rob the improvident of their season's income, or even the rewards

of years of strenuous effort, by killing their trees to the ground while they mean but *profit* to you if you but act your part vigorously at the right time. Bear in mind that in most parts of the orange belt of this state years may intervene between the seasons calling for protection, even for the fruit, giving a chance to spread the expense of preparation over a considerable time.

Bear in mind that the ablest and most successful business men of the world deem it good business prudence to take liberal advantage of insurance opportunities both on person and property. Bear in mind the chagrin as well as hardship, that comes to him who fails, while others with like opportunities succeed about him. Bear in mind that realty values, the prosperity of the state and every interest in it are deeply involved.

Yes, let us carefully consider all these things and the many more that will suggest themselves to us and then ask ourselves if it does not promise fair returns in any case and splendid profit in some to prepare for the cold waves that are sure to come sooner or later and when they do come be ready and on the spot to put up a good fight for our own?

Twenty acres protected means a whole lot if others lose their trees, ten acres of good bearing trees when Florida's crop is mostly cut off means a good income, an acre, or even a half acre, means much to the man too poor or feeble to protect more.

How shall we do it?

I will not stop to describe the many more or less effective plans that have been tried throughout this state and California, as even the best of them, with the exception of that of building small fires in and about the groves possess drawbacks that must yet be overcome to bring either

one into common use among grove owners.

Let us then consider this plan of preparing to build a small fire to each tree so as to warm *all* the air in the groves as the, in my opinion, only effective one with large trees within the reach of all growers, though small trees I would bank with clean earth and leave them to take their chances without fires.

At our meeting here in Jacksonville in 1896 Rev. D. O. Davies enthusiastically reported a very good measure of success in saving a portion of his grove at Micanopy from destruction in the winter of 1894-95 by building a "conflagration" on the north and west sides and smaller fires here and there through it.

He named his plan "The plan of the three P's, Preparation, Promptness, Perseverance." Mr. Kinney of Pierson carried some of his trees and fruit through the same winter in sound condition though the state lost fifty to eighty millions of dollars' worth of property value in citrus groves by the cold of a few hours. Mr. Kinney's plan was far more economical than that of Rev. Davies as he used smaller fires but more of them. By his request his success at that time, and during the two following seasons, were reported to this society at its meeting in 1898 they being the most notable ever attained in this country in that line of effort up to that date.

Both of these lamented friends and fellow members have passed on to their reward but their work lives after them.

Prof. J. G. McKinney gave us a very valuable paper on grove protection at our meeting here in Jacksonville in 1900 in which, among other good things, he gave us his experiments with small fires to the leeward of each tree with a windbreak on

the other side so constructed as to cause wind eddies that drew the heat through the tree and upward to its top.

Mr. S. C. Warner, whom I hope is here present, has this plan in effective operation and with marked success during the cold spell of January last.

California has given us much of value through her work and careful reports in this line and there these small fires, in whatever way they may be made, have proven most effective in warding off injury from cold.

Through results obtained from the practice of this method of protection has come new courage and new confidence to those who realize that only by effective protective measures could we hope to put orange growing on a basis of safety that would more surely warrant the investment of capital than at any time in the past, throughout the section of the old "Orange Belt" of this state that has heretofore produced the highest quality and the major portion of its crop.

Through it the worthy and energetic president of this society is making orange culture profitable within eight or ten miles of the Georgia line.

Now, as otherwise this paper promises to become much too long, I will give, as briefly as possible, a few suggestions on the practical working of this method of protection that my experience tells me are of value, and also offer some that, though not yet sufficiently tested, may on further study, prove to be of value.

The key note of Messrs. Kinney and Davies' teaching was, to use the former's words, "Be ready when the cold comes."

Have your fuel in place, kindlings laid, men engaged, plan of lighting all worked out, a surplus of fuel near by to replenish from and as soon as this is used up rush

in more before you rest, even though the mercury is rising, otherwise you may have worked in vain.

If practicable it is best to have a large supply stored in the groves where it is easily accessible.

If wood is used make it four feet long and leave it coarse. This is a saving in several ways. Part should be lightwood to start with. Lay it right so that it will not waste by burning too rapidly.

The right way is in the form of a capitol V with its point towards the tree to the southeast and resting on the middle of a stick at right angles with its axis. Place the kindlings in the acute angle of the top sticks and cover with a dry palmetto leaf if such is handy.

Where fires are to be built banking is not necessary and the holes are a nuisance in the night, where it is done.

To save oranges start fires when the mercury gets down to 27 degrees above zero. For the trees up to time of starting growth, 25 degrees. After growth has started make it 29 or 30 degrees.

Don't trust to long distance weather predictions or to the ringing of electric bells attached to thermometers outside. Don't trust to high-priced thermometers after the first year of their service.

Get a dozen or two of the 15 to 25 cent ones, test them and mark the variations and they will be the most reliable that you are likely to find. Put them about in the groves, as far from the effects of the fires as possible, and go to them often. Put one or two way outside to windward.

Watch the Weather Bureau reports closely. It seldom fails to give notice of the worst that is likely to come, and to do it well ahead of the arrival of the cold wave, but don't trust absolutely even to it

as it is possible for cold to come from a point outside its range of observation.

When it predicts a degree of cold below the danger point have some one watching the mercury even after it may have gone up a little because of the dew point having been reached. It may go down later.

Call out the men in good time and start a fire here and there even before real danger has arrived, if mercury is steadily falling.

Pay them good wages for night work, more than for day work unless their employment depends upon success so that they are interested as well as their employer in preserving your property.

Hire by the hour and give them plenty of hot coffee and a good lunch in the middle of the night.

Trees do not burn easily in a cold night but better put the fires in the middles as the heat is radiated in all directions.

Be sure that mulching is kept out from under the trees and away from the fires.

Have help enough and have the fires looked to often.

Call on your friends if short of help. You will be surprised to find how ready even wealthy tourists are to help a man who shows energy and foresight in caring for his property.

Watch the fires closely on a windy night. On calm nights the job is a delightful one after you once get at it.

Windbreaks, if such there be, should not be tight ones except they be of the Prof. McKinney kind.

Smoke and the hot sand under the fires, both help to protect in the morning and if the sun comes up bright throw the wood apart so as to make all the smoke possible if you think any of the fruit is frosted.

Chunks that have been partly burned make good kindlings for next time or they

start up easily if left whole when the charred ends are put together. Don't leave the groves alone, if there be any combustible material in or about it, until every fire has been extinguished. Then you may go to rest with a satisfied mind, so far as your own interests are concerned; but with a deep feeling of sympathy for those who have trusted to luck and hoping against hope have lost wholly or in part, for, I know of no more vexing experience than that of rebuilding a grove that has been killed to the ground or even the effort to realize some return from a partly frozen crop of fruit.

Though wood is comparatively plentiful in this state at present it will not always be available in sufficient quantities to allow of its use to the extent of our needs and considering the amount of work to prepare it, place it, keep up the fires, replace it with more when that in the groves is used up, the difficulty of hauling it among closely planted, large trees and the necessity of getting it out and covering it when danger of cold is past, the difficulty of getting the needed help to do all this just when it is needed, it is well for us to carefully consider the matter of the use of other fuels that will soon be, if they are not now, more economical for our purpose.

It may be that the use of some kind of stove would give us more economical protection, even with the use of wood, after their first cost was met, as they give out more lateral heat with less upward waste. The use of coal or coke in stoves or baskets should be tried until we learn more fully their protective worth.

The Griffiths, Munson Briquettes are giving good results in California but there they do not have as low extremes of temperature as we experience.

While in that state last year I talked with Mr. James Mills of Riverside who has had 200 tons of them, and other users. I met Mr. M. L. Wicks of Los Angeles president of the company, was shown through the works where they are made and I am encouraged to believe that they will answer our needs better than anything else on the market if they can be made in this state as cheaply as there and I see no reason why this may not be done. The plant need not be an expensive one, the materials are not costly, the briquettes can be moved on a low freight rate, they are exceedingly convenient to handle, take little room in the grove, can be stored there under the trees where most handy for years with but little, if any, loss of value, need no stove or basket when in use and each replenishing will last from five to six hours, so I am told by those who have used them.

In size they are there made 12x6x5 inches for grove use but much smaller for household purposes. In France where wood is scarce, briquettes are in common use for all heating purposes and may be seen in great piles about the railroad stations almost as plentiful as coal in this country.

There are yet, and always will be, problems to work out in successful citrus culture and the most effective and economical protection from injury by cold is one of them: I am inclined to believe it to be best, in the future setting of orange groves, to plant the rows running north and south far enough apart to allow of the easy hauling of fuel and fruit and the building of fires after the trees get large without danger of injury to them or their crop. All this means work but nature demands that man shall work, happily and in affluence if he will, unhappy

and in poverty if he attempts to shirk, but by working up to Dr. Davies' rule of the three P's we may never now assure ourselves that we have gotten grove protection down to a plan of profitable practice

that makes orange growing here as safe and profitable an investment of money, time and labor as foresight and energy may hope to find in the whole range of horticulture.

Agriculture.

By T. A. Carroll.

Mr. President, Ladies and Gentlemen:

Agriculture, the original, natural, necessary, and almost universal business of man, was planted in the Garden of Eden with mankind, and from this one line of industry come all others. Every art, trade or profession whatsoever is secondary to this parent industry, and dependent upon it,—and is useful only when and in such a degree as may contribute to the one great universal business—agriculture.

Agriculture in its great volume is the social, political and economic salvation of the world.

There are too many young men brought to look upon Horticulture and Agriculture as being only an earthly (or earthy) existence, with the result that the flower of our farmers are flocking to the towns and cities—where the professions are already overcrowded, thus creating a social as well as economic menace. What is to be done to obviate this? There is no single remedy, but I do believe that much can and may be done in a more scientific agriculture, whereby this

most necessary calling might be made more attractive to our young men, whose ambitions now carry them to the universities of art and letters.

The life of the agriculturist is not so dull as many suppose. It will not compare with that of the clerk in the store or bank for ennui.

He has a chance in season and out of season for recreation, and for enjoyment in the work of his own hands—whereas the clerk and mechanic are only the human handle in the pick through which others perform a task. What more can he hope for but existence? What per cent of the suicides occur upon the farm? (not two per cent.) What per cent from those who left the farm for other callings? (more than eighty per cent). Is it necessary to further comment upon this point?

With advanced Agriculture and Horticulture we cannot see why they should not be as attractive to the intelligent man as Law or Physics, or any of the other professions.

We have only to turn to any one of our

many Horticulturists and Agriculturists to-day to prove that it is not only as profitable but equally elevating and independent, besides more genteel. I want to make the prediction that fifty years hence will see more independent farmers than merchants, doctors and lawyers combined in Florida, or in this whole Southland of ours.

Someone said recently:

"What we need now is men of well trained brains, who will organize and diversify agricultural industry," and it is true. We have greater need of men than plowmen.

One need only to watch the real estate transfers to learn that all the most desirable properties are being taken by the "New Comer." Men who know a good thing when they see it, yet our young men are daily leaving these identical farms seeking to better their positions socially morally and financially, with what results? How soon do they realize their mistake, some soon enough to get back before the Old Home passes into new hands. Then watch with what tenacity they cling to that Home and farm. But then there are those who cannot see the mistake in time, and to him there is nothing left but to

drift with the tide of Human Pick Hands until his days are no more.

Then what shall we do?

There ought to be and there is a remedy, and that remedy is at hand—teach the Agriculturist Agriculture. Require every public school to teach agriculture, not only the rudiments of agriculture, but horticulture, forestry, and all its other kindred subjects. Let it be one of the established studies in all public schools, and if necessary make the study attractive by offering premiums for a complete course. But do not understand me to cast a single straw or deprecating word against the work of our present established institutions. They are doing all they can, being handicapped as they are, but they cannot reach the element we want, we want the farmers' sons. To be "like father like son," and we can only have this so by making the farm life interesting to our young men and boys, get their hearts interested in this work, teach them the science of horticulture, the business of agriculture. Show them the independence, the comfort, the profit, of the life of agricultural science and you have won a crown of glory for the noblest calling of man.

The Diseases of the Irish Potato.

By Professor F. M. Rolfs.

(The following paper was lavishly illustrated with stereopticon views of the different forms of fungus growth and we very much regret our inability to reproduce these views in this report.—Secretary.)

Mr. President, Ladies and Gentlemen:

Our potato industry frequently suffers severely from the invasions of various plant organisms which are more or less common to the potato fields of this State. The object of this paper is to describe the most destructive diseases, and suggest such methods of treatment as have been successfully employed in holding these diseases in check. It is often difficult to distinguish some of these diseases without the aid of a microscope, still it is well to know the symptoms of the principal ones so as to be able to use rational methods of treatment. Doubtful cases may be referred to the Experiment Station.

Altenaria solani (E. and M.) Sorour.

Early Blight—This is a wide-spread disease. It attacks both leaves and stems. Plants usually show no signs of the disease until they are six inches high. The first indication of its presence is the appearance of small circular, brown spots on the older leaves. The spots gradually extend and form large areas of dead tissue. The younger leaves soon show signs of invasion, and unless the plants are spray-

ed at once the entire foliage soon becomes involved. In the advance stage the tips and margin of the leaves roll up. The large spots frequently show concentric markings. Because of its slow progress it is usually mistaken for the natural ripening of the plants. The development of the tubers stop as soon as the leaves become thoroughly involved, and the yield is often cut short as much as 20 barrels per acre. Plants which are weakened from any cause are liable to be invaded by this fungus. Bordeaux mixture will hold this disease in check. Applications of this mixture should be made when the plants are four inches high, and repeated at intervals of about ten days until six applications have been made.

Phytophthora infestans (De By.)

Late Blight—This disease invades all parts of the plants and tubers. The first sign of its presence is the appearance of small brownish or black areas on the leaves. These areas which rapidly increase in size followed by the curling of the leaves. If a spell of warm, moist weather follows, the leaves and stems turn black and decay within a few days, giving off a disagreeable odor. Badly infected plants have only small tufts of green leaves at tips of stalks. Many of the leaves hang shriveled as if scorched by fire. The under surface of the diseased leaves are covered with mildew. This mildew is composed of minute, tree-like, branching structures which support a

minute, egg-shaped spore (seed) at the tip of each branch. When a spore falls on the moist surface of a leaf it pushes out a slender, colorless thread which soon enters the leaf, and if the weather conditions are favorable, it soon completely penetrates and kills the leaf. It usually takes about five days from the time the spores germinate until a new crop of spores are formed. This explains why the disease spreads so rapidly. The tubers of infected fields may, or may not, rot. This depends largely upon soil and weather conditions. This rot is worst on heavy soils. The fungus has no winter spores. It is believed to pass the winter in the tissue of the tubers, consequently too much care cannot be exercised in selecting clean, healthy seed. Thoroughly spraying the plants with Bordeaux mixture will hold the disease in check.

Fusarium *Oxysporium* (Schlechtendal).

Dry Rot—Attacks all parts of the potato plant below ground. The first indication of the disease is a change in the appearance of the leaves, which take on a lighter green color and roll up, followed by a gradual drying up and premature death of the plant. However, if the plants are not attacked until they have about completed their growth these early symptoms are often lacking. The upper part of the shoots become flabby, droop and die, usually taking on a dark brown color. When infected tubers are first dug they appear sound, but while they are stored the fungus gradually works inward, following the vascular ring. (This ring soon takes on a brown or black color). The fungus usually gains entrance at the stem end. Black streaks extending from the stem into the flesh is a reliable symptom of this disease. Infected ends

rot and shrivel, and because of this peculiarity the disease is often spoken of as dry end rot. The hyphae (feeding threads) which occur abundantly in the diseased tissue, often appear on the surface of the tubers in dense, white tufts. These soon bear small oval spores (seeds) and later a larger, curved, septate form. If these spores fall on the moist, injured surface of tubers and plants, they germinate and develop new points of infection.

This is a wide-spread and destructive disease. It is a difficult matter to find a lot of seed which is not more or less infected with it, and it is not uncommon to find as high as 25 per cent of our seed completely rotted by it. Frequently tubers which are healthy when they are cut, are completely rotted by this fungus before the plants reach the surface of the ground. This is especially noticeable when the germination of the seed is checked by unfavorable weather conditions. In such cases the fungus gains entrance through the cut surface. The rotting of the seed in various sections of the State during the past winter was due largely to the work of this organism. In a number of fields which came under our observation, as much as 60 per cent of the seed was rotted by this fungus after it had been cut for planting.

The infection in most cases was largely due to carelessness in mixing diseased seed pieces with healthy ones. The spores falling on the cut, moist surface soon germinated and invaded the tuber. The planting was followed by a spell of cold weather which retarded the germination of the seed, thus enabling the fungus to consume the tuber before the young plants reached the surface of the ground. In fields where the planting was followed by more favorable weather conditions, the stand was much better, still many of the

seed tubers were sooner or later completely destroyed by the fungus, but the plants were fairly well established before the destruction of the seed. When the disease is once introduced in the field it is apt to remain in the soil for a number of years, hence it is desirable to practice a systematic rotation of crops.

Carefully selecting clear smooth seed and rejecting from time to time all tubers showing any sign of rot, also aids materially in checking the spread of the disease. Exposing the seed to the light from four to five weeks before planting is an excellent practice. This treatment tends to hasten the germination of the tubers after planting and enables the plant to become established before the seed tuber is entirely destroyed.

Bacillus Solanacearum (Smith.)

Bacterial Wilt—A very common and destructive disease. This disease causes the foliage to wilt, and later, the stems and branches become discolored and die. Infection may occur either above or below the ground. The disease also produces a brown or black rot of the tubers. This organism also attacks egg plants and tomatoes.

Select clean, smooth seed, rejecting all those showing black end vascular bundles. Expose the seed to the light four or five weeks before planting.

Corticium Vagum Var. Solani (Burt).

Rhizoctonia—A wide-spread disease. It is usually most troublesome on low lands but during excessive wet weather it also causes more or less loss on the higher lands. The young plants suffer most, and many of the young shoots are completely cut off before they reach the surface of

the ground. This disease also frequently produces injuries which bring about an abnormal development of small tubers. It is also injurious to the surface of growing tubers and frequently produces a rough surface known as scab.

This fungus forms a white felt-like fruiting membrane on the green stems just above the surface of the ground, often covering the stems for a distance of three inches. This membrane is composed of a network of hyphae which produce many short, club-shaped branches (basidæ) on which small stalks (strigmata) develop. At the end of each strigmata a single, brown spore (seed) develops. These spores fall as soon as they mature. If they fall on a moist surface they germinate in a few hours and thus may start new areas of infection. It is also propagated by black scale-like bodies called sclerotia. These form freely on the stems and tubers below the surface of the ground. The sclerotia are composed of large, closely packed cells. When dry, the sclerotia are hard to detect, but when wet, they are dark brown and easily seen. Tubers which are more or less covered with these bodies ought not to be used for seed, since the cells of these sclerotia develop into long, feeding threads, which, under favorable conditions, soon invade and frequently destroy the young shoots. A diseased tuber in a sack of clean ones under favorable conditions of heat and moisture, may spread the disease to adjoining tubers and in time infect the entire lot. Carefully selecting clean, smooth tubers and exposing them to the light from four to five weeks before planting, gives excellent results. When the fungus is once introduced into a field it remains in the soil a number of years. Good drainage and careful cultivation aids ma-

terially in checking the progress of the disease. Burning all old stems and tubers, after the harvest, is an excellent practice. A systematic rotation of crops is strongly recommended.

Oospora scabies (Thaxter).

Scab—Attacks only the tubers. The skin of the tubers becomes pitted and frequently cracks. These injuries form a gateway for an invasion of various fungi and insects, which in many cases extend the injury. Beets are also attacked by this organism. Infected tubers are the principal means of spreading this disease. When once introduced into a field it remains in the soil for years.

Treating infested seed with a solution of one ounce of corrosive sublimate to eight gallons of water for one and one-half hours, and one week before planting, gives good results, provided the treated seed are planted in soil free from the organism. A systematic rotation of crops gives good results.

Vermicularia.

Anthracnose—Quite destructive to our summer crop. The first account of this fungus was given by Dr. Halstead. It attacks the stems and may cause premature death of the plant. Spraying with Bordeaux mixture would probably hold this disease in check. Burning all of the diseased vines as soon as the crop is harvested is strongly recommended.

Bordeaux Mixture—Has proved the most efficient spray for both Early and Late Blight, but it is simply a preventive, and not a cure for these diseases. It is very essential that the spraying be done at the right time. If the treatment is delayed until signs of damage appear, very

little good will result. Spraying, to be effective must be done before any signs of disease appear, and it must be done thoroughly, for unless the entire surface of the plant is covered by the mixture some of the spores of the fungus will fall on the unprotected spots and gain entrance to the plants. Frequent applications are necessary, especially if sufficient rain falls to wash off the mixture. The following is the standard formula for Bordeaux mixture:

| | |
|---------------------------|----------|
| Copper Sulphate | 6 lbs. |
| Fresh Lime | 4 lbs. |
| Water | 50 gals. |

Potato vines require from 2 to 6 barrels of this mixture per acre, according to the size of the plants. When spraying is done on an extensive scale it is usually convenient to make up a stock solution of copper sulphate. Suspend a coarse sack containing 45 pounds of copper sulphate into a barrel containing 45 gallons of water. The copper sulphate should be placed near the surface of the water a day or two before it is to be used. Stir this solution thoroughly before using, and one gallon of it will contain one pound of copper sulphate.

A quantity of fresh lime may also be slackened and placed in a barrel, and if it is covered with a few inches of water it can be kept in an excellent condition for some time.

To prepare a mixture from these solutions, take six gallons of copper sulphate and place it in the spray barrel, and add 19 gallons of water. From the slackened lime take four pounds of the paste, dilute it with 25 gallons of water and add it to the copper sulphate solution. All the materials ought to be passed through a sieve so as to exclude the particles which might clog the nozzles.

If the "bugs" are plentiful add one pound of Paris Green to 50 gallons of the above mixture. A paste should be made of the Paris Green by mixing it with a small amount of water before putting it into the sprayer.

Potassium ferro-cyanide, is used to determine if enough lime has been added to combine with all the copper sulphate. It is a yellow poisonous salt which dissolves readily in water. Ten cents' worth dissolved in about ten times its bulk of water will ordinarily be enough for one season. In using this test, pour into your spray barrel 25 gallons of the milk of lime. Stir the mixture thoroughly and add a drop of the potassium ferro-cyanide. If enough lime has been added the drop will not change color when it strikes the mixture; however, if sufficient lime has not been added it will immediately change to a dark reddish brown color and more lime must be added. Even after the test shows no color it is best to add a little more lime.

Corrosive Sublimate Treatment for Scab—Corrosive Sublimate or bichloride of mercury is sold in form of white crys-

tals. It may be bought at any drug store for about fifteen cents an ounce. The cost of material for treating the seed for an acre will not exceed fifty cents. The solution is made by placing one ounce of this chemical in an earthen or wooden dish containing one gallon of hot water. As soon as it is all dissolved pour the contents of the dish into a wooden vessel containing seven gallons of water. Put the potatoes into this solution, and let them remain an hour and a half. The solution may be used a number of times. The disinfection may be done at any time. Experiments indicate, however, that treating the tubers about a week before planting, and spreading them on the floor or ground where they will be fully exposed to the light, greatly facilitates their growth after planting. Corrosive sublimate is a deadly poison to both man and animal when taken internally, but the solution and treated potatoes may be handled freely without experiencing any ill results.

Formula.

| | |
|--------------------------|--------------|
| Soak potatoes..... | 1 1-2 hours. |
| Corrosive Sublimate..... | 1 ounce. |
| Water | 8 gallons. |

Commercial Stock Food Law.

By R. E. Rose.

Mr. President, Ladies and Gentlemen:

The necessity for a "Commercial Stock Food Law" similar to our fertilizer law in this State, has been recognized by retail dealers and consumers for years.

The fact that other States have enacted such laws, requiring the analysis, inspection, and guarantee, of commercial feed stuffs, while Florida has not, has caused this State to become the dumping ground of large quantities of material which could not find a market in other States. During the past four years, while I have had the honor to serve the State as State Chemist, numerous samples of feed stuff, good, bad, and indifferent, have been sent to the State Laboratory for examination. My predecessor informs me, and the records of the office show, that for years, complaints have been made as to the quality of commercial feed stuff sold in the State; while at all times the information required, as to quality and value of samples sent in has been given, it has been simply as personal information, no relief could be given officially, and the party defrauded had no resource, except a suit at common law for damages. Adulterated or inferior commercial feed not being prohibited, no penalty for false statements or misrepresentations being provided, the retail dealer and consumer were at the mercy of the manufacturers, brokers, importers, or wholesale dealers. To such an extent had this evil

grown, that a general protest from the retail dealer and consumer, created a demand for a law regulating the sale of commercial feeding stuffs in this State. While the State chemist has received and examined numerous samples of inferior feeding stuff from various parts of the State, there has also been analyzed by the chemist of the State Experiment Station, a number of samples taken from various parts of the State, with results confirming those made by the State Chemist, showing the general inferiority of the stock feed sold throughout the State. This investigation made the State Experimental Station, and the State Agricultural Department, while along the same lines, and caused by the same general protest and popular demand, was entirely independent; in fact, neither Department knew of the other's work, until the bill now before the Legislature had been presented. It is gratifying to myself, and certainly must also be to Prof. A. W. Blair, to know that the labors of each, for the benefit of the feeder and other citizen of the State, has lead to a concerted effort to remedy the evil, borne long and patiently by the people of the State.

Special Bulletin number 30, of the Florida Experiment Station, by A. W. Blair, M. A., Assistant Chemist, "The composition of some of the concentrated feeding stuffs on sale in Florida," so ably and logically states the general conditions, and so fully confirms my opinion, and

position, on this most important subject, that I take the liberty of quoting largely therefrom, and suggest to all consumers of feeding stuffs in the State, to send to the Experiment Station at Lake City, for a copy of this "Special Bulletin, No. 30." Professor Blair says, "The fact that Florida is largely a vegetable and fruit growing State, has seemed to render necessary the importation, from other States, of large quantities of concentrated feeding stuffs. I have no means of verifying the statement, but I believe that I am safe in saying that in proportion to the population and the number of farm animals, no other State in the Union imports such large quantities of these materials for home consumption.

The Necessity for a Feeding Stuffs Inspection Law.

The question as to the quality of these goods seems never to have troubled us seriously. We have been content to take what the manufacturer is pleased to send us, and if the quality has been poor, either the animals have suffered or we have been compelled to buy an additional quantity to compensate for the inferior quality, or both. On the other hand we have not been content thus to accept what the manufacturers of fertilizers were sending us, but have required them to state the ingredients used in the manufacture of the goods, and guarantee that they will, on analysis, show a certain percentage of the fertilizing constituents—plant food; and we have further clothed the State Chemist with power to collect and analyse samples and publish to the State the results of his work, in order that the farmer and fruit-grower may be protected from the sale of adulterated goods.

But a large quantity of commercial fer-

ttilizers used in the State is manufactured here, and to say to the fertilizer manufacturers of this State, "You must make your fertilizers, which you furnish us for growing our crops, come up to a definite guarantee," while we say to the manufacturers of concentrated feeding stuffs in other States (for practically all the ground products on the market come from other States.) "You may send to us for feeding our stock whatever grade of goods you choose," does not seem entirely just to the manufacturers of fertilizers.

It is perhaps, true that greater loss would result from the use of inferior fertilizers than from the use of inferior feeding stuffs, and that it is easier to practice deception with the former than with the latter, still this does not make it less important that he who buys feeding stuffs should be protected from inferior and fraudulent goods. The great variety of mixed feeds, and proprietary feeds makes it comparatively easy to deceive even those who have had considerable experience in handling such goods. How many of those who buy feeding stuffs can say that they do not contain ground corn cobs, rice hulls, corn bran, etc., any more than the farmer can say that his fertilizers do not contain low grade materials worth but little more than half the price asked for them? The fact that the following State viz.: Maine Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, North Carolina, Maryland, Tennessee, Indiana, Wisconsin, Pennsylvania, Louisiana and Ohio, now have feeding stuff laws in operation, would seem to indicate pretty clearly that there is need to guard against adulteration and fraudulent practice. This fact in itself ought to be sufficient to bring us to

our senses; for we need not think for one moment that the manufacturers will stop placing upon the market inferior goods, so long as there are places like South Carolina, Georgia, Florida and Alabama to be used as dumping grounds for what more than half the States east of the Mississippi will not have.

Believing that this condition existed, the Chemical Department of the Experiment Station began, last November, an investigation with a view to ascertaining the exact extent to which low grade and adulterated feeding stuffs are being placed upon the market.

Samples were secured from the various sections of the State, largely through students of the University who went to their homes at the Thanksgiving and Christmas vacations.

They were instructed to secure samples of the different concentrated feeds, which should, so far as possible, represent the whole lot from which they were taken, and also to secure the trade name, name and location of the manufacturer, and the selling price per sack of 100 pounds, or per ton, in the case of wholesale dealers. The names of dealers are reserved, since it is not intended to work any hardship to the wholesaler or retailer, so long as there is no law requiring them to maintain a certain standard.

As a result of this, forty-three samples, representing a considerable variety of feeding stuffs, and collected from different parts of the State, have been analyzed. It would have been much better could the number of samples and localities represented been greater, but the limited time and pressure of other work did not permit this.

It is believed, however, that the work represents, fairly well, the feeding stuffs

on sale throughout the State.

Taking up first the brans and comparing their protein and fat content with the standard we find that all of the samples examined fail to come up to the minimum standard requirement in protein—15 per cent.

Number 1799 is very low in protein and fat, while the fibre—indigestible part—is over 17 per cent, whereas, in good wheat bran it should not much exceed 9 per cent. This sample was highly adulterated with ground corn cobs and screenings.

Number 1714 contained wheat chaff, corn bran, and various pieces of foreign matter, indicating mill sweepings. Numbers 1726, 1730, and 1731 contained corn bran; 1807, dirt and oat chaff, and 1831, chaff, corn bran, and other foreign matter, probably mill sweepings. The average retail price for eight of the twelve samples is \$1.38 per sack of 100 pounds, (27.60 per ton,) which is undoubtedly excessive when it is remembered that not one of the samples comes up to the minimum standard for pure wheat bran.

Six samples of Purina, four of Victor and one each of Boss, Parcell and Mack's Mule Feed, are corn and oat feeds, and are composed of cracked corn, ground or crushed oats and oat hulls, the oat hulls in most cases predominating. These are no doubt, the product of cereal food mills, and furnish a means of disposing of the oat hull at a good profit. They have a fair feeding value, though in most cases this is not in proportion to the price asked for them. Certainly this can be said of those obtained at Dania and Hallandale.

The average protein content of the four samples of Victor Feed is only 7.62 per cent, while the fat is 3.05 per cent, and in this connection it is interesting to note that five samples of Victor Corn and oats

feed manufactured by the American Cereal Company and analyzed at the New Jersey Station, have an average of 8.64 per cent of protein and 4.50 per cent of fat, and five samples analyzed at the Connecticut Station gave 8.26 per cent protein and 3.93 per cent of fat, and sold at an average price of \$25.40 per ton. Both New Jersey and Connecticut have inspection laws.

The sample of Mack's Mule Feed is very low in protein and fat, and high in crude fiber and ash, indicating clearly the predominance of oat hulls.

Number 1805, sold under the name of Yellow Meal, is cotton seed meal adulterated with hulls, making the protein content about 13 per cent lower than it should be, for the price asked—\$27.00 per ton.

Atlas Dairy Feed, number 1738, is a product of the sugar factories, and is made by drying and grinding the bagasse, soaking in molasses, and again drying. Its value as a feeding material, is probably not yet well established in this State.

Marsden Food, number 1829, is ground straw, probably oat straw, and has about the feeding value of oat straw.

The wiregrass hay which grows abundantly in the pine woods of Florida, contains more protein, and more than twice as much fat, as does this material, and would no doubt be about as easily digested. But either beggarweed, cow pea, or velvet bean hay contains anywhere from two to five times as much protein, and would certainly not cost any more, if as much, as does this high-sounding "Marsden Food." Judged by the samples examined, a large proportion of the concentrated feeding stuffs on the Florida market is of an inferior quality.

All of the samples of wheat bran ex-

amined are below the minimum standard for good wheat bran.

Some materials, as "Marsden Food," are sold at unreasonably high prices.

The adulterants found were rice chaff, wheat chaff, oat hulls, ground corn cobs, corn bran, screenings, weed seeds, dirt and other foreign matter, indicating mill sweepings.

Practically all the concentrated feeding stuffs used in this State are imported, and this constitutes a constant drain upon the wealth of the State.

Florida can and should produce much more of her feeding materials than she is producing, and thus save to the State thousands of dollars. Where the farm crops furnish sufficient carbohydrates, only feed stuffs rich in protein should be purchased. The mixtures of corn and oats, containing as they do, large quantities of oat hulls are not economical protein feeds.

There is so much profit in selling ground corn cobs, wheat chaff, oat hulls, corn bran, rice hulls, etc., and at the price of wheat bran, that the consumer must ever be on the watch. A careful examination with the eye or with the help of a small magnifying glass will often reveal these adulterants.

Those who buy feeding stuffs should have the same protection as those who buy fertilizers. Such protection would promote the interests of the honest manufacturer and dealer, diminish the sale of worthless materials, and instruct the people in regard to the composition of feeding stuffs and their comparative value."

While Professor Blair's samples were average samples, those examined by the State Chemist were generally inferior samples, naturally the purchaser finding an unusually poor result, or evident adul-

teration, sends his sample to the State Chemist; which he would not do were the goods at all satisfactory. The consequence has been that all the samples examined by the State Chemist have been of inferior value as compared to those taken generally throughout the State.

As an example, I quote the analysis of a popular feed sent for examination by a Jacksonville wholesale dealer, whose customers had complained of the quality of the feed, and suspecting it of causing the death of his live stock, which is possibly did, an account of the large amount of indigestible fibre:

"Number 332 Stock Feed
 Protein 10.50 per cent.
 Fats 1.31 per cent.
 Starch and Sugar . . . 31.95 per cent.
 Fibre 53.25 per cent."

More than half this feed was fibre, largely indigestible. The commercial value of this sample compared to standard feeds is not to exceed \$17.15 per ton, while it is quoted in Jacksonville to-day at \$26.00 per ton.

[The law advocated above was passed by the last legislature. A law similar to and with same provisions as to guarantee of valuable ingredients, as our fertilizer law, with similar penalty and method of execution, drawing of samples and analysis by State Chemist.—Secretary.]

Some Invitations.

The Florida State Horticultural Society is always the recipient of numerous invitations, some of which it cannot accept on account of time, and others are accepted because time is so arranged that the meetings are not interfered with, and the interest, instruction and social functions of the society are thus broadened and enjoyed by all.

E. O. Painter Fertilizer Co.'s Invitation.

Mr. President, Ladies and Gentlemen:

Knowing that many of the horticulturists have never had the opportunity of inspecting an acid-making plant, and be-

lieving it would be of interest to them, I, therefore, invite your honorable body to visit our plant, in South Jacksonville, on Wednesday, May 10th, at noon. I have arranged with the ferryboat, which leaves at the foot of Main street at 12 o'clock sharp, to take over all members. It will be necessary for the meeting to adjourn at ten or fifteen minutes to 12 o'clock to give the members ample time to reach the ferry-boat, which will take them across to the plant.

I will add, that somewhere on the route a lunch will be served so that the members can return in plenty of time to open the

afternoon session at 2 o'clock. Ladies are especially invited.

Yours respectfully,

E. O. PAINTER,
President E. O. Painter Fertilizer Co.

Mr. McCarty—Mr. President, I move that the society accept Mr. Painter's kind invitation, under the provision, however, that he fumigate the acid chambers, throw a tarpaulin over his blood and bone, and will agree not to give us any dissertations upon fertilizers, for we should all I am sure like to visit this large establishment, and see for ourselves where and how the fertilizer manufacturers get such euphonious and sweet-sounding if not fragrant names as "Simon Pure," "Gem" and "Ideal" as applied to some of these goods we pay the handsome price of \$40 to \$45 per ton for.

Mr. E. O. Painter—Mr. President, I can assure Mr. McCarty that the bad odors will be kept under subjection, and the most fastidious will have no cause for offense, but whether he will enjoy the ammonia, potash and phosphoric acid that he will partake of during the lunch remains to be seen.

The invitation was unanimously accepted.

Captain Garner's Invitation.

The President—The chair desires to announce to the society that Captain C. E. Garner is with us, and desires to extend personally an invitation for some entertainment of the society.

Captain Garner—Mr. President, Ladies and Gentlemen: The Jacksonville Board of Trade has arranged, as a portion of your entertainment during your deliberations, an excursion on the St. Johns river

on the Steamer May Garner. The steamer will leave her docks at 10:30 A. M., and I wish to extend to you one and all a cordial invitation to go on this little river trip, which I trust you will find pleasant and refresh you for your afternoon's session.

The President—The chair, for the society, extends to Captain Garner and the Jacksonville Board of Trade the heartfelt thanks of the society for his kind invitation, which is accepted.

Wilson & Toomer's Invitation.

Mr. President, Ladies and Gentlemen:

The excursion planned by the Board of Trade to-morrow on the St. Johns river does not provide for any objective point, and if it should meet your pleasure we should like very much indeed to have you stop at "Idealia," and look over our new modern fertilizer factory, which we believe would prove instructive as well as interesting to a great many members. And while you are in that locality you would also see the new improvements being made along the river front, the large export yards of the Atlantic Coast Line and also the Florida Naval Stores Co., as well as other industries that are being started in that section.

Trusting we may have the pleasure of showing you through our factory, we are,

Yours respectfully,

LORENZO A. WILSON,
President Wilson & Toomer
Fertilizer Co.

Mr. Painter—As the excursion has no objective point to which to take the members, I move that the society accept Mr. Wilson's invitation so that the members can see the improvements made in that section.

From the Elks.

The President—The chair desires to announce that we have with us his Honor Mayor Nolan, who wishes to extend to the society an invitation.

Mayor Nolan—Mr. President, Ladies and Gentlemen: The Jacksonville Elks Lodge has arranged for an illustrated lecture to-night at the Windsor Hotel Auditorium, and I am commissioned by the Jacksonville Lodge of B. O. E. to extend to you one and all an invitation to attend the lecture. Mr. President, should I not have the pleasure of meeting with you again during the deliberations of this ses-

sion, I trust I may have that pleasure at your next annual session. Jacksonville, as she has always in the past, desires to extend to you at all times a most cordial invitation to hold your annual sessions in this city, the metropolis of your State.

Mayor Nolan's remarks and invitations were received with applause.

The President—The Florida State Horticultural Society, through its President and presiding officer, desires to tender the heartfelt thanks of the society for the kind invitations just extended, and particularly to the invitation touching the holding of the next annual session of this society in the city of Jacksonville.

For Betterment of Report.

Mr. Hart—Mr. President, before we proceed to the reading and discussion of papers, I desire to call the attention of the society to the unsatisfactory stenographic report of the proceedings of the last annual meeting of the society. I assume it is unsatisfactory, it is very much so to myself, as I have been very incorrectly reported, and will not stand for anything in the last report under my name except the Treasurer's account. I note similar complaints from other members. I have been an officer of the society for a good many years, and was Secretary, either by election or as assistant, for seven years, and know that a stenographer's report is a strange and wonderful thing to deal with. I have always found it very difficult to get a satisfactory report

of our proceedings; and one that is misleading I consider very hurtful to the society. I would like to have some suggestion from other members as to the betterment of the service we have heretofore had in this very important matter.

Sending proof to each one for correction who takes part in the discussions seems to be the surest means of improvement, and I would recommend it.

The President—The chair concurs in the remarks of Mr. Hart; it is the opinion of the chair, however, that the Secretary has had the matter of betterment of this very important service under consideration for some time. It seems to be a very difficult matter to secure competent service. While I believe the society has at all times availed itself of the very best assistance in

this direction that could be secured for the money we have paid for it, I believe proper steps have been taken by the Secretary in conjunction with the Executive Committee to secure the future betterment of this very important work. At a later hour during the session, the Secretary will bring the matter of his action in the premises before the society, which the chair believes will meet with the approval of the society.

Mr. Painter—Reverting to the matter of reports of our annual meeting, I believe I have been able to arrange for a report that will be satisfactory to the society. I find it to be a hard matter to get anyone to take these proceedings at any price, or at least at a price the society could afford to pay. The gentleman, Mr. W. G. Powell, now with us, who undertakes this important work for the society, at this session was reported to me to be one of the most experienced men in the State, and upon careful investigation I was convinced that if he would undertake the report for the society he was able to give us a good, comprehensive report. Mr. Powell at first declined to accept this work, knowing, as he put it, what he would be up against, but reconsidered and accepted it. I am assured that this report of our annual proceedings will be the best that can be had. I would therefore move that the Secretary be empowered to pay for this service as per contract agreed upon with him by and with the approval of the Executive Committee.

The President—The society would be pleased to have any suggestion that Mr. Powell may be able to offer for the betterment of this important service.

Mr. Powell—Mr. President, I have had a long experience in reporting the proceedings of deliberative bodies and assemblies in this State, during which time I have

handled the annual proceedings and report of a great many deliberative societies, including our legislative proceedings from time to time, and I beg to assure you that the most arduous duties devolving upon any member of your society is the work of your secretaries and scribes. It has ever been and ever will be from the notes of the scribe that history is written. An old Egyptian proverb says: "The scribe gets everything." He does, but he can't use it, (and an afterthought also reminds me that recent investigations reveal a literal translation from ancient cuneiform tables that "scape-goat" could easily be rendered "scribe!") Seriously, though, Mr. President, it is impossible for a reporter single-handed to make a verbatim report of a large deliberative body. Such a service would cost a great deal of money. It would take a corps of three reporters and three scribes, therefore the best that can be done is to take as full note of the proceedings as may be. From such full data a competent scribe may with facility transcribe and compile a very comprehensive and satisfactory report. Indeed this is the way the history of all deliberative bodies is written. To be able to do this even the reporter must have at his fingers' ends a fund of general encyclopedic knowledge. To be able to perfectly report the proceedings of a society of this character he should know the faintest sound of every technical term in Bailey's work; he should be a botanist, a chemist, and know Cushing by heart. If he would report the proceedings of a medical society, he must know medical jurisprudence and the general history of hygiene. If he would report legislative proceedings, he must know political economy and the history of the world. If he would report a bankers' association, he ought to be the composite

of a John Law, a Lawson and a national bank examiner. As a rule, Mr. President, he is rarely, if ever, any of them. If he were he would not be a scribe, but he must at least have some intuition of what he is to report, some general knowledge of the work undertaken. This alone, Mr. President, is all that I possess, which, with my long experience and the assistance of the officers of your societies, has enabled us to write the history of many of the deliberative bodies of our great and growing State, and gives me the assurance to say that the report of this session of your society will be one of the best it has ever had.

The President—The society has had considerable trouble in the matter of its reports, but the chair believes that the arrangement now made by the Secretary and Executive Committee has been for the betterment of that service, and that the report of the present session will be all that could be desired. The question comes upon the motion of the Secretary that he be empowered to pay for this service as per contract for same made by and with the consent of the Executive Committee. All in favor of the motion will say aye; those opposed, no; the ayes have it. It is so ordered.

Legal Size of the Orange Box.

The following law relating to the size of the orange box was passed by our last legislature:

Chapter 5485—(No. 114).

AN ACT to Fix and Establish a Legal and Standard Box or Crate for Oranges.

Be it Enacted by the Legislature of the State of Florida:

SECTION 1. That hereafter the legal and standard box or crate for oranges shall measure twelve (12) inches in width and twelve (12) inches in depth on the inside, making each end or compartment of said box or crate, whenever the same contains a middle partition, twelve (12) inches in length, twelve (12) inches in depth, and twelve (12) inches in width. No crate or box intended for the sale or shipment, or

delivery for sale or shipment of oranges, except of the standard measure herein specified shall be manufactured or sold.

SEC. 2. Every box or crate used for the sale or delivery of oranges shall be of the Florida standard measure, as above provided. No person shall use any crate or box for such sale, shipment or delivery, except the same be of such standard measure. Any person violating any of the provisions of this act shall be deemed guilty of a misdemeanor and on conviction thereof shall be punished by a fine not exceeding one hundred dollars (\$100.00) or by imprisonment in the county jail not exceeding thirty (30) days, or by both such fine and imprisonment. *Provided,* that nothing herein contained shall prevent the shipment or delivery of oranges for

sale in half boxes as herein described; *Provided*, that nothing in this act shall prevent any person shipping oranges in barrels or other crates over standard size.

SEC. 3. All laws and parts of laws in

conflict with the provisions of this act be, and the same are hereby repealed.

SEC. 4. This act shall take effect January 1, 1906.

Approved June 5, 1905.

The White Fly Act.

The following act was passed by the last legislature relative to groves, orchards and fruit trees in Orange county:

Chapter 5551—(No. 180).

AN ACT for the Protection of the Groves, Orchards and Fruit Trees of Orange County from Injurious Insects, and Providing for a Horticultural Commission for Said County for that Purpose.

Be it Enacted by the Legislature of the State of Florida:

SECTION 1. That if there shall be presented to the Board of County Commissioners of Orange county a petition signed by at least twenty-five freeholders of citrus grove property situate in said county, and setting forth that citrus groves, orchards, nursery stock, or fruit trees in said county are infested with white fly, and praying for the appointment of a horticultural commission, the Board of County Commissioners, if it has reason to believe the allegations of the petition to be true, shall appoint a horticultural commission for said county within thirty days after the presenting of the petition.

The horticultural commission shall consist of three commissioners who shall be

citizens of the State, resident in Orange county, and men well skilled and experienced in the care and management of orange and other citrus fruit groves. They shall hold office for the term of two years from the date of their appointment unless the Board of County Commissioners shall determine that no reason exists for the further continuance of the commission. The Board of County Commissioners may fill any vacancy of the commission by appointment for the unexpired term, and may remove any commissioner if good cause is shown.

SEC. 2. Each horticultural commissioner shall before entering on the duties of his office give a bond to the county in the sum of one thousand dollars conditional for the faithful performance of his duty as such commissioner, with sureties to be provided by the Board of County Commissioners and shall also file with the clerk of the Board of County Commissioners an oath that he will faithfully discharge his duties as horticultural commissioner of Orange county.

SEC. 3. The horticultural commission shall, after qualification, meet and organize with the election of one of its members as

chairman, and thereupon it shall become its duty to supervise the methods and means taken for the abatement and destruction of the white fly. It shall, as soon as possible, with the approval of the proper officials in charge of the Agricultural Experiment Station in the University of Florida and of the Board of County Commissioners of Orange county, make rules prescribing formulas and methods for the treatment of citrus groves, orchards, yards, nursery stock, trees of any kind, shrubs, plants or fruit infested with the white fly, and also prescribing the methods, time and frequency of application, and shall have said rules published for free distribution.

SEC. 4. The commission or any one of its members shall have power to examine any citrus grove, orchard, yard, nursery stock trees of any kind, shrubs, plants or fruit for the purpose of determining whether the white fly exists therein or thereon, and if the same shall be found infested, the commission shall notify the owner, agent or person in charge, in writing that the same is infested, and shall serve him with a copy of the said rules and shall require him to treat the same according to said rules beginning at a specified time, which notice may be signed by any member of the commission and shall be served by any commissioner or by any person appointed by the commission for that purpose in the manner directed for the service of a writ of summons. The commission shall keep a record of all such notices and of the name of the person upon whom and by whom and when the notice was served. If any owner or agent of any vacant property cannot be found in the county, the commission may enter for the purpose herein-

after provided without such notice. If the owner, agent or person in charge neglects or refuses to comply with the notice for one week after the expiration of the time named therein, the commission or any commissioner may enter the property described in the notice and proceed to make treatment at actual cost for the white fly according to the commission's published rules. In such case the commission shall, when the treatment at that time is completed, render to the owner, agent or person in charge an itemized bill of the actual cost of the treatment aforesaid, including the necessary per diem of one commissioner and a statement of the time when the said bill will be presented to the Board of County Commissioners. At the specified time a duplicate of the bill verified by affidavit of at least one of the horticultural commissioners shall be presented to the Board of County Commissioners, and upon a hearing the Board of County Commissioners shall allow the said bill or such part of it as shall appear to them to be proper and just, and if the said bill be not paid by the owner, agent or person in charge, it shall be paid out of the general revenue fund of the county, and such payment by the county shall be a lien upon the property treated, and notice of such lien shall be filed and recorded in the office of the clerk of the Circuit Court of Orange county within sixty days after the warrant for the payment aforesaid has been drawn in like manner as notices of lien of mechanics and material men are filed. Such lien may be foreclosed in chancery, but no bill for foreclosure shall be filed until one year has elapsed from the recording of the lien.

SEC. 5. The Board of County Commissioners shall purchase the necessary ap-

paratus and materials for making the treatment and carrying out the rules aforesaid, and upon the request of any owner, agent or person in charge of any infested place as aforesaid, shall treat same as aforesaid at actual cost: *Provided*, That the cost, if required, be first paid or secured. Whenever the horticultural commission shall report to the board that any wild or uncultivated land is infested with the white fly, the said board may order the same treated at the expense of the county.

SEC. 6. The members of the horticultural commission shall be paid \$2.50 for each day they are actually engaged in the discharge of the work of the commission, and this compensation shall be paid by the Board of County Commissioners out of the general revenue fund: *Provided*, That the per diem of one commissioner shall be included as part of the amount for which any lien is filed. The Board of County Commissioners is hereby authorized and directed to pay such sums as may be necessary out of the general revenue fund to carry out the provisions of this act.

SEC. 7. The horticultural commission shall make full quarterly reports to the Board of County Commissioners showing what work, if any, has been done, and the character and kind of insect pests found and the remedies applied and the result of such remedies. In case any San Jose scale is found within the county the proceedings shall be the same as hereinbefore provided for the white fly, except that only one board of horticultural commissioners shall at any one time exist in Orange county. If the Board of County Commissioners should at any time abolish the horticultural commission as hereinbefore provided, and a new petition as prescribed by Section 1 shall be presented, the Board of County Commissioners may appoint another horticultural commission, if it thinks proper so to do.

SEC. 8. This act shall take effect immediately upon its approval by the Governor.

Approved May 27, 1905.

**FLORIDA
STATE HORTICULTURAL SOCIETY.**



CATALOGUE OF FRUITS.

1905.

CATALOGUE OF FRUITS.

ADOPTED BY THE SOCIETY AT THE EIGHTEENTH ANNUAL
MEETING.

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.

H. HAROLD HUME,
E. N. REASONER,
W. S. HART,
Committee.

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., Originated in Florida.
O., Oriental.
S. A., South America.
W. I., West Indies.

ORIGIN—(Referring to sweet 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.

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.

SWEET 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 has been deemed advisable to omit the names of many varieties which have disappeared from cultivation. The list, however, is still large.

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. | | | Western North Fla. | Eastern North Fla. | Central Florida. | Southern Florida. |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | | | | |
| SWEET ORANGES — <i>Citrus aurantium dulcis.</i> | | | | | | | | | | | | |
| 1 Bessie..... | St M | d s | | r | o | g | l | | | | | * |
| 2 Boone (Boone's Early) | Mal | d s | m | r o | o | v g | v e l | g | p p | | | ** |
| 3 Brazilian | St M | d s | m | r r | o | b | e m | v | | | | * |
| 4 Centennial | St M | d s | m | r r | o | g g | m | v | | | | * |
| 5 Drake Star | St M | d s | l | r r | o | g f | l m | v | | | | * |
| 6 Du Roi | St M | d s | m | r r | o | f | v e | g | p | | | * |
| 7 Early Oblong (St. Michael Egg) | Sev | d s | m | e | o | v g | e e l | g | p | | | * |
| 8 Enterprise Seedless (Starke Seedless) | Sev | d s | m | r r | o | g g | v l | g | v g | | | ** |
| 9 Foster | St M | d s | m | r r | o | g g | v v l | g | p p | | | ** |
| 10 Hart (Tardiff, Brown, Excelsior) | St M | d s | m | r r | o | g g | v v l | g | p p | | | ** |
| 11 Higley Late | St M | d s | m | r r | o | g g | v l | g | p p | | | * |
| 12 Homosassa | Sev | d s | m | r r | o | v g g | m | v | p p | | | * |
| 13 Jaffa | Mal | d s | m | r r | o | b | m m | g | p p | | | * |
| 14 Lamb Summer | St M | d s | m | r r | o | b | v l | v | | | | * |
| 15 Madam Vinous | St M | d s | m | r r | o | v g | m | v | | | | * |
| 16 Magnum Bonum | St M | d s | l | r r | o | g g | m m | v | | | | * |
| 17 Majorca | Mal | d s | m | r r | o | b b | l m | v | | | | ** |
| 18 Maltese Blood | Mal | d s | s | e | o r | b b | m | | | | | * |
| 19 Maltese Oval (Garey Med. Sweet) | Mal | d s | l | e r | o | v g | l m | g | p g | | | ** |
| 20 Mays | St M | d s | m | e r | o | v g | m | g g | p g | | | * |
| 21 Mediterranean Sweet (Sanford's) | St M | d s | l | e r | o | v g g | m | g g | p p | | | * |
| 22 Nonpareil | Sev | d s | l | e r | o | b | e m | v | p p | | | * |
| 23 Old Vini (Beach No. 2) | Sev | d s | m | e r | o | v g | m | v | p p | | | * |
| 24 Paper Rind | St M | d s | s | e e | l o | g | l m | g | v p | | | * |
| 25 Parson Brown | St M | d s | m | e | o | g | e | v | p p | | | * |
| 26 Pineapple | St M | d s | m | r r | o | v g | m | v | p p | | | * |
| 27 Ruby (Sanguinea, DuRoi Blood) | Mal | d s | m | r r | o r | v g | e m | g g | p p | | | * |
| 28 St. Michael Blood | Mal | d s | m | r r | o | b | m | g g | p p | | | * |
| 29 Star Calyx | St M | d s | l | r r | o | g | m | g g | p g | | | * |
| 30 Sweet Seville (Sanford's Sweet Seville) | Sev | d s | s | r | o | g | v e | v | p p | | | * |
| 31 Tephi | Mal | d s | m | r r | o | v g | m | v p | p p | | | * |
| 32 Valencia Late | Mal | d s | l | e | l o | g | l | g | p p | | | ** |
| 33 Washington Navel | Sev | d s | l | r e | o | b | e m | g | p s | | | * |

REMARKS—On varieties as numbered above: Nos. 8 and 25, desirable early sorts: 5, 23 and 28, distinct; 6, distinctly corrugated, desirable; 1 and 10, very desirable late sorts; 11, 12, 13, 17, 21 and 26, desirable; 6, 7 and 18 came from Thomas Rivers, of England, the well-known nurseryman.

OF SWEET 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.

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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.

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, Maltese Oval; Very Late, Hart

Varieties distinctly marked in their exterior appearance, like the Navels, Bloods, Du Roi, etc., are, other things being equal, most desirable for market.

MANDARIN ORANGES—*Citrus nobilis..*

(See Explanation of Abbreviations on page iv.)

| NAMES | Origin. | DESCRIPTION. | | | | | | | Adaptability | |
|----------------------------|---------|--------------|-------|-------|--------|----------|---------|--------|---------------|--------------------|
| | | Fruit. | | | | Tree. | | | | |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Prolificness. | |
| 1 Cha (Mandarin)..... | For | d s | m | f | lo | g | e | gg | f | Western North Fla. |
| 2 Dancy (Tangierine)..... | N | d s | ml | f | r | b | em | gg | v p | Eastern North Fla. |
| 3 King (King of Siam)..... | For | d s | l | f | o | vg | vl | gg | v p | Central Florida. |
| 4 Oneco..... | N | d s | ml | f | o | vg | lm | g | f | Southern Florida. |
| 5 Satsuma (Oonshiu)..... | For | d s | m | f | o | vg | ve | g | v p | * |

REMARKS—No. 1, a favorite in the New Orleans market; No. 2, the favorite of the group. The Satsuma is valued on account of its hardiness, which is increased by being budded on the entirely hardy *C. trifoliata*. It is much planted in sections north of the usual range of oranges.

BIGARADE ORANGES—*Citrus vulgaris.*

(See Explanation of Abbreviations on page iv.)

| NAMES | Origin. | DESCRIPTION. | | | | | | | Adaptability | |
|------------------------------|---------|--------------|-------|-------|--------|----------|---------|--------|---------------|--------------------|
| | | Fruit. | | | | Tree. | | | | |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Prolificness. | |
| 1 Bitter Sweet..... | N | d c | l | rf | do | | vl | v | p | Western North Fla. |
| 2 Phillips Bitter Sweet..... | N | d c | l | rf | do | | vl | v | p | Eastern North Fla. |
| 3 Sour..... | N | c | l | rf | do | | vl | v | p | Central Florida. |

REMARKS—Nos. 1 and 2, very refreshing in summer; 3, refreshing in summer and much used in making marmalades

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POMELOS—(Grape Fruit) *Citrus decumana*.

(See Explanation of Abbreviations on page iv.)

| NAMES | Origin. | DESCRIPTION. | | | | | | | Adaptability. | | | |
|--------------------------------|---------|--------------|-------|-------|--------|----------|---------|--------|--------------------|--------------------|------------------|-------------------|
| | | Fruit. | | | | Tree. | | | Western North Fla. | Eastern North Fla. | Central Florida. | Southern Florida. |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | | | | |
| 1 Aurantium | N | d s | m | r | l y | v g | 1 m | v | v p | — | — | ** * |
| 2 Duncan..... | N | d s | l | r f | l y | v g | 1 | v | v p | — | * | ** ** |
| 3 Hall..... | N | d s | l | r | l y | v g | 1 | v | v p | — | ** | ** |
| 4 Indian River (Standard)..... | N | d s | l | r f | l y | v g | v l | v | v p | — | ** | ** |
| 5 Josselyn | N | d s | m | r | l o | v g | 1 m | v | v p | — | ** | * |
| 6 Marsh | N | d s | l | f | l y | v g | 1 m | v | v p | — | ** | * |
| 7 Mays | N | d s | l | r f | l y | v g | 1 m | v | v p | — | ** | * |
| 8 Pernambuco..... | F | d s | l | r f | l y | v g | v l | v | v p | — | ** | * |
| 9 Royal | N | d s | ml | r f | l o | g | 1 m | v | v p | — | ** | ** |

THE POMELO.—Growing the Pomelo for market is a development of the past fifteen or twenty years; but large quantities of this fruit are now shipped from the State and its culture is rapidly extending. It has proved popular in the general market and its culture is very profitable. Its range of adaptability is about the same as that of the orange. Most of the older trees were planted before named varieties were introduced. The above list comprises the leading varieties now generally planted.

SHADDOCKS—*Citrus decumana*.

(See Explanation of Abbreviations on page iv.)

| NAMES | Origin. | DESCRIPTION. | | | | | | | Adaptability. | | | |
|--------------------------------|---------|--------------|-------|-------|--------|----------|---------|--------|--------------------|--------------------|------------------|-------------------|
| | | Plant. | | | | Tree. | | | Western North Fla. | Eastern North Fla. | Central Florida. | Southern Florida. |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | | | | |
| 1 Blood Shaddock | F | | l | r | l o | f | | v | — | — | ** | * |
| 3 Mammoth or Orange Shaddock.. | F | | l | r | l o | f | | v | — | — | ** | * |

REMARKS—The Shaddocks are of no commercial importance in Florida, nor are they desirable except as ornamental fruits, remarkable for their size and beauty.

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LEMONS—*Citrus limonum*.

(See Explanation of Abbreviations on page iii.)

| NAMES (Varieties.) | Origin. | DESCRIPTION. | | | | | | | Adaptability. | | | |
|-------------------------------------|---------|--------------|-------|-------|--------|----------|---------|--------|---------------|--------------------|--------------------|----|
| | | Fruit. | | | | | Tree. | | | | | |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Prolificness. | Western North Fla. | Eastern North Fla. | |
| 1 Belair..... | F | c s | m | bl | l y | b b | r | v | v p | — | * | ** |
| 2 Genoa (Eureka) | F | c s | m | l | l y | b g | r | v | v p | — | * | ** |
| 3 Imperial (Messina)..... | F | c s | m | l | y | b g g | f | v | v p | — | * | ** |
| 4 Sicily (Sanford's Thornless)..... | F | c s | m | l | l y | b | f | v | v p | — | * | ** |
| 5 Villafranca | 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. | Western North Fla. | Eastern North Fla. | |
| KUMQUATS—Kin Kans (<i>Citrus Japonica</i>) | | | | | | | | | | | | |
| 1 Marumi..... | F | d c s | s | r | o | | | m | p | — | * | * |
| 2 Nagami | F | d c s | s | o | o | | | m | p | — | * | ** |
| LIMES (<i>Citrus Limetta</i>)* | | | | | | | | | | | | |
| 3 Rangpur | F | c s | m | f | r | v g | fw | v | p | — | * | ** |
| 4 Tahiti..... | F | c s | l | l | y | v g | f | v | p | — | * | ** |
| CITRONS (<i>Citrus Medica</i>) | | | | | | | | | | | | |
| 5 Corsican | F | | | | | | | | | * | * | * |
| 6 BERGAMONTS (<i>Citrus bergamium</i>).. | | | | | | | | | | * | * | * |
| 7 OTAHEITES (<i>Citrus sinensis</i>)..... | | | | | | | | | | * | * | * |
| 8 TRIFOLIATAS (<i>Citrus trifoliata</i>).... | | | | | | | | | | * | * | * |

REMARKS.—On varieties and species as numbered above: No. 6, grown as an ornamental, yields an essential oil; 7, grown as an ornamental, and as a stock for dwarfing—fruit valueless; 8, a hardy species, grown as ornamental, extensively used as stock and for hedges—fruit valueless.

*Most of the limes grown in the State are designated as Mexican limes. They are seedlings and should be referred to as the Mexican group. Lime culture is of considerable importance.

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. | | | | Tree. | | | Prolificness. | Western Fla. | North Fla. | Eastern North Fla. |
| | | Use. | Size. | Class. | Color. | Quality. | Season. | Vigor. | | | | |
| 1 Angel..... | P-to | d s | l | r | w | b | m | v | v p | * | ** | * |
| 2 Belle of Georgia | N C | d s | l | r | w | g | m | g | p p | ** | * | * |
| 3 Bidwells Early..... | P-to | d s | m | c | w | g | v | g | p p | * | * | * |
| 4 Bidwells Late..... | P-to | d s | l | c | w | g | v | g | v p | ** | * | ** |
| 5 Cablers Indian..... | S | d c n | l | c | r | g | m | g | f p | * | * | ** |
| 6 Carman..... | N C | d s | l | r | w | g | m | g | p p | ** | * | * |
| 7 Chinese Cling | N C | d n | l | c | w | g | m | g | p p | * | * | * |
| 8 Climax | H | d s | m | r | w | g | m | g | p p | * | * | * |
| 9 Colon..... | H | d s | m | r | w | g | m | g | p p | * | * | * |
| 10 Countess | S | d n | l | r | w | g | m | g | p p | * | * | * |
| 11 Crawfords Early..... | Per | d n | l | r | y | g | m | g | p p | * | * | * |
| 12 Dorothy (Dorothy N.) | P-to | d s | m | r | y | g | m | g | p p | * | * | * |
| 13 Elberta | N C | a | v l | f | y | g | m | g | p p | ** | * | ** |
| 14 Estella | S | d s | l | f | y | g | m | g | p p | ** | * | * |
| 15 Florida Crawford | S | d c n | l | f | y | g | m | g | p p | ** | * | ** |
| 16 Florida Gem | H | a | m | f | w | g | m | g | p p | ** | * | ** |
| 17 General Lee | N C | a | m | c | w | g | m | g | p p | ** | * | * |
| 18 Gibbons October..... | S | d n | m | f | w | g | m | g | p p | * | * | * |
| 19 Greenboro | Per | d s | m | f | w | g | m | g | p p | * | * | * |
| 20 Hall (Hall's Yellow) Early..... | H | a | m l | f | y | g | m | g | p p | ** | * | ** |
| 21 Honey | H | a | m | f | w | g | m | g | p p | ** | * | ** |
| 22 Imperial | H | a | l | f | w | g | m | g | p p | ** | * | ** |
| 23 Japan Dwarf Blood | NOB | d s | m | f | r | g | m | g | p p | * | * | * |
| 24 Jewel..... | P-to | d s | m | f | w | g | m | g | p p | * | * | ** |
| 25 La Magnifique | S | d c n | l | c | w | g | m | g | p p | * | * | * |
| 26 La Reine | S | d c n | l | c | w | g | m | g | p p | * | * | * |
| 27 Maggie | P-to | d s | m | c | w | g | m | g | p p | * | * | * |
| 28 Mamie Ross | N C | d s | l | c | w | g | m | g | p p | * | * | * |
| 29 Onderdonk | S | d c n | m | f | y | g | m | g | p p | * | * | * |
| 30 Oviedo | H | a | m | f | w | g | m | g | p p | * | * | * |
| 31 Pallas | H | d s | m | f | w | g | m | g | p p | * | * | * |
| 32 Peen-to | P-to | a | m | c | w | g | m | g | p p | * | * | * |
| 33 Powers September..... | S | d n | m | f | w | g | m | g | p p | * | * | * |
| 34 Red Ceylon | NOB | c | m | f | r | g | m | g | p p | * | * | * |
| 35 Sneed | N C | d s | m | c | w | g | m | g | p p | * | * | * |
| 36 Stanley | H | d s | m | c | w | g | m | g | p p | * | * | * |

CATALOGUE OF FRUITS.

XI

PEACHES—Continued.

(See Explanation of Abbreviations on page iii)

| NAMES | Origin. | DESCRIPTION. | | | | | | | | Adaptability. | | | |
|-------------------|---------|--------------|-------|--------|--------|----------|---------|--------|---------------|--------------------|--------------------|------------------|-------------------|
| | | Fruit. | | | | Tree. | | | | Western North Fla. | Eastern North Fla. | Central Florida. | Southern Florida. |
| | | Use. | Size. | Class. | Color. | Quality. | Season. | Vigor. | Prolificness. | | | | |
| 37 Suber..... | P-to | d s | m | c | w | g | v e | v | p | — | — | * | ** |
| 38 Taber | H | d s | m | c r | w r | g g | e e | g g | p p | ** | ** | * | * |
| Triana..... | H | d s | m | r r | w r | g g | e e | g g | p p | * | * | * | * |
| 40 Victor | | m l | s | w | g g | g g | v e | g | p p | * | * | * | |
| 41 Victoria | S | d en | l | r | y | g g | l | g | g g | * | * | * | |
| 40 Waldo..... | P-to | d s | m | r | w | g g | v e | v p | g g | * | ** | ** | ** |
| 43 Yum Yum | P-to | d s | m | c | w | g | v e | 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. 21 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.

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PLUMS—*Prunus triflora* and hybrids.

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 | Origin. | DESCRIPTION. | | | | | | | | | | Adaptability. | |
|------------------|---------|--------------|-------|-------|--------|--------|----------|---------|--------|---------------|----|--------------------|--|
| | | Fruit. | | | | | Tree. | | | | | | |
| | | Use. | Size. | Form. | Color. | Class. | Quality. | Season. | Vigor. | Prolificness. | | | |
| 1 Abundance..... | J | a | 1 m | | y r | c | e m | v | r p | * | * | Western North Fla. | |
| 2 Burbank..... | J | a | 1 m | | p y | c c | e m m | v v | r p | ** | ** | Eastern North Fla. | |
| 3 Chabot | J | a a | 1 m | | r p | c c | e m | v v | r p | ** | ** | Central Florida. | |
| 4 Excelsior..... | J H | a a | 1 m | rb | r p | c c | v e | v v | r p | ** | ** | Southern Florida. | |
| 5 Howe.. | J H | a a | 1 m | | r r | c c | m l | v v | r p | * | * | | |
| 6 Kelsey..... | J | a a | v l | | g y | c c | m l | v v | r p | * | * | | |
| 7 Red June..... | J | a a | m | | r p | c c | v e | v v | r p | * | * | | |
| 8 Satsuma..... | J | a a | 1 | | b r | c | b | m | v v | * | * | | |
| 9 Wickson..... | J | a | 1 | | | | | | | | | | |

PEARS—*Pyrus communis*.

(See Explanation of Abbreviations on page iv.)

| NAMES | Class. | DESCRIPTION. | | | | | | | | | | Adaptability. | |
|-----------------|--------|--------------|-------|-------|--------|----------|---------|--------|---------------|-----|-----|--------------------|--|
| | | Fruit. | | | | | Tree. | | | | | | |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Prolificness. | Tr | | | |
| 1 Keiffer..... | OOO | a | I | rbp | y&r | qq | v l | v | r p | ** | ** | Western North Fla. | |
| 2 Le Conte..... | OOO | a a | I | olbp | y g | qq | e e | v v | v p | ** | ** | Eastern North Fla. | |
| 3 Smith..... | OOO | a | I | ep | y g | qq | e e | v v | p | * * | * * | Central Florida. | |
| | | | | | | | | | | | | Southern Florida. | |

CATALOGUE OF FRUITS.

XIII

GRAPES—*Vitis—Labrusca, Æstivalis, Vulpina.*

(For Explanation of Abbreviations see Page iv.)

| NAMES (Varieties.) | Origin. | DESCRIPTION. | | | | | | | | | | Adaptability. | | | |
|--------------------|---------|--------------|--------|--------|-------|-------|-------|-------|--------|----------|---------|-------------------|-------------------|------------------|-------------------|
| | | FRUIT. | | | | | VINE. | | | | | Western North Fla | Eastern North Fla | Central Florida. | Southern Florida. |
| | | Use. | BUNCH. | BERRY. | Size. | Form. | Size. | Form. | Color. | Quality. | Season. | | | | |
| 1 Concord..... | L | dnw | l | s h | l | r | b | g | m | g | f | * | * | * | * |
| 2 Cynthiana..... | A | d w | m | shcp | s | r | b | v g | l | v | f | ** | ** | ** | ** |
| 3 Delaware..... | H? | a | s | shcp | s | r | r | b | m | g | p | * | * | * | * |
| 4 Diamond..... | L | ds | m | shcp | m | r | w | g | v e | v | p | * | * | * | * |
| 5 Elvira..... | RH | w | s | c p | m | r | w | g | m | g | p | * | * | * | * |
| 6 Goethe..... | H | d n | m | c p | vl | e | w | v g | l | v | p | * | * | * | * |
| 7 Herbemont.... | A | d w | m | shcp | s | r | b | v g | l | v | p | * | * | * | * |
| 8 Ives..... | L | sw | m | c p | m | r e | b | f | v e | v | p | * | * | * | * |
| 9 Key..... | | | | | | | | | | | | * | * | * | * |
| 10 Niagara..... | L | ds | l | c p | m | r | w | g | v e | v | p | ** | ** | ** | ** |
| 11 Norton..... | A | d w | m | shcp | s | r | b | g | l | v | f | ** | ** | ** | ** |
| 12 Salem..... | H | d n | m | shcp | l | r | r | v g | m | v | f | * | * | * | * |
| 13 Lindley..... | H | ds | l | shcp | l | v | v | v g | e | v | v p | ** | ** | | |
| 14 Wilder..... | H | d n | l | b r | vl | r | b | v g | m | v | f | * | * | | |

REMARKS.—2, 9, 11, almost free from fungous diseases; 1, 3, 4, 5, 10; 13, subject to fungous diseases in wet seasons; 7, 12, 14, subject to fungous diseases; 7, 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.

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.

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 Luttichau. They are all grafted on *V. riparia* and *V. rupestris*, are now in their fifth 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.

MUSCADINE GRAPES.—*Vitis rotundifolia*.

(For Explanation of Abbreviations see page iv.)

| NAMES (Varieties) | Origin. | DESCRIPTION. | | | | | | | | | | Adaptability. | | | |
|-------------------|---------|--------------|--------|-------|-------|-------|--------|--------|----------|---------|--------|--------------------|--------------------|------------------|-------------------|
| | | Fruit. | | | | | Vines. | | | | | Western North Fla. | Eastern North Fla. | Central Florida. | Southern Florida. |
| | | Bunch. | Berry. | Size. | Form. | Size. | Form. | Color. | Quality. | Season. | Vigor. | | | | |
| 1 Eden..... | v | d nw | s | r | v l | r | b | f g | v l | v | v p | ** | ** | ** | * |
| 2 Flowers..... | v | d nw | s | r | v l | r | b | f | v l | v | p | ** | ** | ** | * |
| 3 James..... | v | d nw | s | r | v l | r | b | v g | v l | v | v p | ** | ** | ** | ** |
| 4 Meisch..... | v | d nw | s | r | v l | r | p | g | v l | v | r | ** | ** | ** | ** |
| 5 Scuppernong.. | v | d nw | s | r | v l | r | v z y | v g | v l | v | v p | ** | ** | ** | ** |
| 6 Thomas..... | v | d nw | s | r | v l | r | b | v g | v l | v | v p | ** | ** | ** | ** |

REMARKS—The Muscadine Grapes are prodigious growers and bear heavy crops of fruit. They are very popular in the South, where they are used for dessert and for making wine and jelly, but they are not grown for Northern market.

CATALOGUE OF FRUITS.

XV

KAKI—Japanese Persimmon—*Diospyros Kaki*.

| NAMES. | Origin. | DESCRIPTION. | | | | | | | | | | Adaptability. |
|-----------------------|---------|--------------|-------|-------|--------|----------|---------|--------|---------|----|----|---------------|
| | | FRUIT. | | | | | TREE. | | | | | |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Prolif. | W. | N. | E. |
| 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 | • | g | s p | ** | ** | * |
| 3 Haykume..... | J | d s | l | rfov | 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 | rfov | v e | v | p | ** | ** | * |
| 6 Tanenashi..... | J | d s | l | rept | l r | b | m | g | g | ** | ** | * |
| 7 Triumph..... | | | | | | | | | | | | |
| 8 Tsuru.... | J | d s | l | olpt | b r | g | v l | v | v p | ** | ** | * |
| 9 Yeddoichi..... | J | d s | m | r f | d r | v g | m | g | g | ** | ** | * |
| 10 Yemon..... | J | d s | l | r f g | o & r | v g | m | v | p | ** | ** | * |
| 11 Zengi..... | J | d s | s | r f | d r | g | v e | v | v p | * | * | * |

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 fruit; 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 Yeddoichi; others are best when still hard, like Zengi and Tabers No. 129. As they 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 Tanenashi; 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 kinds 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.—Tanenashi, Okame, Yemon and Yeddoichi 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 Hachiya 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 Tabers 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. Tanenashi is, perhaps, most highly esteemed in the 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.

MINOR DECIDUOUS FRUITS.

(See Explanation of Abbreviations on page iv.)

| NAMES | Origin. | DESCRIPTION. | | | | | | | Adaptability. | | | |
|--------------------------------------|---------|--------------|-------|-------|--------|----------|---------|--------|----------------|------------------|--------------------|--------------------|
| | | Fruit. | | | | | | | Tree or Plant. | | Western North Fla. | Eastern North Fla. |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Prolificness. | Central Florida. | | |
| APPLES— <i>Pyrus malus</i> | | | | | | | | | | | | Southern Florida. |
| 1 Jennings..... | N? | d n | l | f | g g | g g | e e | v | p | * | * | + |
| 2 Red Astrachan..... | F | d n | l | r | r | g g | e e | | | | | - |
| FIGS— <i>Ficus carica</i> . | | | | | | | | | | | | |
| 3 Black Ischia..... | F | den | m | b | g | s | m | | g | * | * | * |
| 4 Blue Genoa..... | F | den | m | b l | g g | s | m | | v p | * | * | * |
| 5 Brown Turkey..... | F | den | m | b r | b | s | v | | v p | * | * | * |
| 6 Brunswick..... | F | den | l | v b r | g | s | v | | * | * | * | * |
| 7 Celestial..... | F | den | s | p v | b | s | v | | * | * | * | * |
| 8 Green Ischia..... | F | den | m | g | g | s | v | | * | * | * | * |
| 9 Lemon..... | F | den | m | y | g | s | v | | v p | * | * | * |
| 10 White Adriatic..... | F | den | m | | | | | | | | | * |
| MULBERRIES— <i>Morus nigra</i> | | | | | | | | | | | | |
| 11 Downing..... | A | m | ol | b | g | E | v | s | * | * | * | * |
| 12 Hicks.. | A | m | ol | b | f | E & L | v | v p | * | * | * | * |
| 13 Stubbs..... | A | l | ol | b | g | M | v | p | * | * | * | * |
| POMEGRANATES— <i>Punica granatum</i> | | | | | | | | | | | | |
| 14 Acid.. | d | l | r | ry | | F | v | p | * | * | * | * |
| 15 Purple..... | d | l | r | ry | b | F | v | p | * | * | * | * |
| 16 Sweet.. | d | l | r | ry | g | F | v | p | * | * | * | * |

REMARKS.—Nos. 1 and 2, home use; 12, unsatisfactory bearer; 13, enormously productive; 14 and 15, superior quality acid; 16, 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, except when canned or preserved, in which form it finds a ready market at high prices, 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 generally grown for market, but most plantations have a few trees. There are several new choice varieties being tried.

CATALOGUE OF FRUITS.

XVII

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 cuneifolius</i> ... | A | d n | | | | | | | | * * |
| DEWBERRIES— <i>Rubus trivialis</i> | A | d n | | | | | | | | * * |
| LOQUATS— <i>Eriobotrya Japonica</i> | F | d n | m | e | y r b | v g | Sp F | v | p | * * ** |
| OLIVES— <i>Olea Europea</i> | F | c s | s | e | | | | v | p | * * * |

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. The Manatee Dewberry, and the Northey, presumably a hybrid, have proved satisfactory in many localities.

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 largely from seed, and the fruit varies greatly in size and quality. A number of varieties have been introduced from California and are being tested.

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.

TROPICAL FRUITS.

PINEAPPLES—*Ananas sativa*.

(See explanation of Abbreviations on page iv.)

| NAMES. | Origin. | DESCRIPTION. | | | | | | | Adaptability. | |
|-------------------|---------|--------------|-------|-------|--------|----------------|---------|--------|---------------|-------|
| | | Fruit. | | | | TREE OR PLANT. | | | | |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Prolificness. | |
| 1 Abachi..... | F | a | l | ol | o y | b | m | m | v | ** * |
| 2 Egyptian..... | F | a | B | y | g | m | e | g | p | ** ** |
| 3 Porto Rico..... | F | a | v l | o y | g | m | e | g | r | * |
| 4 Pernambuco..... | F | d n | s | dy | v | v s | m | g | v p | ** ** |
| 5 Spanish..... | F | a | m | rg | g | f | e | v | p | ** ** |
| 6 Cayenne..... | F | a | l | o y | v g | f | m | g | p | ** ** |

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 Spanish, Porto Rico, and Cayenne are grown most extensively for market. The Egyptian Queen, and Pernambuco are grown for market less extensively. 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 Cayenne is planted almost exclusively.

BANANAS—*Musa*.

(See Explanation of Abbreviation on page iv.)

| NAMES, (Varieties.) | Origin. | DESCRIPTION. | | | | | | | Adaptability. | | | | |
|----------------------------------|---------|--------------|-------|-------|--------|----------|---------|--------|---------------|---------------|--------------|------------|----|
| | | Fruit. | | | | | | Tree. | | Prolificness. | Western Fla. | North Fla. | |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | | | | | |
| 1 Baracoa (Red Jamaica) | W I | d s | l | | r | g | | v | p | — | — | — | ** |
| 2 Cavendish..... | E I | d s | m | | y | b | | v | p | — | — | — | ** |
| 3 Dacca..... | | d n | m | | y | g | | v | p | — | — | — | ** |
| 4 Golden (Tahiti?)..... | W I | d n | l | | y | g b | | v | p | — | — | — | ** |
| 5 Harts Choice..... | W I | d n | s | | y | b | | v | p | — | — | * | ** |
| 7 Orinoco ("Horse Banana").... . | S A | d e n | I | | y | f | | v | p | — | — | * | ** |

REMARKS—On varieties as numbered above. Nos. 1, 2 and 4, general market; 3, 5 and 7, 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." 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.

CATALOGUE OF FRUITS.

XIX

GUAVAS—*Psidium*.

(See Explanation of Abbreviations on page iv.)

| NAMES. | Origin. | DESCRIPTION. | | | | | | | | Adaptability. | |
|-----------------------------------------------------------------|---------|--------------|-------|-------|--------|----------|---------|--------|---------------|--------------------|--|
| | | Fruit. | | | | Tree. | | | | | |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Prolificness. | | |
| 1 Group of Common Guava (P. Guaiava) many unnamed varieties.... | WI | x' | | | | s & f | v | vp | — | Western North Fla. | |
| 2 Cattley (P. Cattleyanum).... | A | den | s | r | r | s & f | v | p | * | Eastern North Fla. | |
| 3 Chinese (P. Lucidum).... | | c n | s | r | y | s & f | v | p | ** | Central Florida. | |
| 4 Guinea (P. Guineense).... | | den | l | p | y | s & f | v | p | ** | Southern Florida. | |
| 5 Guisaro (P. Molle).... | | c n | m | r | y | s & f | v | p | ** | | |

REMARKS.—On varieties as numbered above. 2 and 3 hardy; No. 5 quite acid.

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 Indica*.

(See Explanation of Abbreviations on page iv.)

| NAMES | Origin. | DESCRIPTION. | | | | | | | | Adaptability. | |
|-----------------|---------|--------------|-------|-------|--------|----------|---------|--------|---------------|---------------|----|
| | | Fruit. | | | | Plant. | | | | | |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Prolificness. | | |
| 1. Mulgoba..... | E I | den | l | k | y&r | b | s | v | vp | * | ** |

Remarks.—A large number of seedling mangoes are grown. Many of these are referred to as No. 11, and, while they have a group resemblance to one another, still they are distinct in varietal characteristics. A considerable number of named varieties are now being tested. Among these may be mentioned, Alfonse, Soondershaw, and Gordon.

FLORIDA STATE HORTICULTURAL SOCIETY.

MINOR TROPICAL FRUITS.

| NAMES. | Origin. | DESCRIPTION. | | | | | | | | Adaptability. | | | |
|-----------------------------------------------------------|---------|--------------|-------|-------|--------|----------|---------|--------|---------------|--------------------|--------------------|------------------|-------------------|
| | | Fruit. | | | | Tree. | | | | Western North Fla. | Eastern North Fla. | Central Florida. | Southern Florida. |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Prolificness. | | | | |
| 1 Akee (<i>Cupania sapida</i>)..... | A | c | l | r | r | g g | s | v | p | - | - | - | * |
| 2 Avocado (<i>Persea gratissima</i>).. | WI | dcs | l | p | y g p | g g | s & f | v | p | - | - | - | ** |
| 3 Barbadoes Cherry (<i>Malpighia glabra</i>)..... | Bar | dc | s | r | y r | g g | s | v | p | - | - | - | * |
| 4 Carissa arduina..... | Natal | dc | m | ob | y & r | g g | s | v | p | - | - | - | ** |
| 5 Cashew (<i>Anacardium occidentale</i>) | S A | c | m | ob | yg | vg | s | v | p | - | - | - | ** |
| 6 Ceriman (<i>Monstera deliciosa</i>).... | J A | d | l | ob | bry | g g | s | v | p | - | - | - | ** |
| 7 Cherimoya (<i>Annon cherimolia</i>) .. | S A | dn | l | e | g | g g | s | v | p | - | - | - | * |
| 8 Custard Apple (<i>Anona reticulata</i>) | W I | dn | l | c | g | gg | s | v | p | - | - | - | ** |
| 9 Downy myrtle (<i>Myrtus tomentosus</i>) | I | s | ob | pr | g g | ff | s | v | p | - | - | - | ** |
| 10 Egg-fruit (<i>Lucuma rivicoa</i>)..... | C | m | cg | y | g g | g | s | v | p | - | - | - | ** |
| 11 Granadilla (<i>Passiflora edulis</i>).... | V I | dc | m | r | g | g | s | v | p | - | - | - | * |
| 12. Granodilla (<i>Passiflora quadrangularis</i>) .. | C A | dc | l | ov | g | g | s | v | p | - | - | - | * |
| 13 Indian Fig Cactus (<i>Opuntia ficus-Indica</i>)..... | I | c | l | ov | r | g | s | v | p | - | - | - | * |
| 14. Jamaica Sorrel (<i>Hibiscus sabdipiffa</i>)..... | M | c | l | ov | r | f | s | v | p | - | - | - | * |
| 15 Kei Apple (<i>Aberia Caffa</i>)..... | A | c | l | ov | r | f | f | v | p | - | - | - | ** |
| 16 Limeberry (<i>Triphrasia aurantiola</i>) | P | c | s | ov | r | f | f | v | p | - | - | - | * |
| 17 Mamme Apple (<i>Mammea Americana</i>)..... | W I | ds | l | r | br | g | s | v | p | - | - | - | * |
| 18 Mamme Sapota (<i>Lucuma mammosa</i>)..... | W I | ds | l | e | y | g | s | - | - | - | - | - | * |
| 19 Otaheite Gooseberry (<i>Cicca disticha</i>)..... | W I | c | s | r | w | g | ev | v | p | - | - | - | ** |
| 20 Pawpaw (<i>Carica papaya</i>).... | E&WI | dcn | l | r | y | f | sp&s | v | p | - | - | - | ** |
| 21 Rose Apple (<i>Eugenia Jambos</i>).... | E I | dc | m | r | ly | f | v | v | p | - | - | - | ** |
| 22 Sapodiilla (<i>Achras sapota</i>).... | W I | ds | m | r | br | g | ev | v | p | - | - | - | ** |
| 23 Sapota blanco (<i>Casimiroa edulis</i>).. | M | ds | m | c | g | g | s | v | p | - | - | - | * |
| 24 Sour Sop (<i>Annon muricata</i>)..... | W I | c | l | r | g | g | s | v | p | - | - | - | * |
| 25 Spanish Lime (<i>Melicocca biguga</i>).. | W I | d | s | r | g g | g g | s | v | p | - | - | - | * |
| 26 Star Apple (<i>Chrysophyllum cainito</i>) | W I | d | m | r | g g | g g | sp | v | p | - | - | - | ** |
| 27 Sugar Apple (<i>Anona squamosa</i>).... | W I | dc | m | c | g g | g g | s&f | v | p | - | - | - | ** |
| 28 Surinam cherry (<i>Eugenia michelia</i>) | E I | dc | s | r | rb | g | s | v | p | - | - | - | * |
| 29 Tamarind (<i>Tamarindus Indicus</i>).. | E I | ds | sm | pod | br | f | ev | v | p | - | - | - | ** |

NUTS.

(See Explanation of Abbreviations on page iv.)

| NAMES. | Origin. | DESCRIPTION. | | | | Adaptability. | | | |
|---------------------------------------------------------------------|---------|--------------|-------|----------|--------|---------------|----|--------------------|--------------------|
| | | Fruit. | | Tree. | | Prolificness. | | Western North Fla. | Eastern North Fla. |
| | | Use. | Size. | Quality. | Vigor. | | | | |
| CHESTNUTS—Castanea | | | | | | | | | |
| 1 Chinquapin (<i>C. pumila</i>)..... | A | d n | s | v g | v | p | * | * | * |
| 2 Japan Chestnut (<i>G. Japonica</i>)..... | F | d c s | vl | g g | v | g | * | * | * |
| PECANS—<i>Carya olivœformis</i>. | | | | | | | | | |
| 3 Centennial..... | La | d s | l | b | v | p | ** | ** | * |
| 4 Frotscher..... | La | d s | l | b | v | p | ** | ** | ** |
| 5 Schley... | Miss | d s | l | b | v | p | ** | ** | * |
| 6 Stuart..... | Miss | d s | l | b | v | p | ** | ** | ** |
| 7 Van Deman..... | La | d s | l | b | v | p | ** | ** | * |
| WALNUTS—<i>Juglans</i>. | | | | | | | | | |
| 8 Japan Walnut (<i>J. Seiboldiana</i> ; <i>J. cordiformis</i>)... | F | d | m | b | v | p | † | † | † |
| COCOANUTS. | | | | | | | | | |
| 9 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.

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. | Productiveness. | | | |
| 1 Brandywine.... | A | B | d n | l | c | c | f | f | l | m | f | ** | Western North Fla. | |
| 2 Cloud..... | A | P | a | l | bo | d c | f b | m | e l | v | p | ** | ** | |
| 3 Clyde..... | A | B | a | l | c | c | f | f | e l | v | p | ** | ** | |
| 4 Excelsior..... | A | B | a | m | o l | d c | g | m | v e | m | p | ** | ** | |
| 5 Hoffman..... | A | B | s | m | c | d e | f | f | v e | m | f | * | * | |
| 6 Klondike..... | A | a | l | d c | d c | g | f | e | v | p | p | * | * | |
| 7 Michel | A | B | d n | l | b c | y r | v | s | v e | v | p | * | * | |
| 8 Murray..... | A | P | a | m | o | d c | m | f | v e | v | v p | ** | ** | |
| 9 Newnan..... | A | B | a | m | o | c | g | f | e l | v | f | ** | ** | |
| 10 Nick Ohmer.... | A | P | n | l | c | d c | b | m | l | v | p | ** | ** | |
| 11 Phenomenal.... | F | B | a | l | c | d c | b | r | e l | v | p | * | * | |
| 12 Rising..... | A | P | a | m | o l | d c | m | f | v e | v | v p | ** | ** | |
| 13 Thompson..... | A | B | s | l | o | s c | f | f | e | m | 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. Rising 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, and has been given a place in the list of desirable varieties.

1889

NEW YORK
BOTANICAL GARDEN

Transactions
OF THE
FLORIDA STATE
Horticultural Society

FOR

1906

PROCEEDINGS

OF THE

Nineteenth Annual Meeting

OF THE

Florida State

Horticultural Society

HELD AT

Jacksonville, May 1, 2 and 3, 1906

COMPILED BY THE SECRETARY

Published by the Society

DeLand, Florida:

E. O. PAINTER PRINTING COMPANY

1906.

CONSTITUTION.

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

ARTICLE 2. Any person may become a 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.

ARTICLE 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.

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

ARTICLE 5. The duties of the President, Vice-Presidents, 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.

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

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

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 standpoints, 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.

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 Munk, John, Mt. Vernon, N. Y.
 Myer, H. Van-W., Madison, N. J.
 Munger, I. C., Lakeland, Fla.
 Nehrling, H., Gotha, Fla.
 Newbold, John, Allapatha, Fla.
 Nicherson, H. Guy, Winter Haven, Fla.
 Nordman, Fred, New Smyrna, Fla.
 Norsworthy, W. G., McIntosh, Fla.
 Nyland, J. A., Lake Mary, Fla.
 O'Brien, W. S., Thonotosassa, Fla.
 Olsen, H. C., Stuart, Fla.
 Osborne, J. M., Daytona, Fla.
 Painter, Miss Okle, Jacksonville, Fla.
 Palen, Peter E., Hains City, Fla.
 Patterson, J. H., Orange Heights, Fla.
 Patterson, Mrs. J. H., Orange Heights, Fla.
 Peck, P. E., Jacksonville, Fla.
 Peck, C. L., Starke, Fla.
 Pennock, H. S., Neptune, Fla.
 Pennock, Mrs. H. S., Neptune, Fla.
 Penny, N. O., Vero, Fla.
 Penny, D. W., Ft. Myers, Fla.
 Pettigrew, A. J., Manatee, Fla.
 Plyffer, John, Pulaski, Ind.
 Pierson, N. L., Pierson, Fla.
 Pike, L. L., Bartow, Fla.
 Player, H., Tampa, Fla.
 Popple, W. S., Estero, Fla.
 Porcher, E. P., Cocoa, Fla.
 Porcher, Mrs. E. P., Cocoa, Fla.
 Potter, R. B., West Palm Beach, Fla.
 Pound, Orange, Bartow, Fla.
 Pratt, E. E., Limona, Fla.
 Prevatt, A. B., Seville, Fla.
 Pugsley, Chas., Winter Haven, Fla.
 Purdie, G. A., Ormond, Fla.
 Ramsdell, Jos., Miami, Fla.
 Rankin, W. H., Punta Gorda, Fla.
 Reasoner, E. N., Oneco, Fla.
 Reed, W. F., Drayton Island, Fla.
 Rice, M. R., Citra, Fla.
 Richardson, C. O., Miami, Fla.
 Ricker, Mrs. B. B., South Lake Weir, Fla.
 Richardson, E. L., Avon Park, Fla.
 Riebold, C. P., Sanford, Fla.
 Rollins, J. A., Miami, Fla.
 Robinson, C. A., Eden, Fla.
 Robinson, Mrs. C. A., Eden, Fla.
 Rolfs, Mrs. P. H., Miami, Fla.
 Rillins, C. A., Thonotosassa, Fla.
 Rose, R. E., Tallahassee, Fla.
 Rose, Mrs. R. E., Tallahassee, Fla.
 Ross, W. E., Jacksonville, Fla.
 Rous, S. H., Philadelphia, Pa.
 Rumble, Alfred, Winter Haven, Fla.
 Sadler, F. A., Clearwater, Fla.
 Sampson, F. G., Boardman, Fla.
 Sampson, Mrs. F. G., Boardman, Fla.
 Sams, Mrs. H. H., New Smyrna, Fla.
 Saunders, Mrs. N., Eden, Fla.
 Sawyer, L. J., Tibbals, Fla.
 Sample, J. W., Bartow, Fla.
 Schmelz, V., Sylvan Lake, Fla.
 Schabinger, J. J., Delray, Fla.
 Schnauber, F. S., Phillips, Fla.
 Schnieder, C. F., Ocala, Fla.
 Schultz, Henry F., Ancon Hospital, Canal Zone, Isthmus of Panama.
 Schuyler, G. W., Indianola, Fla.
 Scott, Dr. A. L., Starke, Fla.
 Sellmer, Chas., Zellwood, Fla.
 Shannhan, M., Grand Rapids, Mich.
 Shepherd, E. W., Winter Park, Fla.
 Shepherd, S. P., Winter Park, Fla.

- Shooter, C. C., Earlton, Fla.
 Shooter, Mrs. C. C., Earlton, Fla.
 Shyrock, W. P., New Smyrna, Fla.
 Sill, A. C., St. Petersburg, Fla.
 Simmons, W. P., Jacksonville, Fla.
 Simpson, James, Mt. Dora, Fla.
 Skinner, L. B., Dunedin, Fla.
 Smith, G. E., Sutherland, Fla.
 Smith, J. A., Cutler, Fla.
 Snell, C. Perry, St. Petersburg, Fla.
 Snow, Geo. E., East Lake, Fla.
 Snyder, A. S., St. Petersburg, Fla.
 Soar, J. J., Little River, Fla.
 Sorensen, John, Jensen, Fla.
 Spencer, H. E., West Palm Beach, Fla.
 Sperry, E. E., Orlando, Fla.
 Spencer, Thos., New York City, N. Y.
 Spencer, Mrs. Thos., New York City, N. Y.
 Spencer, E. D., Lake Helen, Fla.
 Standard Fertilizer Co., Gainesville, Fla.
 Stanton, W. E., Miami, Fla.
 Steele, W. C., Switzerland, Fla.
 Stenstrom, Ivis V., Sanford, Fla.
 Stenstrom, M. J., Sanford, Fla.
 Sterling, H. J., Delray, Fla.
 Stevens, H. B., Stetson, Fla.
 Stevens, Mrs. H. B., Stetson, Fla.
 Stirling, Miss Emma M., Thonotosassa, Fla.
 Stouder, H. G., Eldred, Fla.
 Stockbridge, Prof. H. G., Lake City, Fla.
 Street, A. W., Ormond, Fla.
 Switzer, W. A., Port Tampa City, Fla.
 Taber, Mrs. G. L., Glen St. Mary, Fla.
 Talton, E. H., Stetson, Fla.
 Tarter, C. R., City Point, Fla.
 Tatnall, Richard R., Punta Gorda, Fla.
 Taylor, G. R., St. Petersburg, Fla.
 Taylor, Dr. J. L., St. Petersburg, Fla.
 Taylor, Dr. J. N., Jacksonville, Fla.
 Taylor, Miss Kittie, Huntington, Fla.
 Taylor, Mrs. N. L., Huntington, Fla.
 Terwilleger, A. M., Mims, Fla.
 Thomas, Robt., St. Petersburg, Fla.
 Thompson, C. H., Winter Haven, Fla.
 Thomsen Chemical Co., Baltimore, Md.
 Thompson, W. B., Oneco, Fla.
 Tillinghast, B. F., Davenport, Iowa.
 Tischler, P., Jacksonville, Fla.
 Tompkins, Mrs. T. W., Ft. Pierce, Fla.
 Townsend, C. W., Pittsburg, Pa., 28 Penn.
 Ave., care of Fulton Mfg. Co.
 Townsend, C. Morot, Philadelphia, Pa.
 Tonner, W. E., Steubenville, Ohio.
 Truby, J. M., Starke, Fla.
 Trueman, R. B., Jacksonville, Fla.
 Tucker, R. N., Orange City, Fla.
 Turner, J. P., New Smyrna, Fla.
 Upham, E. S., South Lake Weir, Fla.
 Van Duzie, Col. C. A., St. Paul, Minn.
 Van Gorder, W. D., St. Petersburg, Fla.
 Van Wyck, Miss Marn, Federal Point, Fla.
 Veillard, R., St. Petersburg, Fla.
 Von Luttichau, H., Earlton, Fla.
 Walden, T. D., Highland, N. C.
 Walker, G. W., Huntington, Fla.
 Walker, Mrs. G. W., Huntington, Fla.
 Walker, W. E., Huntington, Fla.
 Walton, W. E., Miami, Fla.
 Wakelin, Amos, Lane Park, Fla.
 Wakelin, G. M., Lane Park, Fla.
 Wakelin, Mrs. G. M., Lane Park, Fla.
 Wakelin, Miss Grace V., Lane Park, Fla.
 Warner, F. D., Gainesville, Fla.
 Warner, Harry, Port Tampa City, Fla.
 Warner, S. C., Palatka, Fla.
 Warnock, W. A., Oak Hill, Fla.
 Warren, G. W. Herradura, Cuba.
 Watts, B. F., Leesburg, Fla.
 Walden, Walter, Miami, Fla.
 Weeks, G. M., Glen St. Mary, Fla.
 Wells, W. T., Melbourne, Fla.
 Westlake, J. Willis, Lake Helen, Fla.
 White, Miss L., Dupont, Fla.
 White, W. Duncan, Mandarin, Fla.
 Whitnall, R. F., Avon Park, Fla.
 Wightman, L., Tampa, Fla.
 William, E. W., Jensen, Fla.
 Williams, H. S., Rockledge, Fla.
 Wilson, J. A., San Juan, P. R.
 Winge, J. Porto Alegra, Brazil.
 Woods, F. A., St. Petersburg, Fla.
 Wood, Geo. H., Tangerine, Fla.
 Woolwine, E. M., Seville, Fla.
 Wyckoff, John S., Citra, Fla.
 Wylie, J. H., Interlachen, Fla.
 Webb, F. F., Winter Haven, Fla.
 Wilson, W. N., Gainesville, Fla.
 Yocom, W. F., Lake City, Fla.

PROCEEDINGS
OF THE
NINETEENTH ANNUAL MEETING

OF THE

Florida State Horticultural Society.

The Nineteenth Annual Meeting of the Florida State Horticultural Society was held in the Auditorium of the Windsor Hotel commencing on the evening of May 1st 1906.

The opening meeting was unusually well attended and the different addresses were greatly appreciated by the audience. Notwithstanding the weather during the three days was intensely hot the sessions were fairly well attended.

The latest introduction into the Society was the "Question Box," and it proved quite interesting, as will be seen by the printed questions and answers in this report. This is a feature that the members can take advantage of, even if they are not in attendance, by sending their questions to the president by mail, which

will be opened and answered during the sessions.

The Board of Trade delighted the members with another one of its famous musicales, rendered by the "Ladies Friday Musicale." So very popular are these musicales that the commodious hall of the Board of Trade building was packed to standing room.

There was a spirited contest when the question of the next place of meeting came up, between those who wanted to come again to Jacksonville and those who preferred to visit other parts of the State. St. Petersburg was well represented, and won the day, so that the Twentieth Annual Meeting will be held in the "Gem City of the West Coast."

Minutes.

FIRST DAY.

EVENING SESSION.

1. Call to order by President C. T. McCarty.
 2. Opening Prayer by Rev. Dr. Hobson.
 3. Address of Welcome on behalf of the city by Hon. D. U. Fletcher.
 4. Address of Welcome on behalf of the Board of Trade by Capt. C. E. Garner.
 5. Response for the Society by G. L. Taber, Glen St. Mary.
 6. Annual Address of the President, C. T. McCarty, Eldred.
 7. Social Hour-Meetings and greetings. Plans and purposes. Introduction of Jacksonville people to members from all parts of the State.
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SECOND DAY.

MORNING SESSION.

1. Address on "Nematode Diseases" by Prof. Earnest A. Bessey, Pathologist in charge of Florida Sub-Tropical Laboratory, Miami, Fla.
 2. Report of Standing Committee on Citrus Fruits.
 3. Report of Standing Committee on Diseases, Insects, and Method of Control: M. F. Rolfs, Lake City; W. S. Hart, Hawks Park; F. G. Sampson, Boardman; E. S. Hubbard, Federal Point.
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AFTERNOON SESSION.

1. Address by Prof. P. H. Rolfs, Lake City, Director Florida Experiment Station: "The Experiment Station Co-operative Work."
 2. Report of Standing Committee on Peaches, Plums and Pears.
 3. Report of Standing Committee on Grapes, Figs, and Kaki: B. M. Hampton, St. Augustine; J. E. Bacon, Ormond; A. J. Pettigrew, Manatee.
 4. Discussions.
 5. Question Box.
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EVENING SESSION.

1. Report of Standing Committee on Pineapples and other Tropical Fruits: W. R. Moses, West Palm Beach; P. H. Rolfs, Lake City; J. D. Bell, St. Petersburg.
 2. Paper on "Some Notes on Pineapple Experiments at Jensen" by W. A. Blair, Florida Experiment Station, Lake City.
 3. Discussions.
 4. Question Box.
 5. Entertainment, 8:30. Ladies' Friday Musicale.
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THIRD DAY.

1. Report of Standing Committee on Fertilizers and Irrigation; Prof. Flint, Lake City; L. A. Wilson, Jacksonville;

F. D. Waite, Palmetto; L. Heimberger, Tallahassee.

2. Report of Standing Committee on Nut Culture: H. K. Miller, Monticello; J. H. Wylie, Interlachen; C. F. Barber, Macclenny.

Paper: "Florida Immigration—What Shall It Be," by Capt. R. E. Rose, State Chemist, Tallahassee, Fla.

3. Question Box.

AFTERNOON SESSION.

1. Paper on "Geology of Florida in Relation to Its Artesian Water Supply" by Prof. E. H. Sellards, Lake City, Fla.

2. Election of Officers.

President—C. T. McCarty.

Vice-Presidents—P. H. Rolfs, F. G. Sampson, F. D. Waite.

Secretary—E. O. Painter.

Treasurer—W. S. Hart.

Executive Committee—E. S. Hubbard, G. L. Taber, O. W. Connor.

3. St. Petersburg selected as the next place of meeting.

4. Report of Secretary, Treasurer and Executive Committee.

5. Report of Committee on resolutions.

6. Question Box.

EVENING SESSION.

1. Report of Standing Committee on Ornamentals: Mrs. G. S. Gates, Welaka; W. C. Steele, Switzerland.

2. Entertainment, Recitations by Mrs. G. S. Gates.

3. Report of Standing Committee on Legislation.

4. Report of Special Committee on Resolutions.

Addresses of Welcome.

BY HON. D. U. FLETCHER.

Mr. Fletcher spoke extemporaneously and rather rapidly, so we are only able to give more than an outline of his happy and well received address.

Among other things he said: A day or two ago I received a letter from Secretary Painter informing me that he had called me up over the telephone and requested me to perform tonight, that he had printed the programs, putting my name on them and enclosed one, hoping I would be present. I told him that, under the circumstances, I would be here although the notice gave me no chance for any preparation. I approve of the Secretary's way, however. He accomplishes what he wants and in the easiest, most satisfactory manner. He gets his speaker and the latter has no time to make excuses or get nervous.

There is nothing the Horticultural Society could ask of me that I would not make an effort to grant. We give you a warm welcome, but the weather seems inclined to over-do the thing. It is unnecessary for me to emphasize the warmth of our greeting, and I assure you that is equally true of its sincerity.

I would feel very much more at home probably discussing some other subject than Horticulture. If our friend Painter should sell a lot of fertilizer and accept a four months note in payment, which he negotiated at the bank, and the parties refused to pay on the ground the fertilizer was not beneficial, I could say whether or

not he would have it to pay; or if Mr. Taber should send out nursery stock to be paid for at a certain time, reserving the title to the trees, I might answer as to whether or not the purchaser could keep the trees without paying the price as agreed.

If this were an agricultural gathering I would be much more at home. I have had some experience raising nubbin corn and bumble bee cotton. Nubbin corn is that kind too poor to shuck, and the cotton referred to is the kind which a bumble bee can suck the top blossom off while sitting on the ground. You have heard of the Doctor who had a patient with fever, and after doing all he could for him, he gave him some medicine at last that threw the patient into convulsions and when asked why he did so, he stated that he had treated him for days and days for fever and he did not know how to cure the fever, but he did know how to cure fits and so was giving him something to throw him into fits. If I could change this Convention into an *Agricultural* Convention there are many things I could speak of from experience.

Horticulture is a kind of high toned agriculture, or the *elite* of agricultural pursuits. I imagine this thing of standing on the shady side of an orange tree and watching its beautiful leaves and enjoying its odoriferous flowers while cultivating it, following it as the sun moves

from one side to the other, is very much better and more pleasant than chopping cotton or plowing corn out in the open, where the unobstructed rays of the sun beat upon you, and no prospect pleases.

There can be few things more important than this great industry you are developing and fostering. As we recall in 1899, the value of the fruit products of the United States was \$131,000,000 and the vegetable products, not including potatoes was \$131,000,000, and we exported over \$9,000,000 worth during that year. The life of the Horticulturist is one of the most joyous and free allotted to man. If we did not have any freezes, or if we could avoid the consequences of them; or if we were not troubled with foot rot, and if the white fly would leave us alone, and if it rained when it should and ceased when it ought, and if we had satisfactory transportation, and if we could hit the market right, and if we were given proper treatment by consignees, and if a few other things happened, or didn't happen, your meetings would partake more of the nature of an annual celebration and you would be touring the country in automobiles.

Now, this is the reason you are here; the purpose of this organization is to surmount the obstacles of this little word, "if." There can be no better or higher purpose of any organization. To solve the questions how to preserve for the human race the necessary food products is a work worthy the brightest minds, the greatest skill, the most persistent industry. It demands the highest and best activities of the most gifted men and women. It calls for the exercise of judgment. It proceeds upon investigation and study. It must have the knowledge born of experience.

We read of the great scientists and statesmen who have won distinction and whose names will be known as long as we have history, but I would ask you whether Copernicus, Gallileo, Michael Angelo, or Isaac Newton accomplished more for the world than the men who have made, developed, and placed on our tables our fruits, flowers and vegetables in their perfection. Of these great scientists who have won distinction, is there any one more entitled to fame than the man who introduced and developed the potato, apple, peach, rose, or made the white blackberry and the spineless cactus. Is there one more entitled to fame or to whom mankind is more indebted than to Luther Burbank, the American naturalist?

Our Legislature meets every two years and passes laws affecting the welfare of the people of this State; there is no more important matter which can command the attention of our law makers and officials than the requests of this Society. I can conceive that you might be aided in your efforts by legislation along certain lines and surely there will be found patriotism and public spirit sufficient to give a hearty response to your appeal and a generous support to your work. There is no more important organization in this State than yours, and your work for the industrial development of Florida and for the material welfare of her people should meet with every encouragement from every quarter.

It is a great pleasure to welcome you here—peculiarly wholesome and joyous and an honor to come in touch with the noble men and women from all portions of the State, who live nearest the fountain of life in the Divine Economy!

Jacksonville recognizes that whatever makes for the prosperity of any portion

of the State is a thing to be desired. She has no prejudices—she reaches out to all sections and would promote the good of each. She loves all the people of the whole State and would have them pros-

per and their various undertakings and enterprises succeed. In this spirit she wishes your meeting here may be profitable, and again bids you welcome.

ON BEHALF OF THE BOARD OF TRADE.

BY CAPT. C. E. GARNER.

Mr. President, Ladies and Gentlemen:

In behalf of the Board of Trade and representing the business interests of our city, it is again my pleasure to extend to you Mr. President, the officers, and to every member of the Florida State Horticultural Society, a most hearty and sincere welcome.

I had in mind telling you a great many things. I had conceived of a magnificent oration, expressing my personal sentiments of the Horticultural Society, of its splendid work in behalf of our beloved State, and I also had in mind telling you something of the progress and prosperity of our city; but, to use the yachting phrase, "my little craft has had the wind taken out of its sails" by the eloquence of the gentleman who has just preceded me.

If any one in this audience thinks they can follow the Hon. D. U. Fletcher along the same lines, and especially in the matter of delivering an address of welcome, and say anything original, or anything appropriate to the occasion which has not already been said, I would like for him to step up on this platform and take my place because I feel utterly unable to conceive of anything that is appropriate that would not be a reiteration of what had been stated.

I wish, therefore, to simply express my high appreciation not only of the Horticultural Society as an organization but of the Horticulturists of the State of Florida.

Probably no man within the bounds of the State has been brought in closer contact with them than myself. It is not an acquaintance of a few days or a few years but for a quarter of a century I have known them, and know them intimately, and I wish on this occasion to say that they are in my judgment the bravest, most heroic class of people in this country.

I know of their struggles, I have seen them under all circumstances, of prosperity and adversity, chiefly the latter, and if you wish to measure the heroism of people you must be acquainted with them under all conditions, and I know of no people who have withstood adversity with a braver spirit than have the Horticulturists of this State.

You talk about the rebuilding of your city, the rebuilding of Baltimore, the rehabilitation of San Francisco from the terrible disaster that has just befallen that fair city, I have in mind the struggles of your horticulturists against all sorts of unfavorable conditions and disasters. They have been attacked by the white fly, that threatened their industry; the red

ant, foot-rot, blight, drought, and in some instances too much moisture. They have seen the result of the labor of years leveled to the ground and have surmounted all these and have never appealed, received aid, nor had any insurance, but have gone bravely to work replanting, and today it can be truthfully said that never in the history of the State have the horticultural interests been in as good condition.

I am reminded of an old friend of mine who came to Florida in the early eighties, bought a piece of land on the banks of the St. Johns River, planted a grove and expected it to support him the balance of his days without any further effort on his part. He used to confide his troubles in me, and he was of an optimistic turn of mind. If his crop was a partial failure he would say "Well, that is not altogether bad because I will get better prices." When he lost the entire crop he said, "Well, it is not altogether bad because I can bud better varieties in the stumps. I am learning every day." Said he was going to protect his grove against frost in the future. There was never any disaster so great but in his mind it might have been worse. He was really typical of the average horticulturists of Florida as I have observed them, and he reminds me somewhat of a story that I heard about a man who went out West and engaged in the growing of stock. After being away about ten years he came back and one day walked into the store of an old friend who said "Well, John, where have you been?" John replied "out West."

"How have you been getting along?"

"Well," he said, "not so very good and not so very bad."

"What have you been doing," inquired the friend.

"I went into the sheep business."

"Well," said the friend, "that is good."

"Well," said John, "not so very good because the sheep all died."

His friend said, "Well that is bad."

"Not so very bad," said John, "because a rich widow sympathized with me in my misfortune and I married her."

"Well," his friend said, "that's good."

John said, "Well, not so very good because she was a regular virago and had a terrible temper."

"Well," his friend said, "that's bad."

"Well," said John, "not very bad because she built a great big fine house."

The friend remarked, "Well, that certainly was good."

"No," said John, "not so very good because the house burned down."

The friend said, "Well," that certainly was bad."

"No," said John, "that was not so very bad because the woman was consumed with the house."

So it is with my friend. He says now that he sees a great many good things that have grown out of the freeze. He had diversified his crops; is more prosperous possibly than if the freeze had not occurred, and he and the other horticulturists of the State, who are a people that adversity cannot overcome, and that no amount of prosperity can spoil, are entitled to all the success that should come to intelligence, industry, perseverance, and courage.

Response to Addresses of Welcome.

BY G. L. TABER.

Mr. President, Ladies and Gentlemen:

In a Society like ours there are sometimes pleasant duties to perform and the task you have assigned me, of replying to these generous words of welcome, is amongst these pleasant ones. During our annual meeting some of our members are called upon to speak on certain well defined subjects, assigned them in advance that have to do with the different phases of Horticulture; and while these duties, never considered onerous, are generally cheerfully complied with, the members who make these Committee Reports, as well as others that follow in discussion, are supposed to confine themselves, rather closely, to the subject in hand. In my case, however, Mr. President, it is different, for custom has decreed, wisely or unwisely, that more than the three words "We thank you" is expected of him who makes response to an Address of Welcome; and this, notwithstanding all the heart-felt sincerity with which those words can be imbued, or the emphasis with which they can be spoken.

And now, Mr. President, having defined my independent position, permitted to touch on few or many things, and these in a light or serious vein as my fancy dictates—I wish to tell a story. My story originated in a State some distance removed from Florida, namely, North Dakota.

An automobilist traveling through that untropical country found himself with a disabled machine and without proper tools to repair it.

He called at a near by farm house and asked the owner, a Swede, for a monkey wrench. The Swede replied that he had none. "Do you know of anyone in the vicinity who has a monkey wrench?" asked the traveler. "Nay" replied the Swede, "may bradder, 'bout eigh miles from hayer ban got cattle ranch, may bradder-law, Ole Olson, 'bout sex miles, ban got shape ranch; but Nort' Dakota too blame cauld for anybody keep monkey ranch." Now Mr. President notwithstanding the more favorable climatic conditions that exists here, I have never heard of a monkey ranch in Florida, and, even if there were, I take it that you would rule its discussion out of order unless introduced in some Horticultural connection, such as "Anima(la)ted Ladders," "monkeys as orange pickers" or "The horticultural possibilities of our friend and one time relative, the monkey." Mr. President upon mature consideration I am convinced that even under any such horticultural disguises as those mentioned, further consideration of the subject would be bootless. I therefore request you that all future allusion to the subject be barred and particularly that no monkey business be allowed to enter the question box—which will be opened later.

Mr. President, there is one danger that always besets a man who is tempted to make humorous remarks and that is that having made them (provided always that his hearers interpret them as such) he finds it rather hard work to get back on

to serious ground; or at least to convince his audience that the lighter vein has been abandoned. I wish to assure you, however, that the remaining words I have to say are strictly and sincerely serious.

Eighteen years ago the Florida State Horticultural Society was organized at Ocala. By a coincidence the figures eighteen also represent the number of our charter members. Of these just one-half have since passed into the Great Beyond. Of the remainder some have removed from the State, others are incapacitated by sickness, and a survey of this audience fails to reveal the presence at this meeting of a single conferee who assisted me at the birth of this Society. Looked at from the standpoint of losses of illustrious members, both of those who were with us at the beginning and others who joined afterwards, retrospection carries with it so much of sadness that I hasten to turn to the brighter side. That there is a brighter side is plainly evinced by the fact that notwithstanding our heavy losses by death and otherwise our last annual report showed a membership of 519. While the majority of these are located in the State, yet a review of the addresses shows that in addition to Florida, seventeen States and nine foreign countries are represented in our membership, as follows:

States: Connecticut, Georgia, Indiana, Illinois, Iowa, Louisiana, Massachusetts, New York, New Jersey, North Carolina, Ohio, Pennsylvania, Rhode Island, South Dakota, Texas and Vermont.

Foreign Countries: Australia, Asia, Cuba, Hawaii, Jamaica, Mexico, New Zealand, Porto Rico and South Africa.

Now, Mr. President, it is not my purpose to go into detail of what this Society has accomplished. Our comprehensive annual reports, published for many

consecutive years past, contain full records of our efforts and our accomplishments. But I make the broad assertion that no other State Horticultural Society in America has done more toward furthering the horticultural progress of a State and that none other can show such an interest in its work as evinced by a worldwide membership. I wish also, Mr. President, to call the attention of these gentlemen, who have so kindly welcomed us, to the fact that what we have accomplished we have done within ourselves, without outside help. The only exception to this statement is that a dozen years ago, for two years in succession, 1893 and 1894, our proceedings were published by the State Department of Agriculture, through Hon. L. B. Wombwell, Commissioner. While many State Societies have looked to liberal legislatures to assist them in their efforts toward upbuilding the Horticultural interest of their States, we have looked only to our own membership; whatever assistance has been necessary has, with the exception already cited, come from within our ranks.

Now, Mr. President, I believe this is all wrong. The fault may have been with ourselves in not having sufficiently appreciated or urged our claims, but I believe the time has come when we should ask, and should receive, from the Florida Legislature appropriations which shall in some measure relieve the, approximately, five hundred members of this Society from carrying on at their own expense a work that is of so much benefit to every one of the more than 500,000 people that comprise our population. For, Mr. President, it is so true as to be axiomatic that back of the lasting commercial prosperity of a country stands the producer, the one who evolves from Mother Earth her fin-

ished products; and just to the extent that he can throw safeguards around these productions, increase their quantity and improve their quality, just to that extent is the commercial prosperity of that country confirmed and enhanced.

I hold in my hand, Mr. President, a copy of the "Transactions of the Florida State Horticultural Society for 1905"—a fair sample of many that have preceded it. We have been issuing them annually ever since 1892. This copy of our transactions covers 132 pages of revised Horticultural advice obtained from experience—and experience that has to do with Florida conditions. It contains more than that. It contains 22 additional pages of catalogue, in which all the different fruits that are grown in Florida are listed in such a way as to give the comparative value of each variety to any given section of the State; whether it be Western North Florida, Eastern North Florida, Central Florida, or South Florida. The work entailed in getting out this annual edition in the creditable manner in which it is presented is unknowable except to someone who has had experience in this direction.

The price of the book, which also includes membership in the Society is \$1.00. If we have 500 annual, and say ten new life members (life memberships are \$10.00) our income for the year would be \$600.00, out of which we have to pay for stenography, secretary's salary, printing of the book, stationery, stamps and all minor expenses. The secretary's salary has in time past been, of necessity, so absurdly small, as compared with the work, that it has been repeatedly turned back into the Treasury by past secretaries, as a gift.

Not that we want or expect the secretary to do this; on the contrary we want sufficient funds provided from the source from which it should be provided, the State, to enable us to meet proper expenses in a manner that shall comport with our own dignity and that of the great Commonwealth we are trying to serve.

Mr. President, I think that you will pardon me if I say that I have had an almost, or quite, unequalled opportunity to know the amount of work performed by this Society. This from the double fact that I have been a member from the beginning, and that, since then, I have filled every office but one that it was in the society's power to confer. I was its first Secretary, then, successively, Vice-President, President, and now, a member of the Executive Committee. I have never yet been elected Treasurer, and know but one reason—or possibly two—why I have been overlooked in this connection. The first is that the handling of the society's funds is too easy a job, and the second—but perhaps I had better not allude to the second one.

Mr. President, our work has to do with the aiding, up-building and uplifting of Horticultural pursuits throughout our State. It is gratifying to know that we, as a society, are held in esteem both at home and abroad; and it is doubly gratifying to know that in this city of Jacksonville, where so many pleasant meetings have been held in the past, we are still received with open arms. To you gentlemen who in behalf of the City and the City's Board of Trade, have so cordially welcomed us, we feel profoundly grateful, and again say with heart-felt sincerity and with emphasis, we thank you.

President's Annual Address.

BY C. T. MC CARTY.

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

This audience will forgive me while I indulge in some retrospection. It is worth while sometimes to lift the veil of the past and behold the achievements of the then actors. That picture reveals to us lessons which suggest progress, hope and advancement. At the outset of this address, it is well for me to take my bearings and to see what is the duty I have assigned myself. To see and to study the standards that have been set for me in the similar efforts of the past; to study the men and the times that have produced the annual addresses of the past eighteen years.

Our Society came forth almost full-fledged from its birth. In response to the demands of the times, it immediately took its place among the great Horticultural Societies of the age. Fortunately, it had as its first president, one of those rugged, fearless and intrepid characters that were transplanted, decades ago, from the great prairies of the Northwest to the tropical and subtropical conditions of our state. With the accumulated wisdom and experience of a life-time, he led the van in the early years of the society's history and led them with unvarying satisfaction and success. In its first decade it had become so prominent that it received and entertained with success some of the foremost scientists of this and other lands. The energy and persistence, the skill and

faith, the merit and the accomplishment of its first president, Dudley W. Adams, are now matters of history. After all it is acts not words, that count in the life impression one leaves upon his age and generation. Judge by this standard what a splendid life was his. It is my duty as well as my pleasure, to put on record the high appreciation this society feels today for its first president after he has for well nigh a decade, felt upon his face the breath of the Eternal morning.

Good foundations, like good principles and good practices, never fail to bequeath to subsequent generations their manifold blessings.

In studying the history of our Society during this period of eighteen years, I find impressed upon this latter half, the large-hearted, good-natured, genial personality and natural ability of its last president, George L. Taber.

How fortunate our Society was when called upon to bear a sudden vacancy in its Chief Executive, that one so able, so thoroughly equipped for its duties, so willing to bear and forbear, should be ready trained at hand. The annual addresses of President Taber always contained a message of importance to the Society. In times of progress and prosperity it brought congratulations and good-cheer. In times of adversity, it brought hope, courage and manhood, and faith in skill and science to overcome difficulties or adverse climatic conditions. His

cheery tones were ever on the side of optimism, were ever turning towards the bright side of the picture of horticultural struggle and endeavor in this state, were ever pointing to new means of combatting the elements, of overcoming the natural enemies of our chosen industries and bolstering up those of less faith and courage. Through all these annual addresses runs the constant tone of enlargement and improvement, constantly increasing in power, thought and literary finish, his last annual address became a fitting climax to the long series of addresses with which he has enriched the literature of our Society. I can well imagine his feelings when preparing his "Message from the Woods." Like that felt by Bryant when he wrote his *Thanatopsis*, when he gave to his age, in poetry, his conception of a proper appreciation of nature and natural surroundings. Like him feels John Burroughs, the nature lover, the poet and admirer of the brook, the field, the orchard and the forest. How much of beauty and poetic feeling and love of nature and nature's God are embodied in the president's last annual address, only future generations shall fully appreciate.

Of retrospection this is sufficient. The past at least is secure. Our Society having passed safely the rapids of its upper course and glided successfully along into its middle course, now moves forward in the direction of its lower and broader course. It has met the questions of the past. It has accumulated wisdom by experience. It should be, and doubtless it is today, well equipped to meet the questions of the present, to maintain the reputation of the past and to lay broad and deep foundations for the achievements of the future. The problems of to-

day are not more difficult than in the past, but they are more complex and diverse. There are in them a greater number of factors even if each factor is of less vitality. What message does the present bring to us?

What duty do we owe the today? What accomplishments can the tomorrow claim logically founded upon today? Are there messages that the horticultural conditions of the state at this moment require bringing to your attention? Fortunately we stand in the presence of no calamity. We do not surround, as we have sometimes done in the past, those conditions that buried the hopes of thousands of our people. But even those clouds had their silver lining, unseen then, but plainly visible now. We are in the midst of prosperity long continued and pronounced. Our industries have been enlarged both in number and in volume. Our output is greatly increased in every department of horticulture. Our sources of knowledge, our ability to handle the drawbacks, the pests and the evils of our diversified industries have been largely increased. What then is there to consider? It frequently happens that the most dangerous periods are those of greatest prosperity. It has been well said that, "Security is mortal's chiefest enemy."

In the line of thought I shall take tonight, I may be straying from the beaten path, may be leading the way into battle fields where the valiant, the sagacious and the steadfast of purpose alone can be found at the front. The commercial battles of the present dwarf into insignificance the battles with insects, with climatic conditions, with all our other obstacles combined. The struggle for new markets, for cheaper production, for fairer treatment by our agents in the markets,

for fair rates and rapid transit, do not these demand our attention and challenge the best brains among us? Of what avail is it that we devote our time and capital to the problems of production if the other and more complex problems of economy, distribution, transportation, receive not their proper attention? These things are as much a part of our legitimate business as the cultivation of the soil, the fertilizer we shall use or the various matters of every day occurrence. What man is there before me who has not felt like this? The season has been a good one, I have fertilized judiciously and wisely, I have cultivated, I have sprayed, I have spared no pains to produce a fine crop. How shall I market it to the best advantage? Have you not realized that you were then confronted with harder conditions than those of production and ones less within your control or management?

The original scope of our Society being much narrower than its present one curtailed the range of topics considered at our meetings to a very narrow margin. The original thought of the founders of this Society was to make it apply almost exclusively to orange growing, to citrus fruits and their allied subjects. As the years have come and gone its scope has been widened so that it now covers, not only semi-tropical, but also tropical fruits, vegetables and many of the fruits of the temperate zone. This enlargement of its sphere has injected into it new relations and new problems for annual consideration. Let us briefly discuss a few of the important items worthy of thought. This is an age of organization, co-operation and consolidation. It is not sufficient that the horticulturist of today knows how to produce the fruits and the products of the soil but that he knows as well how to

successfully transport, distribute and market them. Perhaps the largest field for present and future investigation is the one covering the problem of marketing. This problem involves the element of business experience and study of the relations of the cost of production and transportation to the market value of our products; the study of the laws of supply and demand as applied to each particular product; a study of the value of organization in the securing of reasonable and satisfactory rates of transportation; of the proper commissions to be paid our selling agents; and the proper distribution of the crop so as to prevent surplus in one portion of the country and deficiency in another. Were there no such thing as organized effort among those whose financial interests are opposed to ours there should be no necessity for organization on our part. The value of farmers and fruit growers' organizations is in direct proportion to the tenacity with which they adhere to them and the vigor with which they enforce the principles involved. I do not deem it necessary to go into arguments supporting the needs for compactly united organizations in each of our principal industries. The need for organization must be apparent to all. For greatest efficiency consolidation of all for the handling of problems common to all is only common sense. Questions like transportation, tariffs for protection, rates of commission and kindred broad matters can only be handled powerfully and conclusively in the hands of one central organization. The methods and direction taken by each interest must be dictated by themselves.

It can do no harm to crystallize among them, into some definite form the best ideas of the most intelligent and energetic of the growers, nor need it be be-

lieved that the only value in horticultural organization is that of the maintenance of the price or cheapening the cost of the production and the proper regulation of the matter of transportation. In numerous other ways organized effort is superior to individual effort. The tendency of the times is to the enlarged costs of the material used for the packing and package purposes, the costs of living and indeed, increased cost in everything that the horticulturist purchases. The only fair method of safeguarding the growers and producers' interests is to see that increased revenue accrues to him sufficiently to meet the increased cost of production as well as the cost of living and the necessaries and luxuries of life.

Concurrent with this comes the thought of the reduced cost of production by better management, more intensive cultivation, decreased cost of fertilizing by taking advantage of cheaper sources of nitrogen and other kindred economies. All of these are well and should never be forgotten. The opening up of new fields of production have helped swell the volume of material in our markets and should set us to thinking of how to overcome this new competition.

The solution of these problems will call for the best thought, the best persistent effort and the most constant watchfulness of the thoughtful classes in our midst. Among the hopeful signs of the present are the cordial relations existing between the country and the city; between the producer and the carrier; between the producer and the consumer. In these better understandings of each others' relations we see the future solution of these problems. So long as the different classes understand and appreciate each other, realize their mutual inter-dependence on

each other, maintain their mutual respect for each other, that long will harmony and material prosperity exist. In passing, it might be said that the accentuation of the self-interests of the horticultural classes does not necessarily mean war upon or antagonism of any other interest.

The recent report of the U. S. Department of Agriculture calls attention to the enormous resources of American agriculture and horticulture. In comparison, all other interests combined sink into insignificance. The sums are so stupendous that we can scarcely realize their magnitude. Of this grand total we are a considerable part. It is just cause for congratulation that the importance, vitality and dignity of the horticultural classes is being recognized.

Do our horticultural classes sufficiently appreciate the value of and the necessity for diversification? Do we realize the full meaning of living at home? Is it not a fact that too great a proportion of the income from our products goes for that which can and should be grown in our own state and possibly in our own neighborhood? We hear it discussed on all hands, but have not acted on it vigorously. While this thought is trite, I risk once more calling the attention of our people to its vital importance.

I have felt strongly impelled at this meeting to press upon your attention these important matters. To give vent to the thought that has been growing in my mind for some years, that the most vital and far-reaching questions now calling for solution by Florida producers were not cultural questions but commercial ones; not planting but marketing; not fertilizing but transportation. Let us think about these things, talk about them, study them, conquer them. If this thought,

talk and study take not the form of action then have we labored in vain.

During the past few months, I addressed a circular letter to every member of the society, in which I asked for an expression of opinion on many matters of importance, and asked for suggestions. The replies have been numerous and my reward ample for the trouble I took. Much to enlighten and cheer the Society has come to me. Encouragement for the future, and splendid appreciation for the past of the Society has breathed from many of the much-valued letters received. I desire to thank you, most sincerely for these expressions of your better selves. In the quiet of your homes, you have said things that you would not say on the floor of this house. You have my promise to use the good suggestions in so far as I shall be able. These heart-to-heart letters shall bear fruit.

Among the weighty subjects discussed in those letters, was that of "State Aid" in the printing of our annual reports. A careful tabulation of the replies show about an equal number favoring and opposing the acceptance of such aid. Among those favoring, are some of our oldest and most thoughtful and experienced members. On the other side, can be found those of equal experience and wisdom. Some have cited other states in which State Aid is supposed to be the cause of their ruin as a society, while others point out other states in which it has had the opposite effect. The array of arguments pro. and con. is formidable and shows the ability and reasoning resources of our members. It is not my province or wish

to discuss the question or to express an opinion on it. If the matter comes up, all the reasoning, on all its sides and phases, will be developed and the society can then pass upon it intelligently. Without taking the time to discuss them here, I will say that many of the suggestions made by members will be carried out during the progress of the meeting, as they shall fit into our work.

We are to be favored by a number of eminent persons, with addresses and papers, during the progress of the meeting, as a glance at the program will show. Will these friends of the Society allow me to express, if ever so feebly, our sincere thanks for their kindness and our high appreciation of their valued efforts.

But, what of the work? We have six sessions before us, occupying two full days. We shall have seven formal addresses and papers. We shall listen to the reports of sixteen committees, and these reports will be ably and exhaustively discussed. In the course of these discussions will come out much of the real value of our gathering. Don't hesitate to stuff our "Question Box." Show me by your patronage of this box that you appreciate a chance to ask questions. Work, fast and furious, is our portion for the next few days. At the close of the meeting may we feel that we never had a better one. Amidst the friends of many years, in the city of hustle and progress, with words of welcome to inspire our efforts, with the social feasts before us, our tasks shall be light and their accomplishment assured.

Nematode Diseases of Plants.

BY PROF. EARNEST A. BESSEY.

Mr. President, Ladies and Gentlemen:

I wish to speak to you today about nematodes. In the first place, it may be well to attempt to explain to you just what a nematode is, although most of you are familiar enough with the work of one of them, the root-knot. Nematodes or ell-worms as they are sometimes called, are low animals, slender and worm-like, at least when young. Like the true worms they have no legs nor wings at any stage of their development. They differ from the latter in not being segmented and in having no jaws. They consist essentially of a tube-like skin lined with muscles; inside this is another tube, the alimentary canal, with various modifications along its course to act as gizzard, stomach, etc. Add a very simple nervous system and you have nearly all the essential features of a nematode. They should never be confused with the segmented earth-worms nor with the larvae of various insects, also, but erroneously, called worms.

Many species of nematodes are parasitic in animals, as, for example, the roundworm of the horse, the hookworm and trichina of man; many others live in various locations, both in the earth or in fresh or salt water, on decaying organic matter, a wellknown example being the harmless vinegar-eel; while still others attack living plants. The latter are entirely harmless to animal life, so that we need not fear their presence on that

score. They are bad enough as it is, however.

With the exception of some that are parasitic in higher animals, nematodes are mostly minute. Those that attack plants are rarely over one-eighth of an inch in length, while some are many times smaller. Were it not for their great numbers they would scarcely require serious attention.

The principal disease of plants due to nematodes, at least in this country, is root-knot, in which the nematodes live within the root, causing it to enlarge, forming the characteristic knots. In addition to this disease, other species of nematodes cause abortion of the flowers of grasses, distortion of leaves and flowers through their presence within the stem, stunting and malformation of plants through nematodes living within the stem, killing out of spots in leaves through nematodes in the tissues at these points, and injured canker-like spots on the roots. The latter are caused by nematodes attacking the roots from the outside without entering them.

The life history of the root-knot nematode is in short as follows: The eggs, which are about $1-300$ inch long, hatch into little larvea about $1-100$ inch long, and about $1-2000$ inch thick. These possess at the anterior end, a stout spear. Crawling around in the soil they finally find roots, perhaps not for weeks after

they are hatched. A larva seeks out the root tip and bores into it by means of its spear, taking its place near the center, parallel to the axis of the root, with the anterior end directed away from the root tip. The necessary nourishment is sucked out of the surrounding tissue through the spear which is hollow. Growth is rapid now, and soon the nematode begins to increase in thickness more rapidly than in length. The tip of the root continues to grow. The tissue about the nematode owing to some stimulus, due to its presence increases rapidly in amount, forming a knot of soft watery cells. If but one nematode has entered, the knot remains small, usually, but often the infections are not single and several to many nematodes come to lie close together or at short intervals causing a large knot or a succession of smaller ones to be formed. The nematode's increase in thickness continues until it is flask-shaped. At this stage the male and female begin to become differentiated in shape; the former performing a moult and again becoming a slender creature about 1-25 inch long and 1-500 inch thick. The female, on the other hand, continues to enlarge until she is as thick as long, and only at the anterior end shows any worm-like portion. At this stage the egg laying begins, and continues until 400-500 eggs have been laid. As these hatch they must bore their way out of the root tissue into the soil, and seek other roots or they simply find congenial places to develop in the same knot so that in one large knot can be found nematodes of all stages of development.

The time required for the development from the egg to the mature egg-laying individual depends to a great extent upon the temperature and upon the plant affected, being more rapid in warm weather.

It probably never is less than four weeks, and sometimes requires eight weeks.

The injury to the plant is of two kinds, direct and indirect. As direct injury may be considered that due to the reduction or stoppage of the passage from the roots of water and dissolved mineral food-stuffs, due to the tangling and interruption of the water conducting vessels in the knotted roots, also the injury to the plant due to the diversion of food-stuffs to build up the tissue of the knot instead of building up the rest of the plant.

Then direct injuries, although undoubtedly harmful, rarely cause the death of the affected plants. The indirect injuries are due to the fact that the soft abnormal tissue of the knot is attacked by various organisms of both fungous and animal nature, causing decay to set in which may involve the whole root system and thereby kill the plant. Many fungi find easy entrance in this way. So, for example, the fungus causing wilt of cotton attacks plants suffering with root-knot much more vigorously and destructively than those that are not so infested.

Many plants are attacked so slightly that the injury is very slight or not even apparent. Such plants, however, owing to the large number of eggs laid by a single worm, serve the purpose of keeping the soil well stocked with nematodes.

I have been making a list of all plants on which I have seen root-knot or on which it has been reported to occur. This list now contains about 300 species of plants, including most of those commonly cultivated. Among those that may be seriously injured, may be mentioned the following: fig, peach, European grape, roselle, banana, pawpaw, tomato, eggplant, rose, carnation, tuberose, violet, jasmine, cowpea, soy-bean, cotton, and

most of the garden vegetables, especially cucumber, squash, pumpkin, water and muskmelon. On the other hand, the injury has been but slight in those cases where I have observed it on the following: various grasses, as Bermuda, crow-foot, fescue, orchard grass, German millet, persimmon, sawbrier, wormseed, chufa, bush-clover, etc. I have yet to see a case of true root-knot on any of the citrus trees, velvet-bean, Florida beggar-weed, oats, rye, barley, sorgum, hog-millet, etc.

Many ideas have been advanced as to how this pest should be combated but many of them are based on experiments made with the closely related sugarbeet nematode of Germany. But little actual experimental work has been done. One method is that of soil sterilization, i. e. freeing the soil of the noxious organism by direct means. I shall mention various suggested means of doing this.

Chemical Means.—The most efficient of these is the use of carbon bisulphide injected into the soil to a depth of several inches at close intervals and allowed to diffuse there throughout the soil. If enough is used this is effective. It has several serious objections; it is expensive, so expensive in fact, that it would probably take several hundred dollars worth to treat one acre, not to speak of the labor of applying it. It is also poisonous to roots. A large fig tree will stand it sometimes, but the check to the growth is great. It is highly inflammable. It does not mix with water, and so cannot be used in wet soil. Formalin in dilute solution is equally effective if applied in sufficient quantity. However, to wet dry soil to the depth of a foot would require about five gallons of solution to a square yard costing \$150 to \$200 per acre. My experiments to determine whether a lesser

quantity will be sufficient are now under way. This solution is also harmful to vegetation, but if kept from the growing part of the plant is not as injurious as carbonbisulphide. Lime, gas-lime, gas liquor, oils, etc., have been tried on the sugar-beet nematode without effect. I am now trying some of them on the root-knot.

Heat is the most efficient means yet found for killing out all kinds of pests, including the root-knot nematode. Thanks to Stone and Smith in Massachusetts, the problem has been settled as far as nematodes in green-houses are concerned. Steam is passed at high pressure through tiles or perforated iron pipes running through the soil. This effectually kills all animal and fungous parasites. It seems doubtful whether that method will ever become of use in the open, unless it be for seed-beds or for truck farms where the income is very high. It would probably cost not less than \$2,000 per acre to establish such a sterilizing apparatus. The often recommended building of large fires upon the spot to be sterilized is to be discouraged, for the injury to the soil is too great.

Freezing, formerly supposed to be fatal to the root-knot nematode, is considered so by me no longer since I obtained authentic record of peony plants going through a winter temperature of 35 degrees below zero without even a mulch protection and showing root-knot again that summer. That was not in Florida.

In Java where the dry season is well marked and is really dry, it has been found possible to exterminate the root-knot nematode by drying out the soil. This is done by keeping it in fine tilth during the whole dry season by means of repeated plowings, and harrowings.

Strange to say, the root-knot nematode is easily killed by drying out, although many of its close relatives are dried without injury, and can remain alive for years in that condition, reviving again upon being moistened up. Paradoxical as it may seem, moisture will also kill the root-knot nematode. It has often been found that wet lands are free from nematode injury while dryer lands adjacent suffered badly. In one case I learned of some very badly infected land flooded by a spring freshet for several days. Always thereafter it bore crops showing no sign of root-knot. In Java this method had also been tried and found to be successful. The land must be submerged at least five to eight days.

Besides these direct means for freeing the soil of nematodes several indirect ones have been suggested, and it is by some of these that I believe our main salvation can be attained. The first to be mentioned is the starvation method; i. e. growing nothing on the land that can serve as food for the nematodes until all has perished. How long this would require for the root-knot nematode has not been determined; for its close relative, the sugar-beet nematode, it is not under two years. To keep the land entirely fallow this length of time is, of course, not to be thought of, but the same results can be attained by cultivating only plants not attacked by root-knot even in the slightest degree. Hence comes the great importance of numerous experiments to determine which plants are and which are not susceptible. Of those which so far I have found to be free from root-knot, are crabgrass, the small grains, velvet bean, Florida beggar-weed and but few others. Such information bearing on the subject as I can obtain from you will be gratefully receiv-

ed. In view of the facts known the practise of many of allowing the land to grow up thickly to crabgrass in the summer, is one that ought to tend to keep the root-knot nematode in check. If that could be combined with the use of velvet bean for a season or two, or if small grains were sown as winter crops for two years followed in the summer by velvet beans it looks to me as if favorable results should be obtained. I have such experiments already under way.

Another method of combating the pest, which promises very good results for certain annual crops, is that of breeding up resistant races. Thus the Iron cowpea, if obtained pure, is not attacked by root-knot. Unfortunately, however, most of that obtainable in the markets or even some of that sent out from other sources, contained some admixture of other varieties vitiating the results. Mr. W. A. Orton has demonstrated that this quality of resistance is transmissible to crosses with other sorts. Doubtless some results of value can be obtained by selecting seed from plants least affected in a field known to be full of root-knot. Such plants, when in flower, should be crossed, if possible, with similar resistant plants in same field. In this way a nematode resistant sugar-beet has been obtained.

The influence of increased amounts of certain elements of fertilizers on the amount of injury caused by root-knot has received, I find, practically no attention. It has been investigated very carefully in Germany in connection with the sugar-beet nematode. There it has been found that by greatly increasing the potash the injury is to a large extent, decreased. I am now beginning similar experiments with the root-knot.

The method, however, that has perhaps

been most successful of all against the sugar-beet nematode is the use of Trap-crops. Strange to say, although this has often been recommended for root-knot, I have yet to find a single case where it has ever been tried even as an experiment. I am making some experiments this season. The method consists essentially, in planting thickly in close rows, some crop known to be very susceptible to the nematode, allowing the nematodes to enter it and before they have developed far enough to lay eggs, and so increase the number in the soil, to destroy the crop. This is repeated several times during the season, and so reduces the number of nematodes still left in the soil that it requires several years before they become very destructive again. Certain cautions must be carefully observed, however, or the use of this method will increase instead of decrease the number of nematodes. It is necessary to remove or entirely turn under and kill the plants about four weeks after they come up. If left too long the nematodes will have developed too far and will have begun laying, if not long enough they will still be in the motile stage and will crawl out again and reinfect the soil.

What to do with a peach orchard, for example, where the root-knot is bad is a serious question. In the first place we will take it for granted that the orchard, even in its diseased state, represents too much money to permit it to be cut down. It might be well, then, to try watering the trees heavily before the buds open, either early in the spring or late in the fall, with a dilute solution of formalin, so as to kill the nematodes in the knots. For such I would prefer the cowpea (not the Iron.) But unless they are removed in time these trap crops will do more harm than good. When the orchard is cut down the land should be freed from nematodes by some of the means above mentioned, before setting again to peaches. Avoid cowpeas, except possibly Iron, as they propagate the nematode rapidly. Use velvet beans or beggar-weed instead. These are but suggestions, please understand, not from the result of actual personal experience, but as a result of fair acquaintance with the habits of the nematode. I trust some of you may have the courage to try these in a corner of your orchard and report to me the result.

Report on the Manatee Snail and White Fly.

BY F. D. WAITE.

Mr. President, Ladies and Gentlemen:

Our President recently asked me to get up a paper on the white fly and Manatee snail, the latter having been brought to the notice of the fruit growers within the past six months, and several descriptive articles have been published and copied into the leading papers of the State. I have brought a few specimens with me, also another specie of snail which may play a part in the cleaning up of the sooty mould, as we have found it feeding on the lichens several feet high on the trunks of old seedlings.

Messrs Butler and Heathcote of St. Petersburg sent me several dozen snail found feeding on the Mangrove at Passe-a-Grille, these were put around a tree during early winter and protected with sacks, but all died, I hope this summer to make another trial with them.

I am sorry to say that parties have visited the grove where the Manatee snail was first discovered and stolen so many that we can hardly find any left, and our neighbors who afterwards discovered them in their groves, have been treated in like manner.

From observations already made I believe the snail is not active during cold or dry weather, neither do I think they increase until the rainy season, and during the foggy weather in early fall and winter, when they become most active in ridding the trees and fruit of the sooty

mould. Those wishing to become familiar with the white fly and its enemies should procure Press Bulletin No. 4. issued May 1st, 1901, Press Bulletin No. 59 of January 15th, 1906, Bulletin No. 67 of June, 1903, and Bulletin No. 13 issued by the U. S. Department of Agriculture June 17th, 1897. There is another report of the Entomologist Prof. H. A. Gossard from July 1st, 1900 to July 1st, 1901.

All of the above reports cover the ground completely. I have a copy of Press Bulletin No. 59 with me, and if it is the pleasure of this Society I will read the same.

THE MANATEE SNAIL, *BULIMULUS* DORMANI.

(Press Bulletin No. 59, Florida Agricultural Experiment Station. Department of Entomology.)

The sooty mold of orange, *Meliola*, is one of the most serious results of white fly infestation of citrus groves, and is an element in the injury to various plants from aphids and from some of the scale insects especially the *Lecaniums*, mealy bugs, wax scales, and cottony cushion scale. The fungus is not itself a parasite on the plant, but a saprophyte, deriving its sustenance from the sweet honey dew secreted by these insects. The injury to the plant results from the smothering action of the fungus, the heavy coating of

funal threads interfering with the healthful action of sunlight on the leaves. The appearance of the various ornamental and hedge plants is also disfigured by the dark fungus. The sooty mold is especially bad following the white fly attack owing to the large amount of honey dew secreted by these insects. As the white fly larvae attach themselves to the under side of the leaves the honey dew exuded by them falls to the top side of the leaves beneath, thus affording favorable opportunity for the growth of the fungus. So constant is the association of the fungus and the white fly that badly infested groves and hedges may be recognized at some distance by the heavily coated dark foliage. The fungus develops on the fruit as well as on the leaves and stem and washing becomes necessary, resulting not only in an added expense, but also in increased danger of decay in shipping. In this connection the habits of the tree snail, *Bulimulus Dormanii*, are of the greatest interest. This snail has been found in the orange groves in Manatee county feeding upon the sooty mould. Just how long the snail has been present on orange trees in this county it is impossible to say. It was observed as long as two years ago by Mr. F. D. Waite, at Palmetto. It seems to have been present in small number in other groves at this time, but attracted no further attention until the present summer. The snail is now widely distributed in Manatee county, occurring in many groves on both sides of the Manatee river. The work of the snails is very characteristic. When well started they occur in great numbers on the tree spreading over it from base to top. Its favorite food seems to be the sooty mold. The fungus is cleaned from the leaves, stems, and fruit. The leaves

thus cleaned have a glossy, shiny appearance as though free from white fly. The fruit thus cleaned has a better color and probably ripens earlier. In addition to the fungus, the snail takes algae and some lichens from the stem and trunk, giving the trunk a much cleaner and fresher look. The trees that are cleaned stand out conspicuously from the surrounding trees by their bright foliage and clean trunks. The snails increase rapidly under favorable conditions. The eggs are probably deposited in protected places about the trunks of the trees, possibly also about the base of the tree under leaves and other rubbish. That the snails are capable of doing effective work when present in sufficient numbers has been shown in numerous groves in Manatee county during the present summer. Such trees in these groves as are well stocked with the snails have been thoroughly cleaned, the fruit not requiring washing.

The snails are of medium size, measuring, when full grown, three-fourths to one inch in length. The shells are smooth, white, or *corneous* white, and with about four bands of brown spots. Old shells have often a somewhat corroded surface, the bands becoming indistinct or absent. When the conditions are unfavorable, either cold or dry, the snails take refuge in the hollows of the trees or under leaves accumulated in the forks, or elsewhere, or under sacks at the base of the trees when these are provided. It thus becomes an easy matter to transfer them from tree to tree. A few snails placed by Mr. Wade Harrison in one of his trees in March, increased in such numbers as to free the tree of sooty mold by mid-summer of the same year. The snails are known to range with some variation from the mouth of the St. Johns river on the north, to the

Caloosahatchie river on the south. The species is probably native to Florida as specimens in small numbers were observed about the hammocks and elsewhere as long as fifty years ago. Its habit of feeding on the sooty mold of the orange, however, was not known until within the past two years.

In view of the fondness of the snails for the injurious sooty mold fungus, it becomes of first importance to observe their treatment of the beneficial fungi. Among the fungi parasitic on orange insects there are four species of inestimable value to orange growers. These are, the brown fungus well known as an effective parasite on the white fly larvae; the red-pink fungus also parasitic on the white fly; the red fungus, and the gray headed fungus, both parasitic on the common scales. The brown fungus so effective in control of the white fly, as is well-known, throws out spreading *hyphae* for some distance around the body of the dead leaves. It seems that the snails occasionally feed to a limited extent on these, spreading *hyphae* but evidently not enough to interfere with the spread of the fungus, since this fungus is doing particularly effective work in the groves in the Manatee region where the snails occur.

The red-pink fungus is also abundant in the groves where the snails occur and is untouched by them. The snails have not been observed to feed on either the red or the gray fungi parasitic on the common orange scales, and it is probable that they have no taste for these parasitic fungi. Colonies of the snails are being started in part of the State where the white fly injury is severe and where conditions seem favorable for the growth of the snail. It is desirable that close attention be given to the habits of the snail, as well as to means of protecting colonies against unfavorable conditions. A few sacks thrown around the tree seem to afford a needed protection against unusual cold. It is probable that sprays can not be used on trees stocked with the snails without injury to the colony, for, although protected by the shell from the immediate effect, sufficient spray probably clings to the sooty mold on which they feed to destroy them. The beneficial parasitic fungi and the snails may be allowed to work together on unsprayed trees. The snail is here spoken of as the Manatee snail since while recorded as occurring in other parts of the State it was found working on the orange groves first in the Manatee region.

Report of Committee on Diseases, Insects and Method of Control.

[There was no regular report made by any member of the committee, but the question was opened for discussion, and this proved very interesting. The following is as full a report as the stenographer was able to make.—Sec.]

Mr. Hart.—Mr. President, I regret to say that I have been unable to make any report owing to the fact that I have been in a dark room for some weeks, unable to read or write and have had to depend upon some one else to do my writing for me. After the President had notified me I was on this committee I communicated with other members telling them of my disability and urging them to attend to the work necessary to a good report.

Mr. Hubbard.—I have no formal report on this subject. I have had no experience with the white fly, not even like our friend Mr. Hart. I have a small joke at Mr. Hart's expense. One of our neighbors sent him a specimen and asked if it was the white fly, he also wrote Mr. Hart, but Mr. Hart was so afraid of the white fly that he immediately burned it without examination. I do not believe this gentleman had the white fly, but he did have the white wax scale. The red fungus is now attacking this scale and I think he will soon be rid of it.

I practically do no spraying. In cases of small trees I use a small atomizer, using pure kerosene and treating them

on a warm, dry day, putting it on carefully. The kerosene will evaporate in about an hour and one application will remove most of the scale and will not hurt the foliage. Kerosene has practically the same chemical composition as turpentine and the essential oil of the orange, so that when it evaporates it has very little effect on the tree. If you should saturate the tree with the kerosene, of course it might do some damage.

(Question.) Have you used whale oil soap?

Mr. Hubbard.—I used to do this, but am now depending on Lady bugs and fungus. Orange trees may have some scale the first season, but the next year the lady bug and fungus will clean them out pretty thoroughly. If a man sprays for red spider etc., he kills the fungus and has to keep up the spraying continually.

Maj. Healy.—Mr Waite seems to be the only one who has had any experience with the white fly.

Mr. Waite.—One of the oldest groves we have, contains 600 large trees, so large we cannot get in between them to spray. This grove has been infested with the fly for ten or fifteen years. The fungi is very abundant, also about one hundred trees are inhabited by the snail, specimens of which I have brought with me. We commenced picking this crop of 4000 boxes during Christmas week and finished about the twentieth of January we

had a great deal of rainy weather at the time. Every box was washed except that which had been beautifully cleaned by the snail. The fruit carried well, and sold for \$3.00 per box in Providence R. I. The trees cleaned by the snail gave us a uniform bloom this spring, while the balance of the grove bloomed only in the tops of the trees.

Saturday night I went over to the grove to get specimens of the snail but could only find a few, and concluded that our neighbors had gathered the greater portion of them, but Sunday it rained during the night, and the next morning my foreman found plenty of them crawling up and down the trunks, and over the foliage, and he said that many of the snails had particles of sand still sticking to them. We are not certain that they do not burrow in the earth during the cool winter weather, coming out when the weather is warm, and the atmosphere moist. They do not move around or feed, only when the sooty mold is wet, which I presume enables them to eat it more readily, and in doing so they clean up the eggs of the fly.

Mr. Hart.—Mr. President, I wish to ask Mr. Waite if in spraying he would risk clear water.

Mr. Waite.—This would assist the snails and after two or three sprayings the fungi would make their appearance, for this reason I would recommend to those who do not wish to use insecticides and fungicides, spraying with clear water, and if done toward night, it would keep the sooty mold moist all night.

Mr. Hart.—What kind of a nozzle would you use?

Mr. Waite.—We use the Big Boston in a solid spray on the tall trees, and the Vermoel for small trees and where we

wish to throw a mist over the fruit for the rust mite.

Mr. Bell.—I would like to know whether or not the result of the fungi mentioned is a remedy for the white fly.

Mr. Waite.—After the white fly has been in a grove a few years, this fungi seems to be a natural parasite following it, and will unaided, in time clean up the trees so they will produce one fine crop in three years, and a medium one year, and comparatively nothing the next, but by assisting the fungi to spread more rapidly we may get fewer off years.

Mr. Bell.—Do I understand that when the white fly gets into a grove that it will bear probably once in three years?

Mr. Waite.—Yes sir, but it is my opinion that if we assist the fungi and snail to spread more rapidly, we will soon lose all fear of the white fly.

Mr. Bell.—Is the damage done by white fly as much as one hundred dollars per acre?

Mr. Waite.—I should say that was a small estimate but if the fungi and snail have your assistance they will keep out the fly, if you will take the pains, and use the time you would consume in spraying, distributing fungi and snails, it would not lessen the value of your grove one dollar. As I have stated the fruit shipped from the grove mentioned was as fine as any I ever saw, while that adjoining this grove was not near as fine flavored, it was covered with sooty mold, which excluded the air and sunlight, necessary to make a fine quality of fruit. The trees stocked with the snail were quite clean by the last of Sept., so they had plenty of sunlight (and fully a month before gathering the fruit,) therefore I think the snail the best friend we have with which to fight the white fly.

Mr. McClung.—Is this mould responsible for the damage that is attributed to the white fly?

Mr. Waite.—Yes sir.

Mr. Bell.—How many oranges did you wash and what was the expense of washing them?

Mr. Waite.—We have cleaned as many as fifty boxes in fifteen minutes, with three men at \$1.25 per day. We washed our entire crop of grape fruit and oranges not cleaned by the snail.

Mr. Longley.—I would like to ask about the scale and white fly: Is the white fly more destructive to one kind of fruit than to another?

Mr. Waite.—It is more destructive to oranges than grapefruit, but is worse on tangerine, mandarin and lemon, than any of the others.

Mr. Gist.—I would like to ask what steps I should take if the white fly should appear on my grove. Should I spray or use fungi and snail?

Mr. Waite.—I would advise spraying the first trees showing any sign of the fly, in this way you may be able to hold it in check for several years, but it would pay to introduce the fungi and snail as soon as you see that you have the fly well started in your grove, but not before, for foliage partially covered with the fungi may contain plenty of pupa which may mature in a few days and fly to other trees not stocked with the fungi.

Maj. Healey.—I have sought information on the origin of the white fly and am told that it was brought to this country from China. It might be we could gather some information from there that would aid us in its extermination.

Mr. Sampson.—I would ask if the extermination of the white fly is dependent

on fungi, snails, or spraying, and if there would be a full crop the third year.

Mr. Hart.—I would like Mr. Waite's opinion as to how the spraying can be done on bearing trees, and whether or not it would give us a good full crop the third year or a normal one each year.

Mr. Waite.—Six years ago I took charge of the Manatee Lemon Co's groves in Manatee county. The young grove of 225 acres joined another grove that was badly infested with white fly. Our trees were very small, from one to two feet high, we sprayed that portion nearest that grove the first winter, and as we noticed specimens of the fly farther out in our grove, from year to year, so we increased the area. For the first four years we kept the fly down to such an extent that our trees were always glossy, and only an occasional tree would be black from the sooty mould. As the trees became larger it was more difficult to wet the entire foliage, and the Fly would become numerous by October, and portions of the fruit would be black, but these winter sprayings seemed to clean the trees enough so that they would bloom and set a very nice crop of fruit. Our success was fully as good with old seedlings. We did not spray during the past winter, wishing to see what results would follow the introduction of the brown and red fungi, these only work during the rainy season or foggy weather during the fall and winter. By spraying we have increased our crop of fruit each year. It requires more intelligent labor than the ordinary "Darkey" to do successful spraying as one leaf missed may have hundreds of eggs.

Mr. Brown.—What are the surrounding dangers of the white fly? Upon what does it feed?

Mr. Waite.—It feeds upon the orange, lemon, grapefruit and lime, I have also seen it in all stages from the egg to the adult fly, on the chinaberry, persimmon, cape jasmine and prickly ash. While I have never found the larva or pupa on the palmetto and gall berry, I have seen the adult flies quite abundant. The sooty mold attacks the honey dew, following the attacks of many kind of wax scale and mealy bug. Many have sent me specimens of plants or shrubbery covered with this deposit of sooty mold, and asked if it was not white fly. On examination I found only the wax scale, or mealy bug.

Mr. Taber.—I would like to hear from Prof. Rolfs on this question.

Prof Rolfs.—I was getting more information out of this than I could possibly give, but some people are never satisfied until they get things stirred up.

The damage done by the white fly, and the smut which follows it, does considerable damage to the grove that is ordinarily not taken into consideration. The honey dew, which is excreted by the white fly, falls upon the fruit and the upper side of the leaves, this makes a medium in which the smut or sooty mold grows luxuriantly. By its extensive growth it forms a velvety covering over the leaves and fruit and on account of its black color it keeps the sun from penetrating to the leaves and fruit or in a large measure obstructs it. Sunlight as we all know is absolutely necessary for the welfare of our orchard trees, and is also absolutely necessary for the maturing of the fruit, consequently, when the sunlight is cut off almost completely, as is often the case with this sooty mold covering, the fruits cannot mature properly. This is brought out very strikingly when the fruit is run through a washer. The fruit as it

hangs on the tree appears to be perfectly ripe but when it comes out of the washer it is half green, the green area extending as far as the fruit is covered with the sooty mold.

The Manatee snail does not destroy the white fly as a number of people have asserted. No one who has studied the work of this snail with a hand lens, which is the proper way to study it, will contend for a moment that the snail does any harm to the white fly. It merely feeds on the sooty mold cleaning it off completely from the leaves and from the fruit, doing the work much more perfectly than any washer yet invented.

The good work of the Manatee snail in clearing off the sooty mold was strikingly apparent in a number of cases. The trees that had been cleared of the sooty mold a year before produced an abundant bloom and set a heavy crop of fruit, while the adjoining trees bloomed rather sparsely and set, probably, a half crop of fruit. So far as the natural conditions surrounding these trees was concerned they seemed to be alike, there was every reason for believing that the beneficial effect was attributable to the work of the snail.

Maj. Fairbanks.—I would like to know about the white fly on younger growth, as it did not seem to be on the older growth.

Professor Rolfs.—The females deposit their eggs on the younger foliage, as young trees are usually making a vigorous growth, these are apt to have more eggs deposited upon them proportionally than the large trees. It sometimes happens that a tree will send up a water sprout while the rest of it is practically dormant, if this occurs during the flight of the white fly, the water sprout will be

found to have received myriads of eggs on the lower side of the leaves.

Mr. Henderson.—I want to touch on one point about the white fly. I am not properly in the orange belt, but I have about one hundred trees. In the fall of 1904 the white fly appeared on one tree. I was told if I would cut all the leaves off the one tree I would be free of the white fly, which I did. This is good. I had them only on the one tree.

Prof. Rolfs.—In the matter of keeping the white fly restricted to the area already inhabited. I may cite one instance that occurred among a number, in which we succeeded in eradicating the fly after it had become pretty well established, I am referring to the case that happened at West Palm Beach. A wealthy gentleman who had a fine house at Orlando, decided to build a finer one at West Palm Beach, and after the house was built he carried with him some trees and shrubs. After these had been set out, probably some six months, it was discovered that they were infested with white fly. Permission was obtained to destroy every thing to which the white fly had spread, all the shrubbery, including citrus planted out, were grubbed up and burned, some of the stuff such as the stems of banana plants that would not burn were thrown into the lake.

Later investigations failed to bring to light any white fly, we think therefore, that the pest was stopped and eradicated at the point of infection. If the infection is checked before migration of the white fly takes place, I think it entirely possible to eradicate it.

Mr. Cook.—How did you destroy the white fly? If he is in the air, is he killed, or will he propagate a second year?

Prof. Rolfs.—The white fly in its com-

plete development goes through the egg stage; the larval stage, during the first part of which it crawls about and during the latter part it remains stationary; the pupa stage which to the unaided eye is not very different from the larval stage, but can be distinguished from it by the use of a hand lens; and the last stage or adult state. During the last stage is the insect able to fly and only during this stage does it reproduce itself.

During the summer season the eggs hatch in about three days. The larval stage lasts for about twenty five days, the third stage or pupa stage lasts for about ten days. The adult insect lives only a very short time, the females lay about all of their eggs during the first twenty four hours, the adult flies live only about three or four days. The time required for an entire generation during the summer time, according to Professor Gossard, is about forty or fifty days, while during the winter portion of the year it may be nearly six months.

Mr. Cook.—Does the white fly only live long enough to propagate the first time? Does it lay more than one crop of eggs?

Prof. Rolfs.—The white fly appears to lay only about twenty five eggs and when this hatch is laid off she does not appear to lay a second batch.

Mr. Cook.—I can spray my trees, but the white fly commences laying her eggs the next night. I have not been able to destroy the eggs.

Prof. Rolfs.—During the summertime there is almost a continuous appearance of adult flies, there are, however, periods during which only few are on the wing, at such a time the work of combatting this pest can be carried on to best advantage.

Mr. Cook.—Do I understand that they disappear after laying?

Prof. Rolfs.—There are three or four periods during which the adults appear in countless numbers. During this time it is probably not best, to spray, excepting where it is done for special purposes, spraying can be done most effectively between the broods.

Mr. Griffing.—Prof. Rolfs mentions that a large portion of the State is now free from the white fly. While this discussion has been confined to Manatee, I would ask if it can be determined just where the territories are that are now affected.

Prof. Rolfs.—We can not give you the definite data as to what portions of the State are infested with white fly and what portions are not. Prof. Gossard had this pretty thoroughly worked out, but we know that every year the insect is spreading to new districts and we know how reluctant people are especially if he happens to be a Nurseryman to admit that white fly is present on his premises. A man might not hesitate to state the fact privately but he would not like to have it advertised.

Mr. ____.—I have specimens of fungus which I presume the citrus growers are familiar with. Last year the State was full of this particular fungus. The damage is not known as yet, but we hope to know about it soon. Last year we had scarcely any scab at all, but this year we have an abundance of it. Some one found that by spraying the scab with Bordeaux mixture that it could be controlled. This scab will develop on the sweet trees also. Also on grape fruit it is very severe. [The fungus referred to is the sour orange scab. *Cladosporium elegans*. Sec.]

Mr. Longley.—Is it more prevalent on grapefruit or oranges?

Mr. ____.—On lemon it is more severe than on any citrus stock.

Mr. Longley.—Is the fungus shown on vigorous growing trees?

Mr. ____.—The fungus attacks trees when they are very small, and it seems to make very little difference whether the tree is growing thriftily or not. I believe, however, we see it more frequently on thrifty trees.

Mr. Longley.—Will the fungus spread during the summer?

Mr. ____.—Very little growth appears during that time, but if we have a dry season we are not apt to get much of it. It requires a rainy season for this to grow.

Mr. Longley.—Did that same fungus attack lemon trees prior to the freeze.

Mr. ____.—Yes.

Mr. Beers.—Will inoculation of bluestone be beneficial?

Mr. ____.—I should say, no. This would have no preventative effect.

Mr. Taber.—To what extent have you found this scab affecting trees?

Mr. ____.—Some sweet oranges are sometimes affected slightly; the satsuma, very badly. Ordinary oranges we have no trouble with at all after the buds begin to grow. The scab I referred to was that on tall bearing trees, and so differs in that respect.

Mr. Waite.—Referring to the sour scab on the grapefruit, I will say that in the last few days I have received a letter from a gentleman who says his trees are all more or less effected with fungi, with the exception of about two acres where the trees are located on a shell mound, there they seem to be free from it. Is it lime the trees require?

Dr. Rolfs.—I cannot answer as to this question as we have made no experiment

on this line. It may be due to location, soil, or the shell.

Mr. Fairbanks.—Is there any way of producing and developing non-resisting trees?

Mr. Brown.—It may be possible that there are some varieties of grapefruit that are more resistent than others.

President McCarty.—This is a matter worthy of study. I hope something may be attempted along this line. I think it probable that something can be done, but I cannot tell how long it will take.

Mr. Brown.—There is one other disease, that is withertip: I do not know how many here are familiar with it. If there are those here who know anything about the withertip, I will beg to hear from them.

Prof. Rolfs.—I have been studying the disease (withertip) for the last four years, and have also treated groves varying in size from a few trees up to over twenty acres in extent. The methods of procedure are pretty thoroughly worked out. A bulletin on this subject was published from the Department of Agriculture, Wasington, D. C., and a revised edition of this bulletin is now being prepared.

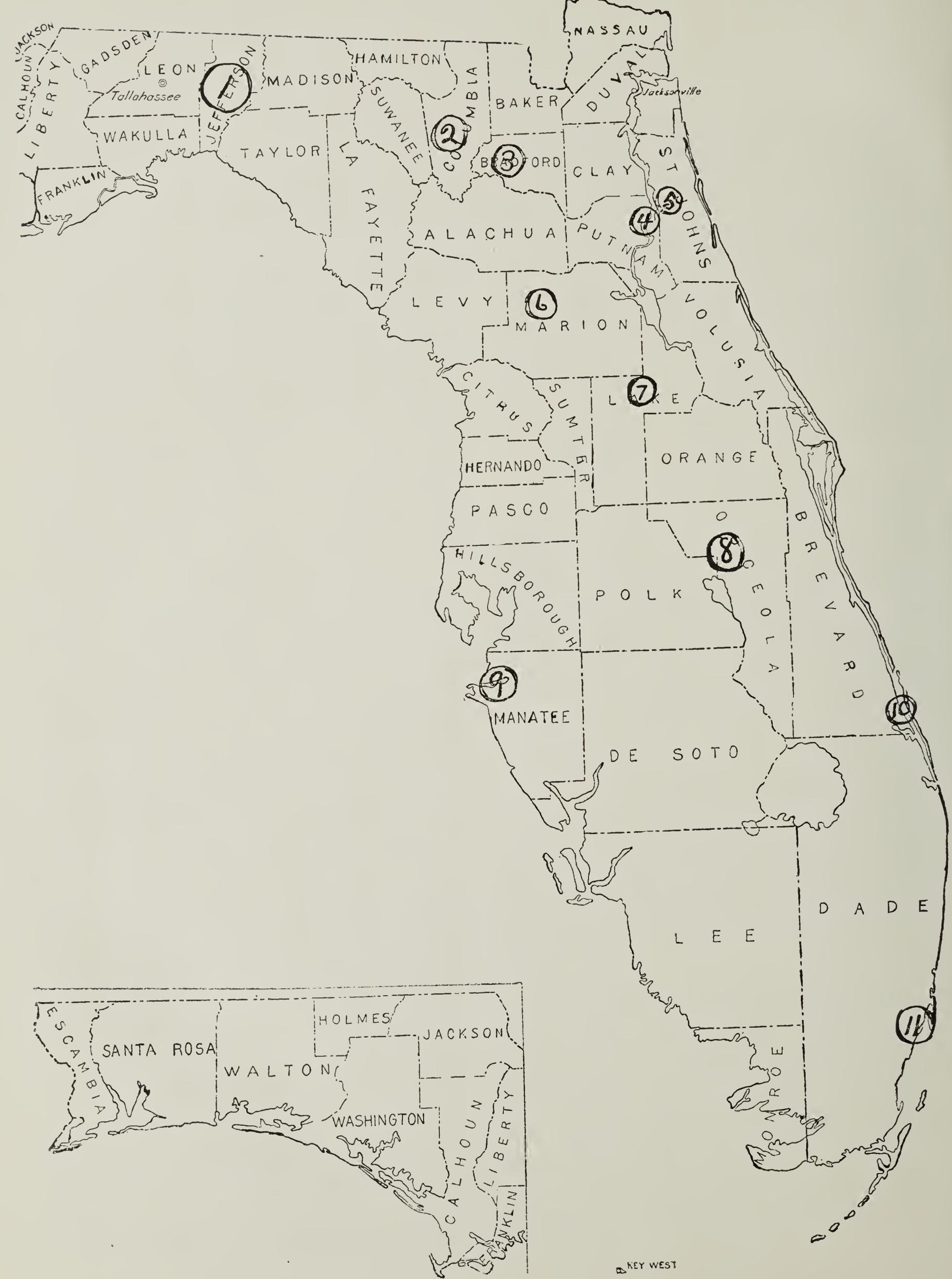
In addition to my own experience in treating this disease, I have given advice to many grove owners and have watched the application of this advice. Where the work is done thoroughly and followed up conscientiously the results have always been satisfactory. A number of groves that were treated according to advice, and were very badly infected with the disease, are now practically free. As there are a number of men present who have had practical experience in combating with this disease, I should like to hear from them.

Mr. Phelps.—I have several groves

that have been badly effected by this withertip; my fruit dropped badly and I wrote to Professor Rolfs but did not hear from him promptly, so I wrote to a sprayer and asked about inoculating with bluestone. I asked him if it would not have the same effect as spraying. I urged inoculating, mixing equal parts of blue stone and air slacked lime. I have been doing this and find that after it has been in about ten days or two weeks there is a great deal of gum coming out. That is as far as I have gotten and I do not know what the effects will be.

Mr. Hart.—Before we leave the matter of diseases and insects there is a very important matter. I am losing trees briefly. A year ago I introduced a resolution asking that we get more assistance from the Agricultural Department in the study of blight, I took it up with Mr. Wilson who promised to help us if we could get in shape to receive it. I want to put in the same resolution. This is an important matter. I am losing trees now that would bear ten or twelve boxes each year, and I am putting in new trees in each place and have a tree growing wherever there is a place for it, but my grove is uneven. I am not alone in this experience; this disease is all over the State but we do not know much about it yet and it is something we should look after.

Mr. Painter.—Your Secretary presented the resolution to Secretary Wilson in person, Mr. Wilson said he would be glad to do more than they were doing if he could but that all of their appropriation for this class of work had been used up. I am confident the only way we can get an appropriation for this work is to take it up with our Senators and Representatives and get them to ask for an appropriation.



MAP SHOWING LOCATION OF CO-OPERATIVE EXPERIMENTS.

The Experiment Station Co-operative Work.

BY PROF. P. H. ROLFS,

DIRECTOR FLORIDA EXPERIMENT STATION.

Mr. President, Ladies and Gentlemen:

In beginning my talk on the Experiment Station co-operative work I cannot do better than to show how the purposes for which the Experiment Station was founded is frequently misjudged, and in many quarters not understood. So much work has been done with the Horticultural Society, as a society, and with the different members of the Society, personally, that nearly everyone in my hearing is probably better informed than the best informed outside the Horticultural Society. In 1887 Congress provided for the Experiment Station by passing the Hatch Act. To show concisely what was intended by the Hatch Act I will quote you Section 2 verbatim:

"Section 2. That it shall be the object and duty of said Experiment Stations to conduct original researches or experiments on the physiology of plants and animals; the diseases to which they are severally subject, with the remedies for the same; the chemical composition of plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and water; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses and

forage plants; the composition and digestibility of the different kinds of food for domestic animals; scientific and economic questions involved in the production of butter and cheese; and such other researches of experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable, having due regard to the varying conditions and needs of the respective States and Territories."

This, as you will see, makes a very clear cut statement of what the funds are to be used for. Thus, things which are not provided for in this Act are necessarily not contemplated and not permissible under it. The Congress, previous to the one in session at the present time, passed a law requiring the Secretary of Agriculture to supervise the experiments much more closely, and also co-ordinate the experiments in different States.

During the past year Congress has passed the Adams Act which will prove of great benefit to the Experiment Station, and directly, to the people of Florida. In this Act an additional \$5000 are appropriated, which is increased by \$2000 annually, until it shall reach \$15000. This fund is more closely guarded even than that of the Hatch Fund. I quote you from this Act which appropriates the fund.

* * * "to be applied only to paying the necessary expenses of conducting

original researches or experiments bearing directly on the agricultural industry of the United States, having due regard to the varying conditions and needs of the respective States and Territories."

The term, "original research," might be a very general one were it not for the fact that the Director of the Office of Experiment Stations is held responsible for the interpretation of the expenditure of this fund. The Director of the Office of Experiment Stations has probably had more experience in Experiment Station work than any other living man, and consequently is able to tell at a glance whether a proposed piece of work is original research, or whether it is a piece of demonstration work, or, what not.

In interpreting this law the Secretary of Agriculture has issued a circular letter in which he states:

* * * "Accordingly, expenses for administration, care of buildings and grounds, insurance, office furniture and fittings, general maintenance of the station farm and animals, verification and demonstration experiments, compilations, farmers' institute work, travelling, except as is immediately connected with original researches in progress under this Act, and other general expenses for the maintenance of the experiment stations, are not to be charged to this fund. The Act makes no provision for printing or for the distribution of publications, which should be charged to other funds."

I have thus taken considerable time to show you exactly what are the essential parts of the laws founding the Experiment Stations, and also what limitations are placed upon us. I do this from the fact that there seems to be a general misinformation as to what the office and privilege of the Experiment Station is.

Even our legislators who assemble at Tallahassee bi-ennially and even people higher in authority have had erroneous impressions in regard to the essential parts of the law.

The Hatch Act was passed in 1888 and became operative in the same year. This makes the experiment station a little over seventeen years old. During this time it has published 84 bulletins and several annual reports. Of the 84 bulletins 46 are devoted to horticultural work directly, and portions of the remaining 38 are also devoted to horticultural work; and also a large part of many of the annual reports. From this you will see that the horticultural interests of the State have been well looked after. This is especially so in more recent years. Taking the last ten years we find that 36 of the bulletins are devoted to horticultural matters. Most of these being fully illustrated. In the last five years 22 bulletins have been published on horticultural matters. Some of these have been profusely illustrated. If no other bulletins had been published from the Experiment Station within the last five years than those published on Horticultural subjects, the requirements of the law, so far as publications were concerned, would have been more than met.

The matter contained in these bulletins in the most cases, has received world-wide attention.

The pineapple growers of Florida have at their disposal the most thoroughly reliable scientific publications on their special subject that has been published anywhere in the world. Within the present fiscal year two new bulletins on this subject have been issued which many of you will find on your tables when you reach home from this meeting.

From the beginning the Experiment Station has had an appropriation of \$15000 a year. During the seventeen years of its life the State of Florida has not appropriated anything toward equipment and maintenance of this institution. Consequently what it has done has been accomplished entirely on Federal appropriation. This, of course, is much to be regretted, especially from the fact that, if, additional funds from the State had been accessible it would have been possible to have erected very suitable buildings and to undertake much more elaborate and useful experiments than it has been possible in the present conditions. Frequently in planning experiments these have had to be altered in such a way as to make it possible to meet the expenditures under the conditions imposed by the Hatch Act. Another serious condition that has arisen is the fact that the amount of appropriation has not been increased since the inauguration of the experiment stations and yet the living expenses and supplies have nearly doubled in prices. In some cases these have more than doubled in price. This is especially true of labor in the vicinity of the Experiment Station.

CO-OPERATION.

Our most successful experiments that have been carried out by the Florida Experiment Station the State has co-operated with the Experiment Station. Among the first of these co-operative experiments was the one conducted in the fertilization of pineapples on the field belonging to Mr. T. V. Moore, at Jensen, Florida. In this experiment Mr. Moore furnished the field and took care of it; while the Experiment Station furnished the fertilizer and made the application.

The crop was the property of Mr. Moore, excepting that the Experiment Station made use of as many of the ripened pineapples as might be needed for scientific work. This piece of work proved to be so thoroughly successful, that in spite of the fact that the writer was roundly criticised by members of the Board of Trustees, they found themselves in a position where his successor was permitted to carry out the exact line of work after a year or two of interruption.

In this connection allow me to say that the members of the Florida State Horticultural Society have always given the Experiment Station their generous sympathy, and in every way pointed out to them, have co-operated and helped us along in the most cordial way. This generous co-operation has not been merely that of words of encouragement, but in actual help in the field. Our scientific staff is not only welcome but requests and importunities are constantly coming for expert help and advice in the field. Whenever possible we respond promptly and cheerfully. There are times however when the conditions at the Experiment Station will not permit us to be absent. It shows that a very great interest is being taken at the present time in scientific information, and that the latest and most improved methods are sought.

NEEDS OF THE EXPERIMENT STATION.

The first requisite of the Experiment Station is to have your hearty sympathy and support. These you have given very generously, though, possibly, not always in the most effective way. We have at times lost some of our most active and energetic men, that could have been saved to us if every member of the horticultural

Society had demanded of the Trustees that the resignation be not accepted.

That we have no support from the Legislature to supplement the funds of the Experiment Station has already been indicated. There is however, a very general misconception on this point, not only by the Legislators, but also by the Agricultural constituents in the State. The Experiment Station is frequently importuned by the Agricultural people to hold farmers institutes. From the reading of the law which I have quoted it is clear that it was not contemplated by Congress when this act was passed to use the funds of the Experiment Station for Farmer's Institutes nor for demonstration work. The following paragraph is taken from a letter of instruction sent out by the Secretary of Agriculture to the Directors of Experiment Stations:

"The increased liberality of the Federal Government in providing for the endowment of research and experimentation in agriculture should be a further incentive to the States and local communities to supplement these funds for the extension of demonstration experiments, farmers' institutes, agricultural colleges, schools, and courses of instruction, and the general education of the rural communities along industrial lines, in order that the masses of our farmers may be so educated from early youth that they will appreciate the benefits of original research and experimentation as applied to agricultural problems and be able to appropriate in the most effective manner for their own benefit and the general welfare of the nation whatever practical results are obtained from the work of the agricultural experiment stations."

From this you will see that it is very clear that the expenses of organizing and

running farmer's institutes and other similar institutions in the State of Florida must be met from funds provided by the Legislature.

SEPARATION OF THE EXPERIMENT STATION FROM THE UNIVERSITY.

The Board of Control of the Florida educational institutions as soon as they came into power decided to make a more sharply defined segregation between the University and the Experiment Station. Through their President Dr. Sledd of the University, they have promised us that the workers in the Experiment Station should not be required to do University work.

This segregation has its advantages and also its disadvantages. It has its disadvantages in losing the services of, at least, two very able men, Dr. Flint and Dr. Sellards; on the other hand, it has its advantages in securing the undivided efforts of a number of the best workers that we have in the South. During the present fiscal year: i. e., until June 30, the connection between the University and Experiment Station will continue as it has been for the past fourteen years. At the beginning of the next fiscal year, which is July 1st, the Experiment Station staff will be entirely free from teaching work. This will make it possible for this corp of scientists to devote their entire time to the working out of experiments that have been inaugurated. It will also enable them to visit various portions of the State of Florida at such a time, and for such a length of time, as their experiment work will permit. During the coming year it will be possible to deliver lectures from time to time at other points and at more frequent intervals.

REMOVAL TO GAINESVILLE.

Every member of the Horticultural Society is familiar with the fact that the University of Florida is to be transferred to a new site at Gainesville during the coming year. At the same time when the University is transferred the Experiment Station will also be moved to its new location. The Board of Control are providing at Gainesville commodious

buildings for every department in the Experiment Station; also propagating house, grounds, and other equipments necessary for beginning work at once. The plans have been made and are being carried out successfully so that there will be no interruption in the experiments that are already in progress and also make it possible to carry forward any new projects that may be found desirable.

Report of the Standing Committee on Peaches, Plums and Pears.

BY G. M. GRIFFING.

Mr. President, Ladies and Gentlemen:

I as chairman of the committee, addressed a letter to the two other members of the committee, Mr. E. H. Hayward, of DeLand and Mr. J. Y. McKinney of Candler, asking if it was their wish that the report be made jointly, or if they wished to make a separate report and asked for suggestions, as neither offered any suggestions or assistance, I proceed to prepare the following report. Was quite in hope of getting some valuable assistance from these gentlemen as each are from sections where there is interest taken in peach growing.

"In no line of business is there more need of Enterprise, and more problems to answer than in the growing and marketing of fancy peaches." These were the words of Prof. M. B. Waite of the Department of Agriculture, in opening his Address before the Georgia Horticultural Society at Dublin, Ga. in 1900, a man who has not only studied peach growing from a scientific standpoint, but from a practical as well, he owning large orchard interests. Never was there a statement truer. Yet, where in all this vast country of ours can we find a people better fitted, better qualified to master this branch of horticulture, and reach the maximum of results, than we find in the Ranks of the

Florida Horticultural Society. Men who have withstood the adversities and the disappointments that they have, yet who have come out victorious over all; certainly will not acknowledge defeat and abandon an enterprise that has made our big sister States, Georgia and Texas famous. It is true that we are farther from market than our Georgia Brothers and that we do not have the famous Elberta variety. These are slight disadvantages we will admit, but we have advantages that outweigh these many times. What are they? Well, I should not think that any true Floridian would ask that question. It is some thing you all brag of and talk about. Why just simply Florida climate that enables us to grow and market the first good peaches of the season offered to the American people, and we have this market all our own for from two to four weeks. Not only this, but in point of flavor and carrying quality it is the best of the year, whether from Georgia, Texas or Michigan. This is rather a broad statement, but before I am through I hope to prove it to your entire satisfaction.

I do not mean that every neglected, gnarly and diseased tree or orchard of Jewell, Waldo, Imperial and other Florida varieties is going to produce this superb peach if left in that neglected un-

healthy condition. No most certainly not. What I do mean is that the orchard planted in soil adapted to the growth of peaches, that is well cultivated and cared for from the day it is planted, that is rightly fertilized and fruit properly thinned, picked at the right stage of maturity, carefully handled, packed and shipped under refrigeration, will vindicate the statement that I have made. It has done it for the Griffing Florida Orchard Company and will do it for others. If the same careful painstaking attention is given to the growing and marketing that is given by our successful Horticulturist and trucker to the growing and marketing of oranges and the tender vegetable crops, that has proved the backbone and the chief support of our State. In the brief time allotted for the reading of this paper I am not going to attempt touching on the details of planting, pruning and cultivation, these are primary points known to all horticulturists.

What we want is to interest more people in peach growing, then a few words about the selection of the orchard site, the treating of the diseases, and last but not least, the harvesting and shipping.

We need five hundred carloads of Florida peaches a year to sufficiently introduce them in the great markets of our country, so that even a small percentage of the fruit eating, fruit loving people will learn to know, remember, and recognize them and call for them from their fruiters so long as they are to be had in the markets. How many markets know them this way now? One! Just one! Philadelphia is the only city that it can be said any perceptible number of the consumers recognize the merits of our Florida peach, and last year over forty cars of

our Florida peaches were marketed there. Each day leading the market. Many of these cars were held in storage from two to three weeks. I was on the market one morning when there was over thirty cars of Elbertas displayed and sold, and that morning two carloads of The Griffing Florida Orchard Company pack of Imperial peaches were sold from the cold storage without the buyers even examining or looking at a crate at a price 25 cents above the price paid for the Elbertas on the dock. Why? Because these buyers knew that they had customers that would have no others so long as these lasted.

It is not my object to pit our Florida peaches against the famous Elberta or to encroach upon the season of the Elberta in Georgia, Alabama or Texas, but I do want to condemn to everlasting doom, that miserable class known as the Persian type, comprising such varieties as Amsden, Alexander, Early Beatrice, and of the later introductions, Greensboro, Triumph, Sneed, etc. As Downing once said of this class of peach "a peach quick to ripen and quick to rot." In fact, they are green, ripe and rotten at one and the same time, the under or shaded side will be green, the side next to the sun and light will be ripe, and the blossom end rotten. Delightful conditions to find in a fruit to create and build up a demand for it. Yet, hundreds of carloads of this class of peaches are shipped from Georgia, Alabama and Texas yearly. So soon as Florida produces sufficient peaches to be really felt and known upon the market, the demand for this class of peaches will cease and good Florida peaches will bring good prices with a strong demand. Fully ninety per cent. of the fruit eating people supplied from our great markets do

not know that there are any good peaches until in July and August when the Elbertas and the later, better class of fruit is being marketed, and for that reason there is no strong demand in May and June. A burned child dreads the fire and will give it a wide birth after suffering from its effects. So also the careful housewife who after buying one or two lots of inferior peaches with no quality, hesitates about trying another lot. Restaurants and Hotels will not put peaches on the menus until the Stewards know that there is a sufficient supply of good fruit so that they can be sure to get it daily and in sufficient quantities for their needs. As the situation now exists, Florida peaches only reach the Cheap Dago fruit stand trade. There is no real life in most markets for our peaches and there will not be until sufficient quantities are produced for them to become an item in the markets.

If Florida produced from twelve to fifteen hundred carloads of peaches a year the average price per crate would be fully 25 cents higher than has been realized.

The Secretary has a few account sales realized by the Griffing Florida Orchard Company the past three years, which he will pass around for those interested to examine. These I consider fair prices and which will yield the owners of an orchard as great a percentage of profit as any branch of fruit growing or trucking. These account sales are taken, at random, out of three years sales, we of course omitting those, that owing to delays in transit, insufficient or improper refrigeration caused the fruit to arrive in bad order, and covers the shipping season from early in June until late in July.

The following are memorandums from the Account Sale Exhibited:

H. B. Williams, Inc.

Philadelphia, Pa., July 8th, 1903.

| | |
|-------------------------------------|----------|
| 409 crates peaches sold @ \$2.00 to | |
| \$2.50 | \$956.00 |
| Freight, Comm, etc. | 369.58 |
| Net proceeds | \$586.42 |

F. G. E. Car 15297

H. B. Williams, Inc.

Philadelphia, Pa., June 18th, 1903.

| | |
|-------------------------------------|----------|
| 449 crates peaches sold @ \$1.75 to | |
| \$2.25 | \$973.00 |
| Freight, Comm. etc. | 409.12 |
| Net proceeds | \$563.88 |

The Lyon Brothers Co.

New York, June 11th, 1904.

| | |
|-------------------------------|----------|
| 416 crates peaches and cante- | |
| loupes | |
| 277 crates peaches sold @ | |
| \$2.00 to \$2.50 | \$587.50 |
| 139 crates canteloupes sold | |
| @ \$1.50 to \$3.00 | 305.13 |
| Freight, Comm. etc. | \$892.63 |
| Net proceeds | 363.32 |

(Net for the 277 crates peaches \$345.19).

The Lyon Brothers Co.

New York, June 16th, 1904.

| | |
|----------------------------------------|----------|
| 334 crates peaches in car C. F. X. 10- | |
| 015 sold @ \$2.00 to \$3.00 | \$785.88 |
| Freight, Comm. etc. | 298.54 |
| Net proceeds | \$487.34 |

H. B. Williams, Inc.

Philadelphia, Pa., June 13th, 1904.

| | |
|-------------------------------------|----------|
| 436 crates peaches sold @ \$2.00 to | |
| \$2.75 | \$993.75 |
| Freight, Comm., etc. | 388.32 |
| Net proceeds | \$605.42 |

M. O. Coggins Co.

Pittsburg, Pa., July 5th, 1904.

| | |
|----------------------------------------|----------|
| 403 crates peaches C. F. X. 10900 | \$700.20 |
| Freight, Comm., etc. | 269.41 |
| Net proceeds | \$530.79 |

H. B. Williams, Inc.

Philadelphia, Pa., June 12th, 1905.

| | |
|-------------------------------------|----------|
| 392 crates peaches sold @ \$1.75 to | |
| \$2.50 | \$861.60 |
| Freight, Comm., etc. | 354.07 |
| Net proceeds | \$507.53 |

H. B. Williams, Inc.

Philadelphia, Pa., June 13th, 1905.

| | |
|-------------------------------------|----------|
| 385 crates peaches sold @ \$2.25 to | |
| \$2.50 | \$881.25 |
| Freight, Comm., etc. | 377.49 |
| Net proceeds | \$503.76 |

H. B. Williams, Inc.

Philadelphia, Pa., July 10th, 1905.

| | |
|---------------------------------------|----------|
| 446 crates peaches F. G. E. car 18585 | \$887.60 |
| Freight, Comm., etc. | 398.62 |
| Net proceeds | \$488.98 |

H. B. Williams, Inc.

Philadelphia, Pa., July 28th, 1905.

| | |
|--------------------------------|----------|
| 475 crates peaches car No. 21- | |
| 443 gross sales | \$956.20 |
| Freight, Comm., etc. | \$394.68 |
| Cold Storage charges | 42.00 |
| Net proceeds | 436.68 |
| Net proceeds | \$519.52 |

Cars selling in July came in direct competition with the Georgia movement and in nearly every case sold from 25 to 50 cents per crate higher than the average Georgia stock. Several cars were held in cold storage all of which came out in fine condition.

We give the account sales of the last one taken out which sold on July 28th.

None of the Jewell variety is included in these cars. The Jewell would have commenced ripening about two weeks earlier and would have prolonged the season that much. The Griffing Florida Orchard Company now has about 100 acres of Jewell at Komoko, all of which were killed by frost, and a hundred acres at Richland Pasco county planted this past winter. Another year we hope to move our first cars by 10th to 15th of May.

As further evidence of the impression

H—4

good Florida peaches make upon the market will read the following extracts from letters from our Commission Men, the originals of which can be seen at the Secretary's desk.

PHILADELPHIA, PA., June 22nd, 1903.

GENTLEMEN: Car of peaches arrived last night, found them good color, but no larger in size than previous lot, selling fancies \$2.25, choice \$1.85, expect to finish the car at these prices. Very good demand and outlook favorable. Wired you situation. Sorry to know you have no more for immediate shipment, just got our customers nicely started on this fruit, and could handle three cars a week to advantage. Quite a good many Georgia peaches in today, mostly Carmen, Waddells and Early River, fruit much larger than the Florida stock but not as good color or flavor, fancies selling \$1.75 to \$2.00 and choice \$1.25 to \$1.50. So you see your Florida peaches are bringing more than the best Georgias.

H. B. WILLIAMS, INC.

The following is copy of a letter H. B. Williams wrote Mr. Frank Lindsey, their representative, with reference to Florida peaches:

DEAR SIR: Have telegraphed you on peaches, Griffings car arrived, took out a portion, sold fancies \$2.25 choice \$1.85. Good color but small compared with Georgia fruit. Had car from Hale Georgia Orchard Co. their smallest grade much larger than the Florida fancies and selling at a lower price. Selling Hales Extra Fancies \$1.75 to \$2.00, fancies \$1.50, choice \$1.25, so you see Florida fruit is bringing high prices compared with Georgia.

H. B. WILLIAMS, INC.

JULY 1ST, 1903.

GENTS: Have no letter or wire from you today in reference to shipment of peaches; fear you did not get car off. This is unfortunate as market continues active for your peaches. No trouble to get \$2.50 for fancies and \$2.25 for choice. Outlook favorable. Our customers will want more of the Florida stock, while Georgias are larger they are not as good flavor as the Floridas.

H. B. WILLIAMS, INC.

JULY 21ST, 1904.

GENTS: We took one crate of the Imperial peaches out of Cold Storage today, which had been put in there July 2nd, and it came out sound as a dollar. If we had a car of them today could get two dollars for them. With a big crop of Imperial peaches, and a short crop in Georgia, twenty or twenty five cars of these peaches in storage they would sell like gold dollars. Their keeping qualities are excellent.

H. B. WILLIAMS, INC.

NEW YORK, JUNE 17TH, 1905.

GENTLEMEN: I want to state that it is a pleasure to handle goods put up in the style and careful manner which you ship in. The trade here recognizes that your brand of Florida peaches, is by far the best that comes from Florida. There will be no trouble in the future of obtaining top of the market.

LYON BROS. Co.

PHILADELPHIA, PA., MAY 11, 1905.

DEAR SIRS: We are enclosing you a letter received from Mr. J. H. Hale on the conditions of the crop in Georgia.

One of our customers called on us and

wanted to know if your crop was secured this year from the cold weather. When we assured him it was he has gone to the expense of twenty to twenty-five dollars in having a large sign painted across the front of his store "Headquarters for Grifing Peaches." He has given us instructions that he wants 100 crates every day as long as you ship, so you see we feel very much encouraged over the inquiry we are having for your peaches.

H. B. WILLIAMS.

NEW YORK, JULY 25TH, 1904.

GENTLEMEN: We have your several communications and it is very satisfactory to us to have you express yourselves as being satisfied with the results, but, we wish to state that a great deal of credit for the results we obtained for your peaches is due to yourselves, for by the style of your packing and the delicious flavor of your peaches, caused the buyers to seek for more and buy liberally.

They were at the top of the market every day we had them to offer. We can say honestly that the eating quality of your peaches were superior in flavor and lacked that bitter taste from the skin that many of the Florida peaches had, that were on the market, and we can assure you that you can look forward to always having New York take your peaches at the top prices and as many as you can place on this market.

THE LYON BROS. Co.

PHILADELPHIA, JULY 8, 1905.

DEAR SIRS: We wired you today to ship all peaches possible here. I enclose you a letter received from Mr. Hale today in which you will note he says about the peach crop there. This is contrary to

what he wrote us a few days ago in regard to the situation, so they must have gone to rot very suddenly. You will notice he says they are rotting green on the trees.

If your peaches arriving here Monday are in good shape and the Elbertas begin to show any rot here, we are going to put them in the cold room, because the last few cars of peaches you shipped us have been the finest you have ever shipped in the last few years and the trade are more than pleased with them. I could have sold ten cars today as easily as one at these prices. I never saw them any better size and better color.

H. B. WILLIAMS.

I hope that I have now impressed upon your mind three things. *First*, that there is a good demand for Florida peaches, *Second*, that if properly grown we have the best flavored and best keeping peach of the year. *Third*, that there is money in it.

Now for the troubles and vexations. And I assure you that the path of the peach grower is not strewn with roses. Neither can he lay on beds of ease and wait for nature and our climate to bring forth fruit in abundance. Nature and climate if yoked together, and intelligently worked will produce wonders. But it wont answer to let them run loose. Oh yes! they will continue to work. But as if vexed at your presumption in yoking them together, and working them for your benefit, they voluntarily enlist in the enemies forces. Nature has created an insect or a form of plant life to prey on and feed off of every other form of insect or plant life in existence, and our climatic conditions are such as to rapidly

develop these forms of insect and plant growth which could be justly termed enemies of mankind. Therefore if we would succeed in the cultivation of peaches, plums and pears all of which are especially subject to these enemies, we must either stir ourselves and find nature's way of controlling them, either by parasitic or predacious insects or fungus, or find artificial means of combating them.

As the peach is the first and most important of the fruits under consideration, will dwell more at length on the troubles of the peach grower. It commences with the nurseryman at the time the pit is planted for no sooner is the little seedling fairly taken root, than an enemy is ready to devour it. This enemy is the Nematode Angoulula, commonly called root knot. For a remedy or a preventative from this nematode, we are forced to appeal to nature for no artificial means for controlling or eradicating, practicable for the orchardist, has been discovered. The preventative nature provides is the planting of the nursery or the orchard on virgin soil, not subject to washes from old field land. This nematode, the Angoulula, is present in all our light southern soils, and only needs the presence of plant roots pleasing to his majesty's palate for him to feed upon to multiply in myriads and so infest the land that a young peach tree, however healthy when placed there, cannot thrive. The only known means of eradicating this pest from the soil is heating it to a high degree, or the saturation of the earth with bi-sulphide of carbon as suggested by Mr. Bessey in his valuable paper on Nematodes. This is sometimes practiced for potting earth for greenhouse or bedding plants, but not practical

for the orchardist. Therefore the simple and effective preventative is to plant on virgin soils, free from washes from old fields. With this simple precaution, and planting trees free from the disease, no serious annoyance should be experienced from this source.

The next trouble likely to attract the peach grower's attention, will probably be the borer. Many are the devices that have been invented and remedies tried all of which have proven more or less a failure. Of these remedies I believe the Porter system of treatment the best and most practical. This system of treatment as invited by Mr. C. M. Porter of Douglas, Ga. and offered by him in farm rights, consists of a series of mounding, worming and applying a caustic wash. We have tried it on our own orchards, and from present observation and status of experiment believe it of some value. The method of treatment employed most largely in our own orchards and by many of the largest and most successful orchardists of the south, is the banking around the trees to a height of eight to fifteen inches in July and August, before the fly deposits the egg on the body of the trees. This forces him to deposit the egg well up on the body. In the fall or early winter this dirt is removed, leaving the young larva in the body of the tree well up in the air, where the bark will harden as soon as the earth is removed causing many to perish. Would also recommend after removing the earth, the scraping the body of the tree from the crown roots up to 12 or 15 inches in height with a sharpedged instrument, this will disturb and kill many more of the young larva. The painting of the bodies from the crown to the limbs after

the earth has been removed, with a strong caustic solution, will also be beneficial in killing many of the larva and preventing others that hatch higher up or that have been knocked off from entering the bark. After these precautions have been taken, a few will likely have escaped, dig them out with the point of pruning knife, as soon as they show themselves by their signs, an excretion of a half gummy half sawdusty matter from the point where the young larva entered and commenced to feed. With these precautions no serious trouble or loss should be experienced from the borer.

The next annoyance noticed is likely to be Gall knots on the roots and crowns and which is generally accepted as Crown Gall and if it is the true Crown Gall, I consider that it has been much over-rated, and especially so by some of the entomologists and pittiologists in some sections.

Mr. A. C. Weiting Commissioner of Agriculture, Albany, N. Y. in an article in the National Nurserymen, in discussing Crown Gall said, "All Galls on the roots are not Crown Galls, a distinction between them may be made." He further said "the galls caused by aphids are usually knotty and very hard, while the Crown Gall is rather soft and as easily cut as a turnip. Its tissues being brain like in formation." As the knots usually found on the peach trees are usually hard woody substance covered with thick pulpy bark and wart-like formation. I am very doubtful about the most of it being the true Crown Gall. This Gall knot has by some been confused with the root-knot Angoulula, and by others with the black-knot of the cherry and plum of the states farther north. It is entirely distinct and different from the former, but

somewhat similar yet different from the latter. It seems to be caused from a fungus which I believe is either always present or develops spontaneously in much of our southern soil. This may be a little radical and not in accordance with some of my professional friends' views, but I will give one of my reasons for the assertion and I believe the experience of those present, who may have had occasion to note same will sustain me. Natural peach seed can be gathered, and I believe if test wanted to be carried far enough, sterilized sufficient to kill any possible germs on the exterior of the pits, and planted in virgin soil, and a percent. will develop these gall knots. In some pieces of ground not one tree in 5000 will develop a knot, while in another plat, or possibly in a different section of the same field, one or even two per cent. may show it. The Marianna plum roots are especially subject to the attack of Gall knots. Cuttings from apparently healthy trees can be planted in any ordinary field, grown one year, and grafted the following winter with scions of the desired variety taken from an equally healthy tree, and by digging time, one to ten, sometimes as high as fifteen percent. will develop gall knot. Now where did these knots come from if, the fungus causing same, was not either already present in the soil simply waiting for a suitable plant to establish itself upon or developed spontaneously. The loss from these Gall knots is usually small. As a remedy would advise removing the knots if they appear on the body or crown of the tree where they can be detected and the cut place moistened with a saturated solution of Blue stone water. They will never appear again at the place. If you

get too much of the Sulphate of Copper (Blue Stone) in the wound it may cause a dead place in the wood. I have seen these gall knots for twenty years, or ever since the first work I did in a nursery, even before our own nursery was founded. I have seen the same in all portions of this State, in Georgia, Alabama and my brother reports the same in Texas. I cannot see that it is any worse now than twenty years ago and do not believe that it will be any more serious in twenty years hence.

Will next consider the part in Florida peach growing played by the most widely known and widely disseminated scale insect of my knowledge. The San Jose Scale. The rapid spread and dissemination of this scale insect caused more activity and discussion by Entomologists than all other scale insects and has caused many very stringent State and Foreign National laws to be enacted, some of which are now proving a menace to American fruit commerce. This scale pest while bad if allowed to run its own course, is easily controlled, either by natural enemies, the Red or Brown Fungus a native Florida Fungus discovered by Prof P. H. Rolfs, now Director Florida Experiment Station, Lake City, Fla., and the other the Chinese Lady Bird (*Chilocorus Similis*) the Natural enemy of the San Jose scale in China, or by artificial means. The most practical and successful artificial means is the spraying of the trees once or twice during the winter months with lime, sulphur and salt mixture. Two applications during the dormant period is sufficient to keep the scale under perfect control if not eradicating it until introduced again from

other infected trees. The following is the formula for the lime, sulphur and salt mixture and our method of preparing and applying it.

LIME, SULPHUR AND SALT MLXTURE.

| | |
|------------------------------|------------|
| Rock Lime | 21 pounds. |
| Flour of Sulphur | 15 pounds. |
| Salt | 5 pounds. |
| Water to make fifty gallons. | |

The lime is placed in the cooking barrel with about 10 or 12 gallons of water. The steam is turned on, which agitates the lime while slackening preventing it from burning, and renders the slackening more perfect. After lime is thoroughly slackened fill barrel about one-half full of water. Mix the sulphur into a paste, after lime is slackened add the sulphur paste and salt and boil vigorously for forty minutes.

The arranging of cooking plant I will be glad to explain to any one sufficiently interested to write or ask about it.

In spray machinery we have used everything from a knapsack sprayer to a traction engine and steam pump, the latter carrying 20 to 30 nozzles, except the gasoline power sprayer. The gasoline power sprayers have never appealed to us for two reasons, first: The weight of engine, pump and tank of water for cooling engine, necessary to haul around, and second, the intricacy of the little engines and a scarcity of a class of help with a knowledge of gasoline engines that would care to work in as disagreeable work as spraying. When you have a days weather, right for spraying you want the most reliable machine possible. The most practical we have yet found is the Wallace Sprayer, manufactured by Wallace Machinery Company, Champaign, Ill. The

pump is driven by a gear from the wheel, one extra mule or horse will pull the extra load occasioned by this gearing and maintain a pressure of from 90 to 120 pounds. For effective spraying a high pressure must be maintained. The traction engine outfit did good service, though do not know as it is an economical outfit, the trouble came from the little annoyances such as two or three of the nozzles out of a cluster of four or six becoming clogged, necessitating the stopping of the remainder of the twenty or thirty nozzles for these two or three to be cleaned. With this steam outfit, an engineer, fireman and six men could spray thoroughly one side of three rows of trees ranging from 12 to 15 feet in height, about one half as fast as a man would naturally walk up and down the rows, covering about ten acres a day. With the Wallace outfit three mules and three men would spray one side of one row at a little faster pace than the engine moved, in fact the team was kept moving slowly and steadily. While I do not know that the Wallace Sprayers would be practical in an orange grove, where a great amount of leaf surface is to be covered but for spraying peaches, while in a dormant condition they are practical.

The curculio, curculio stung or wormy peaches and plums are found in every old peach growing section and in fact in nearly every plum thicket. Cures or remedies for this little rascal are few and difficult, preventatives are about our only hope. Here are a few of them.

Plant your trees in a place as far distant from other peach and plum trees where you find worms in the fruit, as possible. Keep all brush heaps, old rotten logs, and such trash cleaned out

from the orchard, and away from around it. Have if possible, a cleared and cultivated strip of ground from 150 to 200 feet between your orchard and uncleared woodland. Trash and rough woodland harbors the curculio; in a large orchard you will invariably find worms worse next to woods or near a pile of trash. Jar the trees and pick up all fruit that drops off and also stung fruit found on the trees. This should be repeated every two weeks from the time that peaches are the size of a marble until they are ready to ship. Never allow a drop peach to be plowed under or decay in the orchard for in 99 cases out of 100, it has a worm in it that will develop into a beetle that will ruin a thousand peaches next spring. Jarring the trees and catching in a sheet or bug catcher the peaches that fall and also the beetles (curculio) that may play o'possum and drop off is an old method practiced by successful plum growers in nearly all parts of the country, and by peach growers in many places. All the drop peaches that may have dropped the night or day or so before should also be picked up and destroyed.

If these precautions are taken it will be years before sufficient worms will develop in an orchard to be a menace to the fruit. This year we are trying some spray experiments for curculio and next year hope to be able to report the results.

Brown Rot Fungus (*Monilia Fructigena*) is another pest that must be combated by preventatives rather than remedies, for by the time it makes its appearance and you commence applying your remedy, the mischief is done. The precautions recommended for the curculio are the principal ones in preventing Brown

Rot. The removal of all decaying peaches is important. Especially the mummied peaches, that you may occasionally see hanging in the trees. Plow the orchard by blooming time every spring and be sure to stir the entire surface. This will disturb any mummied and decayed peaches that may have accidentally been left in the orchard and prevent them from throwing up a lot of larger fungus growth in the form of toad stools that will throw off sufficient brown rot fungus spores from a single mummied peach to infest the trees of a five acre orchard. All caustic spray solutions are good as fungicides, the lime sulphur and salt mixture is equal to almost any fungicide known and one or two sprayings during the winter to kill scale, will rid the trees of all fungus spores that may be carrying over on the trees, again if these trees are well sprayed and well covered with this caustic solution, at blooming time the spores that may be thrown off from the toad stools in the spring cannot get a foot hold on the trees. Another precaution is to so fertilize and cultivate the trees as not to produce a heavy foliage, also trim all the trees so as to be open in the middle when carrying a load of fruit so as to admit as much air and light as possible.

This I believe covers a list of insects and fungus pests that cause the worst trouble to the peach grower. The same ones that we have here, trouble them in the north also Georgia, Alabama and Texas. Besides in the north and in portions of the other states mentioned they have peach yellows and rosette neither of which have ever been known within the state and either one of which is more serious than all of the pests

we have. Ours can be combated, peach yellow and rosette cannot. If they can make a success of peach growing in other less favored sections, are we to give it up and acknowledge that we are not as skillful horticulturalists as they.

Now for the harvesting and shipping.

First, you should plant sufficient acreage yourself or organize an association in your neighborhood who would plant sufficient acreage to load and ship in car-load lots, about thirty acres of a variety is sufficient for this, forty or fifty would be better. Grade and pack all the fruit uniformly, being sure to have every crate so full that you could not get another peach in the baskets. Separate the fruit and don't put any cull fruit in the bottom of the baskets, let the bottom be as good or better fruit than the top. Use nothing to fill up baskets but peaches. Excelsior either in top or bottom, paper used in any manner prevents ventilation, deceives the buyer and makes a bad reputation for your pack and brand. Have the fruit graded and packed by professional fruit packers, it will cost you but little more and your pack is right. Care in packing peaches is more important than any other fruit. In loading your refrigerator cars, see that the car is clean and that nothing obstructs the ventilators between the ice chests and the body of the car at each end both next to floor and at the ceiling. This is necessary for circulation. Remember without circulation there will be no refrigeration. Load peaches as soon after picking as possible and if you have to detain car more than one day, arrange to get a ton and a half of ice to put in bunkers, so as to have them as full as possible when car leaves the orchards. Ar-

range with the railroad to have car re-iced as soon after leaving the orchard as possible. Remember that the first 24 hours after the fruit is placed in the car is the critical time. The fruit continues to ripen and mature until cooled and refrigerated to the pit. If car is poorly iced and it takes 36 or 48 hours for this refrigeration, the fruit has had that many hours of ripening process going on within it, and it matters not how well the car is iced during the latter part of journey, the damage is done and your fruit melts down almost as soon as it comes from the car. If good refrigeration can be had at first and the fruit cooled to refrigeration point in from 6 to 12 hours, the icing for the last part of the journey is not so important.

Experiments are being made in quick cooling of the fruit before the cars move, by artificially circulating the cold air in the car, and by this means bring the fruit to a refrigeration point in from four to six hours. Fruit quickly cooled this way, is claimed to hold up, an almost indefinite time if temperature is kept reasonably low, and when taken off the ice holds up almost as long as when picked direct from the tree.

I will not attempt to tell a Florida Horticulturalist how to market his fruit. But would say that of all fruit, you should try to establish a reputation for your pack of peaches and I would say put enough of them on one market so that your commission house at least knows that you are in the peach business. Do not scatter your shipments a few crates in a place, on such shipments is where you are robbed by both express company and questionable commission men.

This paper being long and no

doubt many of you are already tired and as plums and pears are not generally enough grown for commercial purposes, I will not attempt to say anything with reference to them. If however any member knows of any plums of any special merit, it would be of interest to myself and dare say to others of the society, to hear about them. The same for pears.

Supplementary to regular report would say that a few days ago I sent out a circular letter, asking for information relative to present conditions of peaches in several sections of the state with reference to damage by frosts of March 1st and 22nd. Also about varieties grown in the several sections. The following is the essence of the replies received bearing on these two points. Some mention was made in some of the replies relative to scale, gall knots and other troubles all of which I think have been covered by report.

DINSMORE, FLA.

I estimate that the frost of March 20th and 21st killed 75 per cent. of the crop.

W.M. MACKLIN.

WALDO, FLA.

Peaches not hurt here in the least. Waldo and Jewell only kind grown for market.

T. K. GODBY.

STETSON, FLA.

So far as I know, none of the peaches were hurt at all in this section.

H. B. STEVENS.

FULTON, FLA.

The March first frost was local in its effects, in and around Fulton some orchards were much more injured than others. Jewell variety suffered most. Waldos came off better. Later varieties some.

H. F. HALE.

INVERNESS, FLA.

We will have a good peach crop. I hear of none being killed by frost.

S. M. WILSON.

BOARDMAN, FLA.

No commercial orchards in this section, only for family, but so far as they go the promise is for full crop, the frost not having hurt them.

F. G. SAMPSON.

INTERLACHEN, FLA.

The frost of this Spring did but little damage in fact only thinned the fruit on outer limbs. None of the early varieties seem to be injured by the cold.

J. H. WYLIE.

LADY LAKE, FLA.

The frost did not do us any damage at all. Peach trees of all kinds are full. Jewell the best.

L. B. MILLER.

DEFUNIAK SPRINGS, FLA.

Peaches and plums not injured in the least by frost. Holding fruit well during this dry weather. Varieties principally Elberta.

L. W. PLANK.

MELROSE, FLA.

Peach crop is as good as can be, we

never miss a crop of peaches in this immediate vicinity. Varieties, Jewell, Climax and Imperial.

W. E. BAKER.

JESSAMINE, FLA.

The frost did not affect the peaches in this region and there is now good prospects for crops. Varieties most preferred Jewell, Waldo and Angel.

W. J. ELLWORTH.

MANATEE, FLA.

None of the peaches were damaged by cold. Varieties Jewel, Waldo, Bidwells Early and Angel.

A. J. PETTIGREW.

EARLTON, FLA.

The Spring frosts did no damage in South Eastern part Alachua county, but have been told in the northern part some damage was done. Varieties Jewell and Seedling of my own.

H. VON LUTTICHAN.

EARLTON, FLA.

No peaches, plums or pears were hurt in the neighborhood of Lake Sante Fe. Varieties Jewell and Waldo.

C. C. SHOOTER.

DADE CITY, FLA.

Crop in this Section not at all damaged by cold.

J. C. CARTER.

LAKE HELEN, FLA.

No damage here by cold.

J. P. MACE.

Mr. J. Y. McKinney, a member of committee who is here, reports no damage at Candler.

GAINESVILLE, FLA.

The peach crop in this immediate section is probably less than half. We had heavy frosts soon after setting both early and medium late varieties. Varieties, Waldo, Florida Gem, Oviedo and Pallas mostly.

H. S. GRAVES.

The damage to Jewell variety in the Komoko orchards of the Griffing Florida Orchard Company was 90 per cent. practically destroying entire crop. Waldos 70 to 80 per cent. The Imperial and other medium late varieties suffered very little, practically full crop. In the Baker county orchards near Macclenny, no Jewells were planted, Waldos damages 60 to 75 per cent. Later varieties not hurt.

By studying the map of Florida you can see that the section in which damage was done is comparatively small.

DISCUSSION.

Mr. Henderson.—As I have had a good deal of experience in peach growing, I think I can give some points that may be interesting. I used to think I could not raise peaches without spraying. I have an orchard of about 100 acres and last year we sprayed until I discovered what has proven to be a red fungus. At first I did not know what it was. I sent to the Experiment Station and found that I had this red fungus and I stopped spraying. I wrote and asked some questions. I asked if I could trust my orchard in the hands of this fungus if it was very slightly affected. The answer was that I could. The scale had practically killed 25 per cent. of my trees, but today I cannot find a single scale anywhere. The

scale is off and it was left in the hands of this fungus alone. Today I am very much more encouraged.

The San Jose scale is worse than any other scale, but there is no let up of the fungus until this scale is all off. I think this is one of the greatest things for the peach growers, in the State of Florida. Take a limb with this fungus on it and it will spread in moist weather in twenty-four hours and little orange colored pimples show over the trees. As soon as it kills all the scale these become black spots on the tree, hence the name black fungus.

Mr. Griffing.—I would like to ask if the trees were not putting on new growth after this fungus had been on it.

Mr. Henderson.—They are, after having been cut back. All the trees that were affected with this scale have put on beautiful new growth and some branches are from five to eight feet long.

Mr. Wood.—Should we cut back healthy trees?

Mr. Henderson.—By all means. Those from five to six years old.

Mr. Wood.—I cut back some of my trees, but those I did not cut back had more dense foliage.

Mr. Henderson.—The fruit will be better next year. The best time to cut it back is just after the fruit is gathered, say in July.

Mr. Ellis.—What is the probable life of the peach orchard from the time it is planted.

Mr. Henderson.—That depends on the class of land and the kind of tree planted. If planted with yellow subsoil, the orchard will be very poor and probably die after it has borne three or four crops. If the tops were cut off and a new crop allowed to come on, it would probably bear from twelve to fourteen crops of fruit. The average crop is only from seven to eight crops.

Mr. Wood.—Would you advise clean culture.

Mr. Griffing.—I would not, but would advise plowing each spring. Be sure to turn over every inch of the surface, then let it grow up in beggar-weed. The beggar-weed will save fertilizer bills.

Mr. Ellis.—On a land naturally salt, would it do for peaches?

Mr. Griffing.—I would not think so. If old land is to be used for planting a peach orchard, plant and grow velvet beans and beggar weed on it for two or three years before planting the peach trees, letting nothing else but these grow on the land. This will not only build up and fertilize the land, but will reduce the nematodes in the soil to such an extent that the young trees will become established before the nematode sufficiently increases in numbers to injure the tree. The nematode, may cause some of the trees to be short lived, yet fairly satisfactory results may be expected.

Report of Standing Committee on Grapes, Figs and Kaki.

BY B. M. HAMPTON.

*Mr. President, Ladies and Gentlemen,
Fellow Members of the State Horti-
cultural Society of Florida:*

For some reason beyond my ken, I have been appointed as chairman of the standing committee on grapes, figs and kaki. While I have had some experience with all of these fruits, I do not want you to think for one moment, that I consider myself as expert authority on any of them; but I suppose you expect something said on the subject, and so I will try and add my mite.

The grape and the fig, as you all know, are among the oldest fruits of which history gives us any record. "Under your own vine and fig tree," is as old as time itself. The vine especially is almost world-wide. Take, for instance, our own country. You will find it flourishing on the bleak and rocky hills of New England, and 'mid the sunny glades of Florida, as well as on the coral rocks of her thousand keys or islands. One of the most valuable fruits known to man is the grape, and no home, however humble, should be without its vine or more of the healthful grape.

Starting from the shores of the Caspian Sea, you will find it flourishing in many lands and under many conditions of soil and climate. As I have already told you, it grows from New England to the

southern extremity of the United States with more or less profit; but up to the present time with less profit in Florida than in most other sections where it flourishes. And as I said before, everyone should have a vine or two at least, for their own use. When you have a nearby market, other things being equal, you can grow them with profit in Florida; but as a bread-winner to be shipped to a distant market, I do not think it has proven a success.

I have known a number of vineyards to be planted in Florida, but for some reason they are soon dug up or abandoned altogether, thus intimating that commercially speaking, they were not a success. I myself planted about two acres some ten years ago. All went well until I came to sell them. For some reason the fabulous prices so often noted in the papers of Florida, did not pan out.

I planted a number of kinds of the Labrusca species or common grape grown in the North for wine or the table mostly—all seemed to do well—also quite a number of different kinds of the Vinifera or raisin grape. Of the former species, the White Niagara seemed to get the closest to filling the bill; thrifty, prolific and a good quality, it is one of the most satisfactory grapes for Florida. Like the old speckled hen, it will give good returns with lots of neglect. Then the Vinifera

species or raisin grapes that are so extensively grown on the western coast, in California, for wine and raisins, whilst I have given them, that is, most of those grown on a large scale there, and some that are not, a trial, I have never found any that gave much promise of profit; though you can grow a few for home use, and they are quite enticing for the novice to experiment with. You see glowing accounts in the papers of this one or that one having phenomenal success with these choice varieties and promising to revolutionize grape culture in Florida. You hear the report quite distinctly, but listen in vain for the echo.

There are two kinds of the Vinifera varieties that seem to be worthy of more extensive notice and also a trial. The one that I am acquainted with is the one known as the St. Augustine grape. It is thin of skin and of a good flavor, quite thrifty and prolific, ripening in July, bunches are large, berries resembling the Catawba; but the bunches are not so compact. It thrives in and around St. Augustine, and is supposed to have been brought from Maderia by the Spanish in the early settlement of the place. It seems to flourish and fruit with as little care as the Scuppernong, but ripening so much earlier than the Scuppernong helps to extend the season for this fruit. Then at St. Augustine they have a blackish-purple grape, pretty much the same as the above, and of the same family, but having larger berries and ripening when the other is about gone. It is quite prolific. Both of them are supposed to come from Spain. I traced their ancestry back for about one hundred years, and then it seemed to end; but all agree that it was brought from Spain with the earliest settlement of St. Augustine.

There is still another grape, said to grow on the Keys in and around Key West. I wrote to the board of trade of Key West about the grape, but failed to get any definite information.

From all I could learn, the grape is of the Vinifera species, and without a doubt came from Spain, though some say England; but this I doubt. The vine is said to be quite a thrifty grower and quite a prolific bearer. The grape is as large or larger than the Niagara. The fruit itself is reported to resemble the famed Malaga, in color a reddish-purple, bunches large, said to weigh from five to seven pounds. Indeed, I have been told some of them have been known to weigh as much as twenty pounds; but I would advise taking quite a liberal pinch of salt with the statement about the size and weight of these bunches. In fact, it would be well, perhaps, to take a grain or so with the whole story. Mr. E. V. Blackman is the only one I have ever met that claims to have seen the grape, and he says he has seen the bunches that would weigh from five to twelve pounds each. Some years ago I had a talk with James Mott about this grape. He took a trip to the Keys particularly to find this grape, and if I remember rightly, failed to do so. The vine is said to be quite tender, but in time this might be overcome. I think perhaps Mr. E. V. Blackman could give us some definite information, he being so close to where it is said to grow. I think it well worth further investigation than I have been able to give it.

Now as to the fig. This is another fruit, if you will allow me to call it a fruit; for really it is not a true fruit. That which we call fruit being the fleshy receptacle, of a conical form attached to the branch by the narrow end, the broad end

or apex having a small opening. This expands somewhat, as the true flowers open, and the seeds mature within this fleshy receptacle.

Be it flower or fruit, it is of great value to man wherever the climate will permit of its growth—one of the most wholesome and nourishing of the long list of fruits given to man, either fresh, canned or dried. I believe several kinds could be grown profitable in Florida, both for home use and for canning and preserving. I have grown various kinds with more or less success for the last twelve or fifteen years on high pine land. I find the White Marseilles, Brown Turkey, and the Brunswick among the best for home use in Florida. By having these three you will always have figs in their season; but if you have a choice spot of ground, rich and moist; not wet, and feel willing to give the tree a little extra care, then plant a White Adriatic, and it will abundantly pay you for all of your trouble; but it must have moisture and plenty of fertilizer in some form. Plenty of good cow-pen manure is about as good as anything. Then you can supplement this with some good commercial fertilizer.

The fig, like the grape, will grow readily from cuttings taken at any time when the tree is dormant and has shed its leaves. November or December, I have found about the best time to clip the cuttings. Either plant these at once or bury them until the beginning of February, then plant in good, rich soil, just leaving one or two buds above the ground and keep the ground moist until well-rooted—not wet, mind.

In writing these few lines on figs, I have taken it for granted that all of you know about them, their culture and use. I will just add that all of the kinds I have mentioned are good for all home purposes

or for canning, preserving or drying. I have made fine dried figs out of each kind; but I prefer the White Adriatic. I have had this fig to cure right on the tree. It is larger than the others when properly grown, and to my way of thinking, much better. It is greenish-white in color and has a thin, but exceedingly tough skin, with a rich crimson sweet pulp, a fine flavor, and is especially sweet—well worth the extra care you have given it. Every home in Florida should have at least a few trees for home use.

Now a few words on the Kaki or Japanese Persimmon, and I am done. This fruit, I think, will in time be of more profit to Florida commercially speaking than either of the others. But in the first place, one should give them names, good English names, that all can pronounce without giving them the lockjaw. There is much in an attractive name. Give a fruit a pretty sounding name, and the battle is about half won. This fruit is just in its infancy in this country; so that we have much to learn as to what varieties to grow and culture of same. Some say to give thorough culture; others tell you just to fertilize and let alone. I have known them to do well under both culture and non-culture. I planted quite a grove of this fruit some years ago and gave it clean culture. The trees grew nicely, but I sold the grove before they came into bearing, and now I have but a few trees just coming into bearing. These are on high pine land, with the usual grayish top-soil, yellowish or reddish sub-soil, underlaid with red clay, at Lakemont, Polk county, Florida.

In some sections of Florida, particularly where I speak of, the Japanese persimmon, so far as I know, has been a shy bearer. I have tried a number of years to get the Tannenashi to fruit, but to no purpose; so finally I dug it up. This is a fine fruit

—one of the best, and in many places fruits abundantly. It is a very large fruit, conical in shape, skin reddish-yellow, with few seeds—many fruit none at all—and a good shipper when not allowed to get too ripe before shipping. This variety is very attractive to the eye and as good as it is attractive; but for some reason I could never get it to fruit to amount to anything, though the wild persimmon fruited in abundance all around me; but because the Tannenashi would not fruit for me, I did not give it up, for some had trees in bearing of other varieties, but all had a good many seeds and all were of medium size—good to be sure—but not extra. But, at last in an obscure corner, I noticed a tree that bore full crops every year. The fruit was large, tomato-shaped and of the deepest red in color, covered with a rich bloom like a plum, seedless and less astringent than most varieties, and was of a finer, richer flavor than any fruit of the kind I had ever eaten, and I think that I have sampled all of the choice varieties around St. Augustine, the home of this fruit; for at this place they all seem to fruit without any trouble. I further noticed when a bud was taken from this particular tree, which for want of a better name, I shall call "Hampton's Choice," simply to designate it from others (I have tried in most of the catalogues to locate this variety, but so far have failed,) and budded on a Tannenashi that refused to hold its fruit, that branch would be full of fruit while the rest of the tree would have but few or none. It will thus appear that the "Hampton's Choice" was immune to that which caused the Tannenashi to drop its fruit.

On the high, sandy land at Lakemont, as yet I have but two or three trees in bearing. They were grafted on the wild, small stock three years ago the past season

and bore full crops of fruit last season and this; however, the trees are but from four to six feet high and had but little care. I have been away from my grove most of the time for the past two years I have gathered this fruit when fully colored and kept it in the house for even four weeks, and at the end of that time it was sound and as fine in quality as a persimmon ever gets. The past fall of 1905 I gathered among others, one fruit that was quite hard and only partly colored. This was early in November, and this fruit was kept until Christmas without showing any signs of decay. Then it was in good condition to eat and was good as one could ask it to be, thus proving its keeping and shipping qualities. The fruit is large, from two to three inches in diameter and of the deepest red and entirely seedless, never having found a single seed in a fruit. Yet I do not know of any persimmon so highly colored that can be eaten when as solid as a good, ripe apple, and then lacking in the astringent qualities that other persimmons would have at that stage of ripeness.

While this persimmon may have been grown by some for years, certainly I have never been able to locate it among others on the fruit stands in Florida. I sometimes think, however, it is simply the section it is grown in that makes it appear different from some of the listed varieties. But one thing is sure, it is the persimmon par excellence for the high, pine land, and the one of all others I could plant on such land for profit or home use.

DISCUSSION.

Mr. Griffing.—I would like to hear from Mr. Macklin who has had some experience in growing persimmons.

Mr. Macklin.—As I read a paper before

this society last year on this subject I did not expect to say anything at this meeting. Nevertheless there are a few remarks I would like to make.

I most heartily endorse the remarks of Mr. Hampton, in the paper just read, on the use of the word "kaki." We do not call an orange a peach, or a pineapple by its botanical name and I see no reason why we should do so with the persimmon. We have a good English name for the fruit so why not use it. I would very much like to see that the word "kaki" discontinued in the reports of this society. I have been at considerable pains for several years past to introduce this fruit into northern markets as the Japanese persimmon and if I have to begin all over again with "kaki" I shall despair of success.

Up till this season I was under the impression that the persimmon was so late blooming as to be immune from frost but this spring a frost on March 21st damaged the crop considerably.

As regards markets, some places will have them while others will not. In New York they sell fairly well, yet Boston which is only a short distance away, will not give a paying price for them. It looks as though the Bostonians were too conservative and would not eat anything that is new. Since reading a paper on persimmons here last year my orchard of the Haycheya variety shows signs of increasing its crop with the increased age of the trees.

Mr. Griffing.—Is the Yemon variety holding its fruit as well as the others.

Mr. Macklin.—I have only three varieties in commercial quantities, the Hyakume, Tannenashi, and Haycheya, the Tannenashi I find to be the best.

Mr. Henderson.—We can have the persimmon so long that I think there are few fruits better. We can have them from the first of August until March. I have only six varieties. The Tannenashi is the best I have. They are of a large beautiful shape and carry well, better than any I have. I kept some of them until after Christmas and they were perfect. I think we should have more Japanese persimmons and grapes.

Mr. Griffing.—I would call attention to the fact that we may use the persimmon to good advantage in diversifying our products. The Japanese persimmon is the very best food for hogs. There is one variety the Zengi that ripens and commences dropping in August and continues until December. Hogs are very fond of these and will fatten on them.

Mr. Steele.—In their report on figs, there are two varieties left out that have proven to be very good with me. The Celeste, the little sugar fig, as it is called is always to be desired. The Poulette fig is one of the best that I ever tasted.

Mr. Blackman.—Some four or five years ago there was quite a stir about the Key grape. At several different times there were brought to my office, bunches that weighed from 3 to 5 pounds each, and much larger bunches have been known to be produced. So far as we know they are a very good grape; but will not compare with some of the finer varieties. There is one difficulty regarding this grape, the berries do not ripen evenly and the vines are short lived. I know one party who secured a good many cuttings, all of which grew for a time and then died. Rev. Bolton of Cocoanut Grove at one time had a number of vines in fruiting; but they have since died out.

Report of Standing Committee on Pineapples and Other Tropical Fruits.

MANGOES.

BY PROF. P. H. ROLFS.

Mr. President, Ladies and Gentlemen:

Among the tropical fruits that are being introduced into Florida, no one is more certain to make a definite impression upon the market than the new mangos. The fruit produced by the mulgoba exhibits such a character that it will push its way into the market were it to compete with peaches; but fortunately it ripens just ahead of that crop, and so we will not be thrown into actual competition with this luscious fruit. The mulgoba budwood can now be had in almost any quantity that any one desires in Florida. There is still some difficulty experienced in propagating and setting out the trees. From my experience in this matter I am inclined to believe that we shall have to adopt methods for the propagation and setting out of these trees that are radically different from those practiced in setting out citrus trees. As citrus growers we are apt to make this our standard, and anything that does not conform to the methods of procedure that we have adopted for growing citrus trees is considered to be extra difficult, or else not worthy of attention. We are also apt to draw a long breath when the nurseryman confronts us with a price for these trees that is probably ten times as high as that of citrus trees. Here again we allow our standard to interfere with our business methods. We should re-

member that mulgoba trees are really rarities.

PROPAGATING.

Budding of mangos is not only possible but may be done profitably. The mango nursery, however, must be radically different from that of the citrus nursery. For general purposes I think the methods advised by Mr. John B. Beach, and which he has published repeatedly in the agricultural papers, and also in addresses to the Horticultural Society, are probably familiar to every one here, so I will not take them up again at this point.

AREAS ADAPTED TO MANGOS.

If we will examine the map of Florida we will see that all of that area on the East Coast south from Mangonia and on the West Coast south from Caloosahatchee River, is adapted to mango growing. In addition to this general area there are isolated areas to the north of this in which mangos can be grown with a fair degree of assurance that crops will be obtained. Several years ago a considerable number of mango trees were fruited in the vicinity of St. Petersburg. In this region there are trees sufficiently large to produce a considerable quantity of fruit. Various places on the Manatee River are also quite certain to produce paying quan-

tities of mangos. I will not attempt to enumerate further the isolated localities where mangos may be grown. To a large extent this will have to be determined by actual experiments. In a general way we may say, however, that wherever citrus fruits may hang on the tree all the winter and never become frosted it will be possible to grow the mango. This definition for a region in which mangos can be grown should not be taken too strictly as we know that under certain peculiar conditions a few citrus fruits pass winter in orchards where the greater bulk of the fruit is frosted.

We are hopefully looking forward this year to the fruiting of Alphonse mangos. This variety is said to be very much better than the mulgoba. To us who have eaten the mulgoba, however, this sounds like sweetening honey or perfuming the rose.

MANGO RACES.

The mango, so far as I have examined the fruits critically, seem to group themselves into the following races: 1st, The Number Eleven; 2nd, The Pineapple; 3rd, The Manilla; 4th, The Apricot-Apple; and 5th, The Bombay.

First. The Number Eleven group, which is composed of seedlings running to well-marked varieties, is early ripening, flat fruit, and long tapering fruit, weak fibre, but profuse; color, pinkish or reddish. Tree tall upright growing. The leaves medium smooth and veining not prominent. Stigmatic area even. Skin medium and not tough.

Second. The Pineapple group, is early ripening. Leaves medium, smooth and veining not prominent. Stigmatic area prominent early ripening. The fruit medium size, tapering to obtuse point at

stigmatic area; fibres medium, profuse; color light orange with strawberry cheeks; skin medium and rather strong.

Third. The Manila, which is said to be the same as the Philippine of Cuba, ripens early; flat fruit; tapering; long; fibres very weak and scanty. Color, lemon or a little darker. It ripens about the same time as the pineapple, and many hybrids, and all intergradations were seen, but the two types are very distinct. Skin very thin but tough.

Fourth. The Apple-apricot group contains a number of named varieties. The tree is of a low, spreading growth. Leaves rather short. Fruit ripens late. Very full at side. Very short. Stigmatic area well up on ventral side. Color uniform yellow; between orange and lemon. Fibres very coarse and strong, though scattered. Skin thick and tough.

Fifth. Bombay, including mulgoba. Late ripening; fruit short for its diameter; sides very full; stigmatic surface well up on ventral surface; frequently grooved along lower portion of ventral surface; fibres scant and very weak; confined mostly to ventral and dorsal sides; skin very thick; not leathery; ground color, green turning to yellow with rosy cheek. The tree is a vigorous grower and is between upright and spreading, and the leaves are rather small and rigid with the veins prominent.

AVOCADOS.

For a money crop in the sub-tropical region of Florida, this has a very promising outlook. During the last five years a very great amount of work has been done in systematizing the varieties and in working up the methods of propagation. In connection with this work, I may be allowed to say that among

the avocados as among the citrus varieties, we strike some that are particularly difficult to bud, and others that take very readily. Buds of the Chapellow avocado live with the greatest ease. The Trapp avocado does so somewhat less readily; the Pollock buds fairly easily, and the Baldwin requires considerable attention to work well. The family avocado is one which begins to ripen in July, and continues to ripen its fruit until late in October and November. It should not be planted for commercial purposes, but is one well worth having at the home place.

TRANSPLANTING.

Lately a great deal has been said about the difficulty of transplanting avocados. Just why this should occur, I do not know. I know that a certain disease occurs upon the young trees, which is especially apt to strike in at the point where the stock is cut off. This difficulty can be avoided to a considerable extent by waxing over the stock at this point when it is cut off, or by painting it over. Then the shock of transplanting is apt to prove somewhat severe and the tree apt to die back to the bud. In my own field there seems to have been no difficulty in planting avocado seedlings. As a matter of fact, I have turned this work over to colored labor, and the success met with has been somewhat better than the experiences in having colored labor set out citrus trees. From my experience in this matter I am inclined to believe that there is no greater difficulty in having avocados set out than in having citrus trees set out.

SAPODILLOS.

This is one of the fruits that originated in the Western Hemisphere. In

fact, it has not been domesticated in the true sense of the word. A few seedling trees have been planted out in the Antillean region, which includes the West Indies, the eastern portion of Mexico, the eastern coast of Yucatan, and in the southern portion of Florida. They also occur as native trees down through the central portion of Mexico, and I believe in South America.

This species adapts itself to cultivation very readily. The number of varieties, however, are about as great as the number of seedlings that come into bearing. In the Miami and Key West market a very careful distinction is made between the better and the inferior fruits. In Miami some of the largest and finest of this fruit sell for high as ten cents apiece, and the smaller varieties one can frequently buy at ten cents a dozen. Systematic work at propagating and improving sapodillos has already begun at the Sub-tropical Laboratory.

The region through which sapodillos may be grown successfully, is practically coincident with the region where the mango may be grown.

CERIMAN.

(*Monstera deliciosa*). This plant belongs to the peculiar family of aroids which includes the calla lily, the tania and various other tropical species the roots of which are used for food. This plant has been grown for a number of years and fruited in the vicinity of Miami; also at Mangonia. In the conservatories of the North, it has also been fruited repeatedly. In the regions where only a little frost occurs, and freezes are never known, this plant can be grown successfully under a pineapple shed. It produces a creeping trunk that is about four inches in diameter, and if permitted,

will grow on the wall to the top of the highest conservatories. In such positions the trunk is rarely more than one and one-half to two inches in diameter. For fruiting purposes, however, it is better to prevent the vine from climbing at all. Under pineapple sheds it blooms profusely, and it fruits rather abundantly. Every bloom is almost certain to make a fruit.

PROPAGATION.

For propagating purposes the trunks are cut into segments in such a way as to leave an eye on each segment. These segments are planted out and struck with a fair degree of success. In the course of two or three years, if these plants are well cared for; they will produce fruit. It is about 14 months from the time of blooming for the fruits to ripen.

TYESS.

This is also sometimes called egg-fruit. No systematic effort has yet been made to bring this fruit into the best state of cultivation. Only seedling trees have fruit and the product of these is exceedingly variable—good, indifferent, and bad, I think the extreme of inconsistency was met in this fruit in the tree which was fruited by Prof. Gale, at Mangonia. This tree fruited abundantly and gave a fine-looking specimen. Some of them were sweet and delicious, other fruits from the same tree were only indifferent, and some of the fruits growing on the same tree, and taken from among the good fruits were extremely bitter. Even the same fruits were somewhat variable; one side being quite palatable while the other side would be distinctly bitter.

THE LOSS OF PLANT FOOD IN PINEAPPLE AND OTHER COARSE SANDY SOILS.

BY A. W. BLAIR.

Mr. President, Ladies and Gentlemen:

A very interesting point which has been brought out by the pineapple fertilizer experiment, is the great discrepancy between the amount of plant food applied to an acre of pineapples and the amount that is actually removed by the crop taken from an acre, including fruit, slips and suckers.

AN UNBALANCED ACCOUNT

To illustrate, we may first take one of the plots from the experiment, which has been fertilized at the rate of 3750 pounds

per acre. This plot received annually one pound of actual phosphoric acid, one and one fourth pounds nitrogen and two and one half pounds of actual potash. Multiplying these figures by 150 (the plots being 1-150 of an acre in size) gives to one acre 150 pounds of actual phosphoric acid, 187 1-2 pounds of nitrogen and 375 pounds of actual potash, or 712 1-2 pounds of actual plant food in one year. Now, if we allow that this acre produces 500 crates of pineapples, each weighing 70 pounds net, the amount of plant food removed by this 35,000 pounds of fruit would be, as calculated from the

average of a number of analyses, 15 pounds actual phosphoric acid, 25 pounds nitrogen and 79 pounds of actual potash, or a total of 119 pounds of actual plant food.

This does not take into account that which is removed with slips and suckers, which unfortunately has not yet been determined, but allowing that these would remove as much as the fruit, which is, I believe, an exceedingly liberal allowance, there would be removed from the acre a total of 238 pounds of plant food against 712 1-2 applied, a loss somewhere amounting to 474 1-2 pounds—66.6 per cent.

To take a more familiar instance, the grower who puts on 3000 pounds per acre of a fertilizer which would analyze 4 per cent. available phosphoric acid, 5 per cent. ammonia, and 7 1-2 per cent. potash, applies 120 pounds actual phosphoric acid, 123 pounds nitrogen and 225 pounds actual potash, or a total of 468 pounds of actual plant food, and if he gathers 350 crates of pineapples per acre, which would be a good average yield, he removes from his soil 10.36 pounds actual phosphoric acid, 17.32 pounds nitrogen, and 55.26 pounds actual potash or a total of about 83 pounds of plant food from the acre.

If here, as before, we allow that slips and suckers taken off, remove an amount equal to the fruit, the total amount removed in this case would be 166 pounds against 486 applied, a loss somewhere of 302 pounds—64.5 per cent. But this probably does not represent the entire loss, for in many instances there is added, over and above what has been counted, some phosphoric acid which is not reckoned as available, but which, nevertheless, does become slowly available, and undoubtedly some of this would be lost.

WHERE THE BALANCE GOES.

Now what becomes of this lost plant food? If it remained in the soil within reach of the plant, the soil would increase in fertility more rapidly than it does. We are driven to the conclusion that the greater part of it is carried down by the rains and is finally lost in the water table below. Perhaps a small amount of the nitrogen escapes into the air.

A LABORATORY DEMONSTRATION.

In an effort to explain this unprecedented loss, for certainly in no other field crop is the percentage of loss so great, I have recently conducted some experiments to show the rate at which water percolates through different types of soils, and the consequent loss of plant food. And while it is true that the conditions in the laboratory were not the conditions that exist in the field, still the results are relative, and serve in a way, to illustrate what takes place in the soil.

Four glass tubes of equal size were taken and one end closed with perforated disc and filter paper, thus retaining the soil but allowing a solution to pass through. Into each was placed air dried soil as follows: No. 1, 150 grams (between five and six ounces) of South Carolina clay soil; No. 2, 150 grams Columbia Co. virgin soil; No. 3, 150 grams of typical pineapple soil, and No. 4, 150 grams of muck soil. Into each was poured 100 cubic centimeters (a little less than a gill) of water containing one gram of sulphate of ammonia, and the following observations made:

- 1) Time required for the solution to begin dropping through.
- (2) Time of completion.

(3) Per cent. of the water retained by soil.

(4) Per cent. sulphate of ammonia retained by soil.

(5) Per cent. sulphate of ammonia retained by the soil after pouring through an additional 100 cubic centimeters of distilled water.

The results were as follows:

| TYPE of SOIL | S. C. clay soil. | Columbia Co. soil. | East Coast typi- cal pineapple soil | Muck soil. |
|-------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------|----------------------------------------|--------------------------------------------------------------------------------------|
| Time required to begin dropping. | 2 hrs. 17 min. | 8 min. | 1½ min. | No part of the first 100 cubic centimeters of solution passed through the muck soil. |
| Time of Completion. | 4 hrs. 30 min. | 23 min. | 6½ min. | |
| Per cent. of the water retained by soil. | 55 | 52 | 30 | |
| Per cent. of sulphate of ammonia retained. | 75.9 | 58 $\frac{1}{2}$ | 34.5 | |
| Per cent. of sulphate of ammonia retain'd aft'r pass- ing through an additional 100 cu. centimeters of distilled water. | 17.8 | 6.6 | 5.77 | 90.9 |

This emphasizes very forcibly the fact that the coarser the soil, the more rapidly the water and plant food get away, and it perhaps gives us a clearer idea of the conditions which exist in the pineapple belt. There we have a very coarse soil, composed of almost pure sand, through which water runs almost as it would run through a pile of stones, carrying much of the soluble plant food with it. The question then arises, what is there about

clay soils, and other fine soils, to hold plant food and moisture, that is wanting in the pineapple soils?

THE WORK OF OTHER INVESTIGATORS.

The researches of Way and other eminent investigators have shown that most soils have an absorptive power with reference to plant food.

In the case of phosphoric acid this is not difficult to explain, as the acid forms insoluble compounds with the iron, lime, and magnesium, which are present in most soils, and is in turn rendered slowly available by the action of the solutions contained in the roots of the plants.

As to the absorption of the alkalies, the explanation is more difficult, since nearly all their compounds are readily soluble in water; the potash salts for example. Since most soils consist of sand, clay, and organic matter, Way went to work to determine which of these constituents exercised the absorptive power. Without describing in detail his methods it will suffice to say that he showed that clay alone is capable of absorption phenomena.

(It should be borne in mind that the term absorptive power as used here refers to a chemical change, and not to physical absorption as when a sponge absorbs water).

Having shown that clay was the main constituent in a soil which caused the absorption of alkalies, Way next tried to trace out the particular compound which caused the absorption, and finally succeeded in producing a hydrated silicate of aluminum and soda which exhibited displacement and absorptive properties very similar to those shown by the soil.

Then Eichorn hit upon the idea of trying natural hydrated silicates, or zeolites

and found that they exhibited the same power as Way's artificial ones. Other investigators have shown that the absorptive power bears a close relation to the amount of soluble silicates present. That is to say the absorption of salts of the alkalies, accompanied by the change of base, is due chiefly to the presence of zeolitic materials in the soil.

There is besides this purely chemical absorption of salts by the soil, a physical absorption, which is illustrated by the absorption of water containing dissolved salts, by the organic matter of a muck soil; even sand will hold back a limited amount of dissolved salts, but the amount is in proportion to the fineness of the soil, and that it is held in a merely mechanical way can be demonstrated from the ease with which it is washed out.

IMPORTANCE OF THE ABSORPTIVE POWER OF THE SOIL.

The importance of this absorptive power can scarcely be estimated. Houston and Goss formerly of the Indiana Station, have pointed out that by means of this power those mineral ingredients of plant food of which most soils contain but little, referring more especially to phosphoric acid and potash, are held in a form too insoluble to allow of rapid loss by drainage, and still soluble enough to answer the needs of vegetation, provided the store is large enough. This cannot, however, be said to apply to nitrogen in the form of salts of nitric acid, but here nature has made a wise provision for this element by binding it in the form of organic bodies which nitrify but slowly, and by supplying each year a small amount from the atmosphere. Houston

and Goss conclude their discussion of the importance of soil absorption with the following statements: "By means of the absorptive power of soils, the farmer if he puts on an excess of potash and phosphoric acids as a fertilizer, does not lose it, but is able to reap the benefits from it in the next year's crop: If it were not for this power the best method for applying fertilizers would be a much more complicated problem than it is at present, as it would be necessary to apply them at just the proper season and in nicely regulated amounts to insure against loss."

PINEAPPLE SOILS LACKING IN ABSORPTIVE POWERS.

Of course Houston and Gross did not have in mind such soils as the East Coast pineapple soils when they wrote this, for we have there just the conditions which they say would make the problem of fertilizer application much more complicated than it is, and make it necessary to apply them at just the proper season and in nicely regulated amounts to insure against loss.

We have there a soil which is practically devoid of clay and therefore of soluble silicates; which contains only traces of iron, lime and magnesia, and a comparatively small amount of organic matter but which is, on the other hand, 98 to 99.5 per cent. sand—much of it being very coarse sand—hence there are wanting nearly all those properties which in ordinary soils would effect the absorption of soluble plant food, and instead of being held there in a form suitable for utilization by the plant roots, it is there in quite soluble forms, and as the rains come it goes down and down into the soil waters below. Only that portion is stored

up which the roots actually get hold of, and that which is mechanically held, and in such coarse sand, the amount mechanically held is quite small as has been demonstrated by leaching tests.

Even organic fertilizers such as bone meal, cottonseed meal, dried blood and castor pomace are slowly converted into soluble forms in the soil, and on account of the almost entire absence of those substances which produce absorption phenomena (a binding of soluble plant food) a large part of this soluble plant food, if not used at once by the plants, goes down with the first rain that comes.

VALUE OF SLOWLY AVAILABLE MATERIALS.

However, there is a great advantage in using these slowly available forms over the readily soluble forms, for all the while that they are thus being made available, the plants are being benefited, and the excess to be carried away by percolation is not so great.

I believe one of the merits of slag phosphate lies in its somewhat insoluble, but nevertheless slowly available form of phosphoric acid. When applied from year to year, a small amount is being rendered available all the time, and at the same time no very great amount is lost by percolation. I further believe that if we could get a more slowly available form of potash for such soils, the problem of fertilizing pineapples would be simplified and the expense reduced. The good results obtained with tobacco stems might possibly be attributed to the fact that the potash becomes slowly available, and thus in the end is nearly all taken up by the plant.

PLANT FOOD AND CAPILLARY ACTION.

But some one asks, may not much of this lost plant food be recovered and brought within reach of the plant roots by the capillary action of the soil moisture?

If the soil were a clay or a clay loam the answer would certainly be in the affirmative, but in such coarse sandy soils the conditions are very different. It is a well known physical fact that when three tubes of different internal diameters are placed open end in water, the water will rise highest in the smallest tube, that is the smaller the tube the greater the capillary action. So with the soil, the finer the particles the greater the capillary action, and as the particles of sand composing the pineapple soils are very large in comparison with the particles that make up clay soil, so the amount of water, and hence of plant food, brought up from a deep soil by capillary action is correspondingly smaller. Hence it is that plant food when once lost in the waters of the subsoil, are recovered but slowly and with great difficulty by capillary action. This was well illustrated by another experiment conducted in our laboratory.

Over the end of a glass tube of about 3-4 in. internal diameter, was tied a piece of muslin cloth, and into the tube was placed the pineapple soil to a depth of 12 in. The tube was then suspended so that the end over which the cloth was tied just touched the surface of distilled water contained in a beaker. At the end of three days the highest point at which the soil had been moistened by capillary water was 3 3-8 in. The same experiment was tried with the Columbia Co. soil, and the S. C. clay soil with the result that at the

end of the three days the Columbia Co. soil was moistened to a height of 8 3-8 in., and the S. C. clay soil 10 7-8 in. In each case the tube was weighed with the dry soil, and again at the expiration of the three days. The pineapple soil retained 8.9 grams of water, the Columbia Co. soil 23.4 grams, and the S. C. clay. 27.2 grams or a little more than three times as much as the pineapple soil. This indicates very clearly the difference in capillary action. In the pineapple soils the grains are large and as a consequence many of the spaces between them are too large for capillary spaces.

To illustrate in another way, if you could put these grains of sand together into the form of a lamp wick, you would still have a very poor medium for lifting oil, but if the wick be made of fine particles of asbestos, which is also a mineral, the oil is raised without difficulty and a good flame is the result.

SOME REMEDIES SUGGESTED.

Then is it possible to do anything to prevent this great loss of plant food?

Certainly it is not possible and perhaps not desirable to convert the sandy soils into clay soils, nor even to mix with the sand a small percentage of clay.

I will mention a few ways that have suggested themselves to me.

(1) By increasing the amount of organic matter in the soil.

It is a well established fact that organic matter acts as a sponge to hold moisture, and in holding water it will hold plant food. This was well illustrated in the experiment with the soil. 150 grams of an air dry muck soil retained over 100 grams of water, and 90.9 per cent. of the sulphate of ammonia. Whereas the

same weight of the pineapple soil retained only 30 grams of water and 5.77 per cent. of the sulphate of ammonia. Old pineapple plants and other organic matter might be allowed to decay on the fields instead of being burnt. In some cases it might be possible to increase the organic matter by spreading seaweed and muck soil over the fields. Other ways will doubtless suggest themselves to those interested. Of course the pineapple grower cannot resort to cover crops such as velvet beans, cow peas, beggar weed etc., as can the man who grows ordinary field crops.

(2) By the use of wind breaks.

Currents of dry hot air passing over the fields cause the surface moisture to evaporate rapidly, thus to a certain degree breaking the chain of capillary moisture.

(3) By the addition of lime to the soil.

Lime coagulates the soluble nitrogenous matter of manures and fertilizers, and this coagulated nitrogenous matter tends to make the soil more retentive of moisture; moreover lime, before it is carried very far down would probably begin to bind the grains of sand together and thus form a layer somewhat impervious to the downward movement of the water. In the use of lime, however, care must be exercised that it be not applied in such a way as to cause the loss of ammonia from other materials.

(4) By using materials which become slowly available.

For such a crop as pineapples where the plants remain in the ground from year to year, there would seem little reason for using quickly available materials except say for the first 18 months to get the plants started, even had we a soil that was capable of absorbing and holding the plant food.

After a certain amount of these slowly available materials have been added to the soil, some plant food is being rendered available all the time, and as the roots are there ready to utilize it—perhaps almost as rapidly as it becomes available—not so much is lost by seepage to the soil waters below. It seems to me, too, that this might apply to the fertilization of orange trees.

(5) By shading.

Shading undoubtedly conserves soil moisture, and if we can retain the soil moisture near the surface, it not only means more water for the plant, but it also means more water, and with it more plant food, brought up from the deep subsoil by capillary action.

In the light of the evidence before us I am strongly inclined to the belief that it would be economy to fertilize pineapples from four to six, instead of two to three times a year. I am aware that this is not in accord with recommendations made in the recent bulletin on fertilizer experiments with pineapples, but at the time those recommendations were made we had not discovered that the loss of plant food on pineapple soils was so great

If you should give to your horse at one time, food enough to last him one week, you would expect much of it to be wasted; so, if you give to your pineapples at one time, plant food enough to sustain them six months, and there is nothing in the soil to bind or absorb this plant food, so that it may be given out again gradually, there must necessarily be much loss.

At present I know of no experimental evidence on which to base such a statement, but reasoning along the lines indicated, I am of the opinion that 2000 pounds of fertilizer applied at intervals of two or three months would be as effective as 3500 pounds of the same material in two applications.

There is, however, the difficulty that the extra expense of frequent applications might outweigh the cost of the extra fertilizer required in the case of two applications. This of course could be determined by experiment, and as the Chairman of the Committee on Fertilizers and Irrigation points out in his paper, it would no doubt be a profitable field for investigation along other lines than pineapple growing.

SOME NOTES ON THE PINEAPPLE EXPERIMENT AT JENSEN.

BY A. W. BLAIR.

Mr. President, Ladies and Gentlemen:

A bulletin giving full account of this experiment up to and including the crop for last year has recently been published by the Experiment Station, and will very soon be distributed, but I trust that I may

not be out of place here, if I sketch briefly the object and plan of the experiment, mention some of the more important results obtained, and perhaps raise some questions which it may be profitable for pineapple growers and others to consider.

In the beginning, I wish to accord to Prof. H. K. Miller full credit for the part he has had in this work. He planned the experiment and had immediate supervision of it for three years, and on his retiring from Station work, the writer, who was associated with him during this time, was placed in charge, and has endeavored to carry to completion the plans which Prof. Miller projected. Much credit is also due Mr. W. R. Hardee, whose hearty co-operation, and sincere interest in solving the problems which confront the pineapple grower, have made it possible to continue the experiment over so long a period.

Credit is also due a number of others whose names I need not mention, but who, nevertheless, lent efficient aid, and acknowledgment is hereby made to all such.

OBJECT OF THE EXPERIMENT.

The object of the experiment, as stated in the bulletin referred to above, is to find out from what source or sources it is best to obtain fertilizing materials for pineapples; the right amount to use; best method of applying; ratio for phosphoric acid, nitrogen and potash; the effect of shading, and to determine any other conditions which will prove of advantage to the grower.

Certainly not all of these questions have been answered to our satisfaction, perhaps none of them have been fully answered. However, we had not hoped to be able to make two pineapples grow where one grew before, nor to produce two at the cost of what had formerly been the cost of producing one, but we did hope to throw some light on some or all of these questions, and we leave it for those who study the results obtained, to

say with what success we have accomplished our task. That there is much yet to be learned, there is no doubt.

GENERAL PLAN OF THE EXPERIMENT.

The experiment was commenced in the spring of 1901, arrangements having been made with Hardee Bros. of Jensen to conduct it as a co-operative experiment, they furnishing the land, work, etc., and the Experiment Station to plan and direct it, and furnish fertilizers and shed, and have samples of the fruit for analysis when required.

In accordance with this plan, Hardee Bros. set aside for the experiment about one acre of virgin spruce pine land. It was cleared and put into thorough condition, laid off into 96 plots, 24 sections of four plots each, as shown on diagram, and in August of that year, planted to slips of the Red Spanish variety.

The plots are 1-150 of an acre in size, and contained, in the beginning, just 100 plants each, making a total of 9600 plants.

On account of a border around the outer edge, and extra space required for alley-ways only about 2-3 of an acre was actually required for the experiment.

PLAN FOR FERTILIZER APPLICATION.

As mentioned above, the plots are in sections of four, all the plots in a section receiving the same kind of fertilizers, but in gradually increasing amounts, beginning with the first in the section.

The second plot in the sections is taken as the standard, and received annually .8 pound phosphoric acid, 1.0 pound nitrogen and 2.00 pounds potash, or to put it in terms of pounds per acre, it received at the rate of 3000 pounds per acre of a fertilizer which would analyze 4 per cent.

available phosphoric acid, 5 per cent. nitrogen and 10 per cent. potash, this standard being based upon the analysis of the plants and fruit, and the experience of the more successful growers. Plot one received one fourth less than the standard, plot three one fourth more, and plot four one-half more or twice as much as plot one.

That is, plot one received at the rate of 2250 pounds per acre of such a fertilizer, plot two 3000 pounds, plot three 3750 pounds, and plot four 4500 pounds.

With the exception of a few sections introduced for special purposes, this plan was followed throughout the entire plot, different sources of plant food, of course, being used in the different sections.

It will thus be seen that all the plots in a given horizontal line received the same amount of plant food, the difference being in the sources from which they are derived.

To illustrate, the 2nd plot of sec. H received 0.8 pound phosphoric acid derived from slag phosphate, 1.00 pound nitrogen derived from dried blood and 2.00 pounds potash derived from muriate, while the second plot of section M; for example, received the same amount of phosphoric acid, nitrogen and potash derived from bone meal, cotton seed meal, and high grade sulphate. Several sections were introduced for special purposes; for example, section K was introduced with the idea of finding out the effects of lime when used with acid phosphate; section L to determine the proper ratio for phosphoric acid, nitrogen and potash; section V to determine the number of applications giving the best results, etc.

After the first 18 months the fertilizers

were applied twice a year, except in the case of one or two special sections, according to the plan mentioned above. One application in February or March as the conditions seemed to require, and one soon after the removal of the summer crop.

THE RESULTS OF THE FIRST YEAR.

Beginning with the first crop which came off in 1903, careful count was kept of the number of the different sizes of pines taken from each plot. This record is published in full so that in one table may be found the amount and kind of fertilizers applied to each plot, and in another the number of the different sizes of pines produced by these plots for the three years 1903, 1904 and 1905. They cannot be given in detail here.

The crop of 1903 was about 88 per cent. of a total possibility; that is, each plot had a possible yield of 100 pines, and actually yielded, on the average 88. This must be considered a good yield when it is remembered that in an experiment of this nature, it is almost a foregone conclusion that some of the plots receive a treatment which will, to a greater or less extent, injure the crop.

As a matter of fact there was a wide difference in the yield of the various plots, some yielding little more than half a crop, while several yielded 97, 98 and 99 out of a possible 100 and one, at least, yielded 100.

The results are interesting, but can best be studied from the published tables. I will, however, undertake, in a general way, to point out some of them.

COMMENT ON FERTILIZERS.

The experiment has emphasized the fact, which had already been pretty gen-

erally accepted, viz: that acid phosphate and kainit are injurious to pineapple plants; it has shown that nitrate of soda has some good qualities and some bad ones; it is good as a source of nitrogen to start young plants, but used liberally on bearing fields it finally injures the plants and produces a fruit which has poor carrying qualities; the results obtained with the sulphates of potash, low and high grade, were slightly better than those obtained with the muriate. As sources of phosphoric acid bone meal and slag phosphate have given very good results, slag apparently giving slightly better results than bone meal.

Dried blood, cotton seed meal and castor pomace have all given good results as sources of nitrogen, and it would be rather difficult to say which is the best. One grower may use dried blood with success, and perhaps another may use cottonseed meal or castor pomace with equally good or even better success. The price of the goods, the requirements of the individual etc. will necessarily come in here as determining factors. And I may stop here to say that in this work it has been our endeavor to show just what results the different amounts and different kinds of fertilizers will give, rather than to calculate to a nicety which is the most economical, thus leaving it with the grower who is, in almost every instance, competent to determine which is the most economical in his individual case.

A THEORY FOR THE INJURIOUS EFFECTS OF ACID PHOSPHATE.

Before leaving this point it may be well to state that the beds which received acid phosphate without lime have been almost entirely ruined, while those which receiv-

ed acid phosphate and lime in addition, have remained in good condition and have given almost as good results as some which have been considered among the best. It is not an easy matter to explain this. However, one theory at least has been advanced, which is, that acid phosphate contains sulphates of iron and alumina which are astringent salts, the presence of which might be injurious to the tender rootlets of the pineapple plant. With the addition of lime these astringent salts would be neutralized with the formation of the harmless insoluble oxides of iron and alumina. This explanation would seem to be strengthened by the fact that the plots which received genuine dissolved bone black, which does not contain salts of iron and alumina, were not injured.

It may be objected that if the tender rootlets of the pineapple plant are injured by these astringent salts, then would not the rootlets of corn, cotton, wheat, etc. be injured in the same way? To this question I would answer no, not necessarily, since in the soils where these crops grow, there is much more lime than there is in the pineapple soils, probably all that is needed to neutralize these astringent salts.

However I would not recommend the use of acid phosphate on pineapples, even with lime, at least until the subject has been further investigated.

The excellent results obtained by the use of slag phosphate might possibly be taken as an indication that there is some efficacy in lime, since this material contains a goodly percentage of free lime.

THE LIMIT OF PROFITABLE FERTILIZING.

One very interesting part of the experiment has been the determining of the limit to which it is profitable to fertilize pineapples.

TABLE III.
Showing increase of 24's and decrease of 42's as fertilizer is increased—Crop of 1903.

* Special plots.

As has already been pointed out, the first line of plots received at the rate of 2250 lbs. per acre, the second 3000, the third 3750 and the fourth 4500.

Now by actual count there was, for the crop of 1903 an increase, in a number of the sections from the first to the third plot, though seldom were there materially more on the fourth than on the third, some times less. This seemed to point to the fact that with the third plot of the section, that is, the one that received its fertilizer at the rate of 3750 lbs. per acre, we had reached the limit of profitable fertilization. However, when we came to sum up the totals of these four lines, we found them to be so near the same that we would hardly have felt justified in drawing such a conclusion on this evidence alone.

But when we came to take into consideration the number of the different sizes, there was a marked difference.

To take the 24's for example it may be seen by reference to the table that there is a decided increase in the number from the first to the third plot of nearly all the sections, while from the third to the fourth there is seldom a very great increase and indeed sometimes a decrease. Reference to the totals emphasizes this fact. These are in the upper half for No. 1, 45, No. 2, 105; No. 3, 277 and No. 4, 277, and for the lower half, No. 1, 124; No. 2, 165; No. 3, 162 and No. 4, 269. a very decided increase from No. 2 to No. 3 but practicably no increase from No. 3 to No. 4 and yet No. 4 received at the rate of 750 lbs. per acre more fertilizer than No. 3. Likewise there was an increase, though not so pronounced, in the 30's and a somewhat corresponding decrease in 36's and 42's; but if by the addition of something like 1-2 to 3-4 of a ton of fertili-

zer per acre up to a certain limit we can grow 24's and 30's where before we grew 36's and 42's I think the growers will bear me out in the statement that we are still engaged in a fairly profitable business.

Plot 19, the third in sec. E and which received its fertilizer at the rate of 3750 lbs per acre, yielded in 1903 an increase over plot one, of this section, apparently due to thus increasing the fertilizers an amount equivalent to over \$339 per acre above the expense of the fertilizers. Other plots showed an increase nearly as great. The plot which gave the largest total returns for that year was also the third plot in a section and received 3750 lbs. per acre, plot 35 sec. I. This yielded at the rate of 537 1-2 crates per acre while plot 36, the fourth in the same section, and which received at the rate of 750 lbs. per acre more fertilizer, yielded about one crate less.

Putting together all these facts and some others which I cannot now take time to mention, I think we are safe in saying that for shedded pines and under present conditions, there is profit in applying as high as 3500 to 3750 lbs. per acre, of a fertilizer which will analyze 4 per cent. available phosphoric acid, 5 per cent. nitrogen and 10 per cent. potash, beyond this is money lost.

The profit comes chiefly in very materially increasing the number of the larger sizes.

THE CROPS FOR 1904 AND 1905.

No such decisive conclusions can be drawn from the crops for 1904 and 1905, but this is undoubtedly due to causes other than fertilizers. The crop from the experiment plot for both these years was less than one third of a total possibility

and it would seem hardly fair to undertake to draw many conclusions from such a diminished crop. Certainly the fact that in several instances, at least, the plot receiving the least fertilizer gave the largest yield of fruit would indicate that it was not want of plant food that caused the short crops. Possibly the shortness of the crop for 1904 may be attributed partly, at least, to the heavy yield of the previous year, the plants being somewhat exhausted temporarily; the shortness of the crop of 1905 is explained by the freeze of that year. However, there is in the results from this year, further evidence tending to show that with 3750 lbs. per acre of a fertilizer analyzing as stated, we have reached the limit of profitable fertilizing. We shall await with much interest the results from the crop of 1906.

For a full discussion of the results of the experiment up to and including the crop for 1905 those interested are referred to bulletin No. 83, Florida Experiment Station.

DISCUSSION.

Prof. Stockbridge.—I have forgotten from your statement, whether or not in your different fertilizer applications nitrate of potash was used.

Prof. Blair.—It was not used.

Prof. Stockbridge.—Mr. President, the thought was suggested to me that capillary action might be increased by changing the character of soil. If we could add clay to pineapple soil the capillary action would be increased; the point I wish to bring out is to know whether chemical salts are put on in addition to the other properties with a view of increasing the capillary action. Some of the salts used in fertilizers such as kainit

is known to increase the capillary action, but it could not be used in pineapple, but there is one, the nitrate of potash, commonly known as salt peter. Experiments have shown that the nitrate of potash will increase the capillary action to 25 per cent. or to a very great extent. I believe the best experiments shows an increase of 22 per cent., therefore it seems to me that it is quite feasible, at least there is a field for experiment with nitrate of potash in growing pineapples and this might increase 20 per cent. the amount of water consumed. I think this suggestion worth consideration. What is the contents of Nitrogen in nitrate of potash?

Mr. Wilson.—Sixteen per cent. nitrogen, 44 per cent. potash, 96 per cent. of pure salt peter.

Prof. Blair.—I think that reasoning very good, but it seems to me that nitrate of potash is so very expensive that the loss by solution and going down deep into the soil, outweighs the capillary action he speaks of.

Mr. Blackman.—Mr. President, have you or others ever made any experiments in Dade county with surface soil in regard to loss of fertilizers?

Mr. Blair.—Our experience so far has only been carried on in Jensen, which is not the type of soil you refer to, it is the sandy soil.

Mr. Blackman.—I wish there could be experiments made in the rocky lands of Dade county along this line. I am of the opinion that there is little or no loss of fertilizers in our rocky soils. The rock is very porous and we believe that a great amount of fertilizing properties which in sandy soils would be lost, are retained in the rocks and held there. The rock being so porous that the roots penetrate it gathering up

the stored fertilizer and appropriating it. Another reason why we do not believe that the fertilizer in solution percolates through the rocks and is lost, is that our pine lands are lower than the glades, and there is an ever flowing underground current of water, forcing its way upward through the rock, which would have a tendency to force back to the surface what soluble matter that had penetrated the rock, making it available at all times. A well may be put down any where in the rocky lands from eight to ten feet deep which can never be pumped dry, furnishing an unlimited amount of fresh, sweet, pure water. During the past three or four years I have put down a number of these wells and have not had a failure in any of them. The flow of water is as

great today as it was the day they were put down.

The thought came to me while Professor Blair was talking, that in some way, down in our country nature had provided us a pocket in which to hold these fertilizers. It is held largely in solution in these rocks and the roots go down and penetrate them, thus throughout the severest droughts we have, does not tend to yellow the trees, to dry up the foliage, or check the growth. I call attention to this hoping that the professor will sometime make an experiment to see whether a portion of our fertilizers are lost in percolating through the soil and rocks, or whether they are stored underneath the ground in the rocks and are ready for future use.

Report of Standing Committee on Fertilizers and Irrigation.

BY PROF. E. R. FLINT.

Mr. President, Ladies and Gentlemen:

I take it that it is the province of this committee to present any progress that has been made during the year, in regard to fertilization and irrigation, in so far as it is of interest to the horticulturist, particularly of the State of Florida.

While I cannot announce any startling discoveries for the year in the matter of fertilization, nevertheless there is undoubtedly a constant and steady accumulation of experience and experimental data which is gradually leading to the point of making plant fertilization more nearly an exact science than it has been, or perhaps it would be nearer the truth to say, to a point where we begin to realize that, as it varies so with every varying condition, it never can be an exact science.

In regard to practical results and progress in our own State, the Florida Experiment Station has just published the results of an extensive experiment on the fertilization of the pineapple and has reached some interesting and valuable results, which are to be presented in another paper. Fertilizer experiments are also in progress on the orange, cotton and potatoes.

If we review the work done by the various experiment Stations on fertilization,

for the past year, it seems to me that we must be lead to the belief that not only every State, but every county, every farm and indeed every portion of that farm requires more or less special or individual treatment to get the best results. A universal formula for any particular crop is not possible. Such a formula may serve as a basis, but no intelligent plant grower should rest content with this, but should constantly seek to so modify it that it will best meet his own individual conditions, and the more intelligently and conscientiously he does this, the more economically and profitably he will be able to fertilize his land. It is for this reason that Stations and Agricultural papers are always advocating home mixing, and that fertilizer dealers are advertising, more and more, the various plant food ingredients rather than mixed fertilizers. A mixed fertilizer will always find some sale because there are many that will not take the trouble to do their own mixing, and I would not in any way imply that they are not of value, as every reputable dealer aims to supply what is needed and in the best form, as it is in the results obtained that he gets his best advertising, and I think we have no reason to complain of the dealers in our own State.

I believe, in the past that we have become accustomed to place too much reli-

ance on published formulas which have been made up from the analysis of the soil and the crop, and have contented ourselves with these data. The subject of animal nutrition and feeding is naturally one of considerable complication and difficulty, as compared with plant feeding, but I think that we shall eventually come to believe that the more intimate questions of plant nutrition, approach it in this respect. To be sure we are concerned in furnishing only a very small percent of the total plant food that is required, as by far the larger part is obtained from the air, but that part is just as essential to the growth of the plant as the other. If the problem was merely one of determining just how much potash, phosphoric acid and nitrogen was removed in the crop and was required for the additional growth for the year, it would be easily solved. But in practice, this is found to be wholly inadequate for crops like the orange and from eight to ten times as much as the amount so indicated by the above figures seem to be required to keep the plant up to the best condition of quality and quantity of fruit. Where does this excess go to, and how can we economize by reducing this discrepancy to a minimum without lowering the results we wish to obtain?. To answer this question, I think we must turn from the chemical side of the question to the physical one, or, in other words, study the physical and mechanical conditions of our soils to find a solution.

There are various sources of loss of plant food in the soil, and reasons why the plant does not get all that we apply, with which we are acquainted. One of the most evident of these is the leaching

of the material through the soil and carrying it away from the area of the root system of the plant. The rapidity of this leaching increases markedly as we pass from a clay to a sandy soil. Now, on our Florida soils there is no question but that leaching goes on to a very great extent. It is of course desirable that we have our plant food in a soluble form as it is only in this condition that the plants can make use of it. If we apply it in this condition, or in such compounds that it rapidly becomes so, it is conceivable and no doubt to a large extent true, that with the first soaking of the soil with rain it is carried away to a large extent beyond the reach of the plant (speaking particularly of our loose, sandy Florida soils.). Now can we prevent this serious and expensive loss? At present the method of overcoming this seems to be to supply sufficient to allow for this loss and to feed the plant too, which is one reason why we have to apply from eight to ten times the amount removed by the crop, and that would seem, from all rational and scientific standpoints, to be necessary. In other words, we apply say from one to two tons to the acre, expecting and knowing that we shall lose a large part of it, when perhaps 200 to 300 pounds is all the crop needs and makes use of. If such conditions held in any technical line, you may be sure the manufacturer would take immediate steps to prevent this loss. If the farmer can stand this constant drain and still make a profit, there must indeed be money in farming. I believe, however, that we can control this loss to a considerable extent. According to the usual practice, we make one or two applications of fertilizers a year to the crop and expect it to save and make use

of what it can out of this, for the next six months more or less, although its food is being rapidly carried out of its reach, and I have no doubt but that the amount of available plant food within access of the plant roots, during the last few months of such a period, is exceedingly small. In other words, we give it a surfeit of food in one meal and then starve it for some months. Does not the remedy in this lie in our dividing up our applications, making several of them through the season, keeping our plants supplied with available food in small amounts, as required. I believe that such a practice would result in a considerable saving and that a smaller amount of fertilizer so applied, would produce the results of one or two large applications. To get the best results such a system of applying fertilizers should be accompanied with means of irrigating, so that, with each small application, if there were not sufficient rainfall, just enough water could be applied to bring the food into solution, but not enough to leach through the soil. It is true that the proper carrying out of such a system would involve some initial expense, but to the progressive farmer of today, who aims to get the best results at the least expense, and can look ahead on his balance sheet, it will eventually save money.

Another source of loss, which however is largely temporary, and with the present system of applying fertilizers perhaps more beneficial than otherwise, is the chemical changes that the fertilizing material undergoes in the soil, tending in general, to pass from a soluble to a less soluble form. This would be obviated, to a considerable extent, by the system just suggested.

The belief in the value of a chemical soil analysis as an indication of what is necessary to add to that soil in order to make it fertile, is rapidly loosing ground, and attention is being turned more particularly to the bacteriology of the soil, the various conditions of acidity and alkalinity, the changes of the humus in the soil etc., and when the present lines of investigations shall have advanced further, we may hope for a more practical and intimate knowledge of the relation existing between the chemistry of the soil and the fertilization of plants.

Present methods of soil analysis are aiming to determine the plant food that is actually available to the plant, rather than the total amount of such material in the soil. These methods should give a much better idea of what is needed than the methods formerly employed.

The farmer has two valuable and inexpensive means of improving his soil and thereby cutting down his fertilizer expenses, which I do not think are practised nearly to the extent that they should be, and these are, the plowing under of green crops and the growing of leguminous crops as a source of nitrogen. As the natural sources of fertilizing material become less abundant and more expensive, in the future, these means will be more appreciated and used. It is a striking fact that is noticeable as we review the development and advancement of civilization, with its ever increasing necessities and requirements, that no sooner does an urgent emergency arise for anything that may contribute to the comfort and welfare of mankind, than some discovery is made that supplies that demand. Up to the present time, we have lived in a time when nature, by the exploration

and opening up of new countries and the discoveries of great deposits of valuable mineral material, has supplied everything needed with a lavish hand. Nor has man been at all backward in using, with the greatest freedom and often times with the most inexcusable wastefulness, the resources which have been so bountifully given to him. The time has already arrived, however, when we begin to look into the future and speculate as to what is going to happen to posterity when we shall have exhausted the resources which we are now drawing on with ever-increasing freedom to supply the constantly growing demands. That the crude material stored in the earth, which has grown to be so indispensable to our welfare, will eventually be exhausted, no one can doubt, and in fact it is possible to calculate approximately, with the present rate of use, when many of our natural resources will be exhausted, a period in many instances surprisingly and almost alarmingly short. We must then, console ourselves with the above mentioned fact, that some discovery will be made which will enable us to get along as well or better without them.

Let us consider for a moment, the situation in regard to the future supply of fertilizing materials and see what is being done to provide for the time when we shall have exhausted the great deposits that have proved of such inestimable value to agriculture. First in regard to potash. It is calculated that the present consumption of potash, for all purposes, is over three million tons a year and that it is constantly growing. Practically all of this comes from the great Stassfurt deposits in Germany. As minor sources of supply we have wood ashes and cotton

seed hull ashes, which are limited. About 2000 tons of muriate of potash are annually made in the south of France from sea water and the Scottish manufacture of kelp yields perhaps 1000 to 1200 tons yearly as a by-product. There are a few other minor sources of supply, such as nitrate of potash, wool washings and beet sugar residues. Leaving out these minor sources, which supply but a very small part of the total demand, we have as practically the sole source, the great potash deposits at Strassfurt, Germany. Although the yearly output of this great collection of mines is now nearly four million tons a year and is steadily increasing, the supply seems almost inexhaustible, so that it will at least be many, many years before mankind will find itself face to face with the problem of its potash supply, which has become so essential to successful agriculture, and the necessity for which will grow greater as the population increases, virgin soils are robbed of their natural fertility, and intensive farming becomes more and more a necessity. Let us hope that when that times comes, some means will have been found or new discoveries made, which will supply the deficiency.

In regard to phosphoric acid the natural supplies may be summed up in general, in the deposits of phosphate rock, phosphatic guanos, bones and slag. The great guano deposits which have been drawn upon so heavily in the past will be exhausted before a great many years, and although smaller gauno islands may from time to time be discovered, the supply from this source must gradually diminish. The conditions which allow the accumulation of such deposits, which require many years to form will probably never

be repeated to the extent they have been, so that this source, when exhausted, will probably never be replaced. The phosphatic deposits, as those through the southeastern portions of the United States are large and will give an abundant supply for a long time, but they are not inexhaustible. The source of supply from bones etc, which however, is insufficient to supply the demand, can be counted upon as a steady source, and the same applies to slag, a by-product in iron smelting. Viewed as a whole, there is nothing alarming in the present situation of the potash and phosphoric acid supply.

In regard to nitrogen, the fact confronts us that we are continually using up this element of plant food without an adequate return to the soil. The constant cropping of the land, combined with our present system of sewerage disposal, which prevents the return to the soil of such a large and legitimate nitrogen supply, the fact that so many crops are sold away from the land, are sufficient to indicate the loss, without considering the destruction of nitrogen compounds by denitrifying bacteria, the leaching of the soil and other sources of loss. The world's supply of the two richest sources of nitrogen, guano and saltpeter, is being rapidly exhausted. At the present rate of consumption of the latter, one billion tons a year, it will be exhausted, as claimed by some, in 30 years. New methods for the production of nitrogen compounds available for fertilizing purposes may be discovered, and some efforts have already been made in that direction with electricity, but this does not promise sufficient as yet to count on it to any extent to relieve the situation.

Nature has provided, to a certain ex-

tent, for the return of nitrogen to the soil. Arising from the chemical changes going on, on the surface, there are always traces of ammonia compounds and compounds of nitrous and nitric acids in the air, which are washed down by rains. Electrical discharges in the air bring small amounts of the free nitrogen into combination so that it may be returned to the soil by the rain. In 1891 it was discovered that there were certain micro-organisms in the soil which could bring the free nitrogen of the air into combination without the aid of any other plant life. Experimentation on this line has been undertaken to make practical use of these organisms but so far without result.

The fact that leguminous plants had a very beneficial effect on the soil is a very old observation and they have been used for this purpose without the knowledge of the reason for this. It was demonstrated in 1895 that there was actually an increase in nitrogen after such a crop. It was also noticed that these plants would grow in a soil that contained practically no nitrogen. Hellriegel, in 1886 announced that leguminous plants derived their nitrogen from the atmosphere and in 1888 Wilfarth and Hellriegel demonstrated that the growth of such plants in a nitrogen-free soil, occurred after the development of nodules on the roots. Previous to this time, although these nodules had been noticed, they had been considered as a diseased condition of the roots. When the true solution of the question began to appear, it was easily demonstrated that a leguminous plant, grown in a soil absolutely free from nitrogen, as in pure quartz sand that had been heated to redness, and watered with a solution devoid of nitrogen in any

form, would produce a normal growth when the nodules were present, but if they were not present they would quickly die. It was indeed proved that a legume growing in a poor sandy soil provided with nodule-forming bacteria, will be even more vigorous and produce a better crop than plants growing in a moderately rich soil devoid of the bacteria. A great many recent field experiments in all parts of the country have proved this beyond a doubt.

One of the most striking experiments was that of Prof. J. F. Duggar at the Alabama Experiment Station in 1895 and 1897. On one field where hairy vetch had not been grown previously and the fertilizer used contained phosphoric acid and potash without any nitrogen, the yield was but 235 pounds of hay per acre. On a similar plot, treated in a similar manner with the exception of the addition of some soil from an old field containing the proper bacteria, the yield of hay was 2540 pounds per acre, or an increase of over 2000 pounds. This beneficial effect is not confined to the leguminous crop itself, but is imparted to the crops following such plants and this has become so universally accepted and so many times proved, that every recognized system of rotation includes some leguminous crop in its course. The fact is tersely stated by T. E. Neal, from results of experiments at the Delaware Experiment Station, that \$100 invested in clover seed returned four times as much as the same amount invested in nitrate of so-

da. It is estimated in this country that the average amount of nitrogen added to the soil by legums is 122 pounds per acre. When it is remembered that a high grade nitrate of soda contains only about 15 per cent. of nitrogen, while much that is on the market often contains considerably less, it will be seen that a crop of legumes is equal to from 800 to 1000 pounds of nitrate of soda per acre, which at the present price of this fertilizer, is equal in value to from \$20 to \$25.

We thus see a possible future solution of the question of the nitrogen supply, at least. The horticulturist of Florida, as well as in other states, in order to meet the gradually extending competition, has got to take advantage of every possible means of furnishing the fertilization necessary to secure the best results, at the lowest price consistent with efficiency, but in doing this he must be careful that he does not deteriorate the quality of his fruit. Every poorly fertilized grove means poor fruit which in turn is a menace to the reputation of the whole crop, which up to the present time at least, has justly and easily held first place. We must however, seek always to improve our fruit, so that we may not only meet, but keep ahead of the competition that is bound to develope from the West Indies etc. The geographical position of Florida is such, that I believe she can and will meet this competition, especially in the quality of her fruit.

THE ECONOMIC IMPORTANCE OF FIXED NITROGEN.

BY L. HEIMBURGER, M.S.,

FIRST ASSISTANT STATE CHEMIST.

Mr. President, Ladies and Gentlemen:

Of the three natural elements so often deficient in our soils combined nitrogen is the one most easily exhausted, the most costly and the most rare.

Every crop removes its aloquent portion of combined nitrogen from the soil, and if not returned by the grower leaves the soil proportionally poorer. Every battle results in the waste of hundreds even thousands of tons of nitrogen that could be used in supporting instead of destroying human life.

Again our sewers are delivering untold millions of dollars of nitrogen annually into the sea.

Every pound of coal or wood as ordinarily burned, results in the return to the atmosphere of a definite amount of nitrogen.

The problem is to replace this annual loss of combined nitrogen and as our two chief sources at present are neither inexhaustible, it becomes a serious matter. These two chief sources are our coal beds and nitrate deposits. Of the coal burned only a comparatively small amount of the nitrogen content is saved and our visible supply of Nitrate is being rapidly exhausted.

At the present increasing rate of exportation, now one and a half million tons annually, the Chili nitrate deposits cannot last more than another twenty years.

Nitrogen is one of the least active

chemically of all the elements, and for this reason, it is found in nature principally in its free uncombined or elementary form. It is only by the most drastic of chemical or physical methods that elementary nitrogen can be made to combine with other elements. The ultimate source of all our nitrogen combined and uncombined is the atmosphere where it is present in its elementary form to the extent of about 79 per cent. by volume. The remaining 21 per cent, is principally oxygen.

The greatest direct economic value of elementary nitrogen in the atmosphere is to act as a delutant to the oxygen. Incidentally it is the source of all combined nitrogen.

Elementary or uncombined nitrogen has no neutrant value to the higher organisms and therefore is of no direct value to the plants and animals we are most interested in.

In its combined forms nitrogen is one of the bases of life among higher organisms being a principal constituent of protoplasm; the others being Carbon, Hydrogen, Oxygen, Sulphur and Phosphorus.

If it were not for combined nitrogen, life as we now know it would be impossible.

Here the question may be asked, how is the free or elementary nitrogen which is so inactive chemically, made to combine in nature with other elements so that higher life may be possible?

This is a most difficult question to answer, and at present can only be answered in part by Science. It is along this line that bacteriology together with chemistry and physics have accomplished great work in recent years.

Bacteriology, the youngest of all the sciences has shed the greatest amount of light upon this question. During the last two decades this science through its many researches tells us of a great number of micro-organisms that have the power of fixing nitrogen; that is, they are capable through unknown processes to cause elementary nitrogen to combine with certain other elements present to form compounds of Nitrogen which are available as food for higher plants.

These nitrogen fixing micro-organisms may be divided into two classes, symbiotic and non-symbiotic.

The greater amount of research has been devoted to the former, and therefore they are best known at present.

These symbiotic micro-organisms are always found intimately associated with certain higher plants especially the papilionaccae or leguminosae (beans, peas, clover, etc.) in whose roots they reside. The amount of nitrogen that may be fixed by these micro-organisms is large and the cultivation of legumes should always be encouraged.

Of late years our National Department of Agriculture has been making great efforts to devise a reliable method by means of which the micro-organisms above mentioned may be readily distributed in a commercial way.

The method of drying the cultures on cotton, recommended so highly not longer than a couple of years ago, has recently been shown to be but at best partially suc-

cessful. Still a reliable method will undoubtedly be forthcoming before long.

To the second class or non-symbiotic nitrogen fixing micro-organisms belong those of bacteria that have the power of fixing elementary atmospheric nitrogen unaided by any host. These organisms have not as yet been studied extensively, still a large number of forms have been discovered.

Besides the nitrogen fixing bacteria just discovered, there are forms of micro-organisms that have an opposite function, that is, they have the power of breaking up nitrogenous compounds with the liberation of elementary nitrogen. Therefore the action of these bacteria result in the loss of fixed nitrogen in the soil. These organisms can, however, be readily controlled by the proper drainage and cultivation of the soil, for they are as a rule anaerobic, (not capable of existing in the presence of air) or at best but slightly facultative (capable of existing in or not in the presence of air.)

Another natural agency by means of which atmospheric elementary nitrogen is fixed is through electrical discharges.

For many years it has been known that lightning discharges cause atmospheric nitrogen to combine with oxygen to form oxides: These in turn unite with aqueous vapour to form nitric and nitrous acids, which are washed out of the air into the soil by the rain.

It must be borne in mind that but a very limited amount of atmospheric nitrogen is fixed in this way.

As far back as 180 years ago Cavendish, one of the founders of modern chemistry, predicted the commercial fixation of atmospheric nitrogen and a few years later contemporaneously with Priestly

showed that electric sparks under certain conditions oxidized atmospheric nitrogen.

Later the noted chemist Bunsen did more valuable work in the electro-thermic fixation of atmospheric nitrogen.

Until very recently the yield of oxides of nitrogen has been very poor by electro-thermic methods being only in the experimental stage. The principles upon which are based all electro-thermic methods for the fixation of free nitrogen are in general as follows:

When air is subjected to silent electrical discharges of high potential, the oxygen is ozonized and the nitrogen is oxidized most largely into nitric and dinitric oxides (NO , NO_2) the former can be further oxidized to dinitric oxide.

Dinitric oxide or nitrogen preoxide in the presence of water forms nitric (HNO_3) nitrous acid (HNO_2) as well as nitric oxide (NO) depending on the relative proportions of peroxide and water present.

These acids, nitric and nitrous, combine with bases to form nitrates and nitrites.

To oxidize nitrogen requires a very high temperature. It has been shown in recent years, that the percentage of nitrogen oxidized is very largely dependent upon the temperature the gases are exposed to. Nernst determined that at 1,811 degrees C. only .37 per cent. of the Nitrogen supplied was oxidized, while at 3,200 degrees C. 5 per cent. of the nitrogen was oxidized.

If the oxides formed are not rapidly removed, this high temperature causes their decomposition.

Electricity is the best source of heat for obtaining the high temperature re-

quired for the oxidization of atmospheric nitrogen.

Of the large number of electro-thermic methods for the fixing of free nitrogen, but one, the Birkeland-Eyde process, has proven a complete commercial success.

In the Birkeland-Eyde process the inventors use magnetic blow-pipe electrodes with an alternating current, this gives a flame disk of large surface.

The air enters from both sides of the flame disk and is drawn off from below in such a manner that it has passed directly through the plane of the flame.

Only about two percent. of the nitrogen is oxidized in the flame. After passing through the flame, the air is cooled in a suitable chamber where the nitric oxide (NO) is further oxidized to peroxide, (NO_2). From the cooling chamber the gases are conducted through absorption towers, eight in number, where they come in contact with water. The dilute nitric acid is drawn off from below, raised again, and allowed to trickle down again from tower to tower, until upon flowing from tower number eight the formerly very dilute acid has been raised to about 50 per cent.

The last traces of acid are removed in towers irrigated with lime water and finally in a dry lime chamber.

The nitric acid thus obtained is neutralized with calcium carbonate (lime-stone) Ca CO_3 , and the resulting calcium nitrate (Ca NO_3) is evaporated and fused using the waste heat from the electric furnace.

The factory at Nottodden, Sweden using the Birkeland-Eyde process, obtains a yield of from 11 to 13 hundred pounds of nitric acid per kilowatt year, equivalent to about 11-3 horse power year.

At these Nottodden works cheap water power is to be had, and in many places in Sweden power may be produced for the very low rate of \$3.00 per horse power year.

With the above figures in mind i. e. \$3.00 worth of power for the production of one half ton of nitric acid, it is proven that the nitrate of lime as produced at Nottodden can successfully compete with Chili nitrate of soda at current prices.

The Birkeland-Eyde process being new, is susceptible to material improvement.

A new improved plant, recently put up, turns out over fifteen hundred pounds of nitric acid per kilowatt year.

The much dreaded nitrogen famine so often predicted of late years, may in the very near future be entirely eliminated by electro-thermic methods for the direct fixation of atmospheric nitrogen.

FERTILIZING MATERIALS.

BY LORENZO A. WILSON

Mr. President, Ladies and Gentlemen:

The fertilizer question has been so ably handled before this Association during its nineteen meetings it would appear there was very little left to be said regarding it. My friend, Mr. Painter has told you some of the things he knows on several occasions and has also issued some very intelligent books that nearly all of you have read. During the past twelve years I have written articles myself, sending them broadcast over the State to nearly every one of you I think, and there is only left for me now the rehashing of the same matter.

There are so many growers in the State who have made such a close study of the question of plant foods and are so well-posted on it that I find it a very difficult matter to-day to get a traveling salesman to work for me, who knows as much on this subject as many members of this Association do. I have always said it was a bad plan to put a fertilizer manufacturer on this Committee as it is almost im-

possible for him at times to leave out some of the good things he might say of his own brands when he writes or talks on fertilizers. In the following article I have tried to write with the idea before me all the time, that I was a fertilizer broker in New York, selling materials to the manufacturers of Florida.

First I would like to say that the fertilizer industry has been very thoroughly developed in Jacksonville during the past two years. To-day the fertilizer factories of this city have a capacity for making approximately two hundred thousand tons of complete goods, if they had the market for them the year round, and the equipment to move them with.

PRICES.

The small growers of Florida buy their fertilizers cheaper to-day in this State than many of the larger buyers do on Long Island, New Jersey or Connecticut or Massachusetts. All of this has been made possible by the development of the fertilizer business in Jacksonville; the

fact that the market has grown as it has; that the materials are imported direct to this port from their points of production and the fact that the State of Florida itself produces practically the Phosphate supplies for the world. I have heard many growers say they were raising orange groves, pineapple patches and vegetable crops for the fertilizer manufacturer, as they get all the money. The question must necessarily then be of all-absorbing interest to the horticulturalists of the State.

The greater proportion of the groves and pineries are on high pine lands, which are composed of from 95 to 98 per cent. sand. The rest are mostly on hammocks that were quite rich to start on but under the draft of heavy crops of oranges their fertility was soon reduced to the same degree of poverty as the high pine lands so that the fertilizer question began to appeal to all alike and the whole country set in to study this subject.

In this article I will only take up the question of fertilizing materials, principally those that are used by the orange grower.

Under the influence of the German Kaili Works the first article that seems to interest the orange grower the most is Potash. In the modest opinion of the writer they have worked Potash rather strong on the grower, claiming for its excessive use a great many things that cannot be sustained.

The first or crude produce of the German mines is Kainit, which gives 26 per cent. of Sulphate Potash, Salt, Magnesia, etc. This is purified and the Double Manure Salts of Potash, Magnesia was formed, which gives 50 to 52 per cent. Sulphate of Potash or 26 per cent. K_2O and about

35 per cent. Sulphate of Magnesia, with 2.50 per cent. of salt. This is still further purified and the chemist obtains the almost chemically High Grade Sulphate of Potash, 90 to 96 per cent Sulphate of Potash or 49 to 52 per cent K_2O .

On account of the supposed good effect of the Sulphate of Magnesia on the soil and the fruit a great many orange growers prefer to buy Double Manure Salts, paying the difference in price and freights over the High Grade. I do not know whether they are justified or not in this belief,

I will pass over the Murate of Potash because it is so little used by the grower, its high content of chlorine or salt making it objectionable to the orange tree.

Nitrate of potash or salt petre is used to a limited extent. There are several grades, the highest 16 per cent. ammonia and 44 per cent of potash K_2O , giving the ammonia a valuation of \$3 per unit per cent. we find this a little cheaper source of potash than the sulphate. At a selling price of \$92 per ton at Jacksonville the 44 per cent. of Potash is worth \$42 or less than \$1 for each per cent. It is very quick in its action and does not seem to combine readily with the soil elements and is in great danger of being washed out by heavy rains.

The next important element in a fertilizer is the phosphoric acid, without it no blossom or seed is perfect. It is derived from a great many sources. Animal bone gives 4 to 5 per cent. ammonia and about 24 per cent. phosphoric acid of which from 6 to 10 per cent. is available to the plants, the rest gradually undergoes decomposition in the soil and it will take from three to five years for it all to become used up. Steamed bone gives

about 3 per cent. ammonia and 25 per cent. phosphoric acid and on account of its fineness is more readily available to the plants. The spent bone from the sugar refineries is treated with sulphuric acid to make its phosphoric acid available at once, and is used and sold under the name of dissolved bone black. It contains then from 16 to 18 per cent, available phosphoric acid.

Florida phosphates or fossil bone is the greatest source of phosphoric acid. This is mined in the central and southern parts of the State and immense quantities are exported to Europe. This phosphoric acid in our Florida phosphates is entirely insoluble. If it had been soluble it would not have remained, but would have been dissolved by the soil water and long since have disappeared from our country into the Gulf of Mexico. Chemistry has come to our relief in making this and other phosphatic materials available to the plant. Sulphuric acid is used in rendering water soluble the insoluble phosphoric acid in animal bone and the fossil bone in Florida. Each contains phosphoric acid and lime combined in the same proportion; one part of phosphoric acid and three parts lime which is called bone phosphate of lime, which is insoluble. Now to make the material, either bone or the Florida phosphates soluble and available to the plants it is ground and combined with sulphuric acid diluted with water to 52 per cent beaumae. The sulphuric acid has more affinity for the lime than the phosphoric acid has and combined with two parts forming sulphate of lime or land plaster, leaving the phosphoric acid combined with one part of lime which is soluble in soil water and available to the plants. The sulphuric acid

combining chemically with the lime is no more sulphuric acid and there is no more danger of your getting free sulphuric acid in this preparation than you would in sulphate of potash or sulphate of ammonia. This idea of danger from free sulphuric acid is a humbug and not worthy of the slightest attention by the intelligent horticulturalists of this State, an idea advanced by a northern manufacturer. Soluble phosphoric acid is identical no matter from what source it is derived, and when some growers realize this they will save money.

One of the northern firms for the last twenty years has been trying to make the Florida grower believe that all other complete fertilizers have free sulphuric acid in them, claiming that through a secret process by steaming he makes bone, Peruvian guano and other phosphatic materials all available. This statement has been made to many growers in the State but would never be made before a fertilizer manufacturer or some one who knew because the party making this claim knows only too well there are no elements in water or steam to combine with the lime in bone or phosphate to make it available even though he should put it through a secret steaming process for seventeen years.

Peruvian Guano is another fine source of phosphoric acid. High grade will give 9 to 10 per cent. ammonia, 9 to 12 phosphoric acid partly available and three to four per cent. potash. Lower grades will give 3 to 4 per cent. ammonia, 18 to 20 per cent. Phosphoric Acid and 3 to 4 per cent. Potash. All of its phosphoric acid sooner or later becomes available in the soil. They are not susceptible of treatment with sulphuric acid.

The by-products of the slaughter houses, tankage or blood and bone furnish variable quantities of phosphoric acid and ammonia.

The next and most important element of all fertilizers is ammonia or nitrogen. It is the life, the growth of all plants. It is derived from a great many sources, which are divided into non-organic or chemical and organic. Of chemical ammoniates sulphate of ammonia heads the list, giving 25 per cent ammonia. This is one of the slowest of all, gradually changing into nitric acid in the soil. Nitrate of soda or Chili salt peter gives 17 to 19 per cent ammonia in its most available form, the nitric acid separating from the soda at once, being immediately available to the plants. As it does not readily combine with the soil elements it is in danger of being washed down below the reach of some plants by heavy rains. Nitrate of potash mentioned before has the same tendency.

In the list of organic ammoniates we have dried blood, giving 17 per cent. This changes quite quickly into nitrate with a reasonable amount of soil water. Blood and bone or tankage contains from 10 per cent. to 6 per cent. ammonia according to grade and changes rather slowly in the soil into Nitrate.

Cotton seed meal furnishes 7 1-2 to 8 per cent ammonia. Castor pomace contains from 6 to 6 1-2 per cent. ammonia. Tobacco stems furnish a small amount of ammonia from 1 to 3 per cent. and some potash, one grade giving 3 ammonia and 10 potash which is in a very available form.

You will see from the above list of ammoniates that you have quite a lot from which to choose but the intelligent hor-

ticulturalist knows that the chemical ammoniates give the best results on orange trees and I will conclude by giving an extract from an article by Mr. Herbert J. Webber, Assistant in Division of Vegetable Pathology at Washington, and who is well known to most orange growers.

"Probably no element of plant food used in the fertilization of orange trees should be more carefully considered with respect to both form and quantity than nitrogen. It is the most costly and at the same time the most dangerous element to use, as excessive applications are liable to result in extensive splitting and dropping of the fruit or in the production of the serious disease known as die-back."

"The mineral nitrogen manures, nitrate of soda and sulphate of ammonia apparently stimulate the production of fruit more than organic manures, and yet produce a fair general growth. The fruit produced by fertilization with these salts used in correct proportions with the other elements, which it is necessary to apply, is usually of good quality, being solid, rich and juicy, with thin skins and little rag. Sulphate of ammonia has the effect, growers testify, of sweetening fruit to a great extent.

"Sulphate of Ammonia has been very widely used among orange growers. Nitrate of soda has been but little used thus far, but is apparently in favor. Its insecticide and water attracting properties are probably much greater than those of sulphate of ammonia.

"Organic manures are of doubtful utility. Barn manure is largely used by many growers who still hold to the tradition that chemical manures are injurious to the plants. The benefits of barn manure in an orange grove are a serious

question. The fruits produced from nitrogen from this source are usually large, coarse, thick skinned, with abundant rag and inferior flavor. If barn manure is used and most growers have a limited quantity and desire to use what they have, it should be spread over the grove lightly so that each tree receives only a small amount. When such manure is depended upon as the main element of fertilization, liberal dressings of sulphate of potash should be occasionally applied. This will tend to correct the evils of an overbalanced nitrogenous fertilizer. What has been said as to the effects of barn manure on the quality of the fruit applies equally to the effects produced by muck, cotton seed meal, blood and bone, tankage etc. In general, organic fertilizers do not stimulate fruiting to the same extent as the mineral fertilizers. It is probably better to apply such fertilizers to annual crops, garden truck, etc.

"In fertilizing the orange, potash is most frequently used either in the form of sulphate or wood ashes.

"The noticeable effect of the potash on orange trees appears to be its aid in completing and maturing the wood; apparently an insufficiency of potash is shown by an excessive growth of weak, immature wood, which does not harden up as winter approaches and is liable to be injured by frost."

"The phosphoric acid, which is a very

Florida orange lands, is mostly used in the form of dissolved bone, superphosphate, bone, bone black, raw bone, guano etc. The immediate effect of phosphoric acid on the orange tree and its fruit is little understood. Several intelligent growers claim to be able to recognize the necessary element of fertilization on effect of phosphorus starvation by the appearance of the new growth of leaves. If these, when they first push out, or while they are young and tender, present a slightly variegated appearance, mottled with light and dark green it is claimed that they are suffering from a lack of phosphorus and if a liberal application of some soluble phosphoric acid is applied this appearance may be checked. If this can be shown to be the case it will prove a valuable index to the available quality of phosphorus in the soil. A similar appearance may, however, appear in light cases of so-called frenching, a disease, or more properly a symptom of disease which is not uncommon. Phosphorus starvation may have some effect in inducing this disease."

Having watched the irrigation question since the dry Spring of 1890 I can say that not one plant in a hundred has paid a dividend on orange groves. If the trees are properly fertilized early in the season and kept cultivated until the rainy season sets in, I do not think that irrigation need be resorted to.

FERTILIZERS AND IRRIGATION.

BY F. D. WAITE.

Mr. President, Ladies and Gentlemen:

My report on Fertilizers and Irrigation will not take up much time, but I trust we shall have a full discussion as to the merits of chemical fertilizers. In my mind there is nothing that is so necessary as the right kind of fertilizers, when, and how they should be applied, in order to grow the very best fruit and vegetables.

Thinking it necessary that I should give to this Society something new along these lines, I reviewed my file of this society's reports for the past twelve years, and after I had finished, it seemed that the ground had been completely covered, and that it would be a waste of time to rehash them all. Not that they are not valuable for they are, and I recommend that the members of this Society that have not a complete list of these books, apply to the Secretary for copies of as many as he can furnish, commencing way back in 1893, when Major Healy and others were discussing the merits of muck and stable manure (being a complete fertilizer for orange trees) up to the present time when the question arises, whether we shall (to get the best results) experiment with our individual soils, using pure chemicals, or purchase ready mixed fertilizers of standard formulas from reputable manufacturers.

Some well known growers have recently remarked that ten and fifteen years ago when blood and bone was used with a balanced ration of potash, we experienced less trouble with our groves, and new diseases were not developing as rapidly as they are today, and the question arises:

Are we pursuing the right course? Some tell us we should not use acid phosphate, that it contains so much free acid, that our soils will become poisoned. Yet our State Chemist tells us that available phosphoric acid is just as good from one source as another, and that when we buy the so-called dissolved bone black it is just as liable to be acid phosphate colored with lamp black, and we pay about seven dollars extra for the coloring. Prof. Rose also says that efforts have been made by agricultural chemists to distinguish them, so far without results.

As the situation exists to-day, we may buy a complete fertilizer which has on its tag, dissolved bone or dissolved bone black as its source of phosphoric acid. All our State chemist can do is to determine by samples sent him the true analysis as to its content, of ammonia, phosphoric acid, and potash.

The manufacturers that we deal with may be honest, and believe that which they sell us is the true article, as they have a guarantee from the dealers that sold them, and have no way themselves of telling one from the other. Some assert that the supply of bone does not equal the demand, then we had better buy acid phosphate and save seven dollars per ton, or buy steamed and raw ground bone, if we are afraid of filling our soils with acid.

I have recently corresponded with dealers who handle nitrate of potash and basic slag. With these two chemicals we can secure a fertilizer well balanced and absolutely free of all acids, and the slag contains 50 per cent. of lime.

At present I think all the basic slag is imported, and is a by-product in manufacturing steel from an iron ore containing a high percentage of phosphorous. To one ton of iron ore, 1000 pounds of rock lime is added, and this material having a great affinity for phosphorous, takes up this element from the iron, and when drawn from the converter, the slag is at the top and usually runs about fifty per cent. of the original charge.

At the steel works in this country I understand the slag is cooled with water which cracks it into small pieces, it is then used to balast railroads. We pay from \$20 to \$22 per ton in large lots for the imported product which runs about 17 per cent. available phosphoric acid, and 50 per cent. of lime. If the Alabama slag is of the same quality it seems to me that our Jacksonville manufacturers could give us a pure form of phosphoric acid, and at less expense than the high grade acid phosphate is now costing us.

During our meeting at St. Augustine Mr. C. G. White gave us the results of some very interesting tests made in growing Irish potatoes with slag phosphate, and says, "Slag phosphate does surprisingly well and as far as one test goes, sustains the European experiments as to its value on sour soils, also the results at the Ohio Experimental Station."

Why is it we have so little exchange of thought in regard to fertilizer? Is it because we are ashamed to admit a lack of knowledge, or that we are perfectly satisfied with our own mixtures or manufactured goods? Even if we are, I believe we should express ourselves more fully, thereby saving the Novice much time and expense.

This subject has been discussed in the meetings for several years and many plans have been given in recent reports for surface and sub-irrigations. Probably the best plan for sub-irrigation is that in use at Sanford among the vegetable growers, and fully described in Year Book for 1903, page 60. It is just as necessary to have drainage, as irrigation, and if I could have only the one, I would choose drainage, but with this plan at Sanford it acts for both. Water from artesian wells being the source of supply.

These wells are less than half the depth of those in the Manatee section, I have never heard that the water from the Sanford wells has an injurious effect.

We, on the Manatee use surface irrigation from artesian wells, carrying the water either through cement pipes under ground, in ditches, or canvas hose to all parts of the grove.

Some assert that artesian water has killed a great many trees, we admit that in some cases this is true, but largely due to the lack of drainage. An excess of rain fall would probably have the same effect. We should be cautious as we approach the rainy season and not fill our soil too full of water, for if we do we shall certainly suffer from the result.

The following is a discription of the irrigating plant of the Wills grove at Sutherland Florida, as given me by Mr. Wills. The plant is supplied from a pond or small lake, with this as you will see, he can spray his trees with clear water for the red spider and purple mite.

SUTHERLAND, FLA., APRIL 24, 1906.

MY DEAR MR. WAITE: Our Irrigating Plant is equipped with a White-Blakleslee 20 horse power engine and a Rumsey rot-

ary pump, with a five-inch suction and a four-inch discharge maximum capacity of which, is 335 gallons per minute, with a guaranteed capacity of 250 gallons per minute. We have a four-inch main running through the center of the 30 acres under Irrigation and from this main are laterals every 150 feet, starting out with two-inch pipe and running down to one inch, with three-fourths inch stand pipes 150 feet apart over the entire 30 acres, so that a 75 foot piece of three-fourth inch hose connected with two opposite hydrants will meet each other. The spray rods are made of three-fourth inch pipe, six feet long tapered down to a point at the lower end to stick into the ground, with a T about 18 inches from the lower end for connecting the hose and on top of the spray rod is a McGowan sprayer.. We run twenty sprays at a time with three-fourth inch hose moving them from center to center, when the ground is sufficiently moistened. Last year I found that our twenty spray rods were giving twelve gallons per minute all over the grove, it took us six days last May to spray the entire grove, with an amount of water equal to one inch of rain fall, according to figures given to me by Prof. Rolfs, that is, it will take about four or five hundred gallons to every 30 square feet to equal one inch of rain fall. The engine that we are using is made by the White-Blakleslee Manufacturing Company, of Birmingham, Alabama. We have a three-thousand gallon Tank thirty feet from the ground, connected with our Irrigating Plant, this gives us pressure enough to wash down our budded trees through one-hundred feet of three-fourth inch hose with a nozzle on same without using the Engine, two men working at a time.

With the Engine running we can easily wash down trees from thirty to thirty-five feet through ten or twelve lines of hose at a time. We are now trying to wash the spider off the grape fruit trees with the tank pressure, as we cannot get sufficient labor to work many nozzles at a time.

DISCUSSION.

Dr. Bessey.—Mr. President, I would like to ask whether any one present is familiar with the recent work that has been done with the processes invented in Germany for combining calcium with nitrogen of the air; it has been shown that this compound can be produced very cheaply and very satisfactory results have been claimed for it.

No response.

Maj. Healey.—In the old days we used to fight this fertilizer business to a finish. We did not have quite so much science then as we have now. It strikes me that if these fertilizer men would give us an "electro-magnate" that would turn us out ten hours work for \$1.00, it would be of interest to us. The time was when this society was the best posted of any in the United States but that was the time before it fell into the hands of the fertilizer men. We thrashed out our own compost pile and I think we were capable of knowing how to combine the necessary elements to make up the necessary fertilizer for a large grove.

It is a curious proposition that of all the members here on the fertilizer committee that not a man has a word to say as to where the cheapest source of ammonia can be found. He says, if you will use my fertilizer you will get a cer-

tain percent. of ammonia and a certain percent. of nitrate. I know there are growers here who have been making nitrate with beggarweeds. The reason I do not use the cow pen is because I have not the cows.

Now we are here to get at the manner of producing a crop from the ground. We are the ones who produce it and the other fellow is the man who lives on the producer (applause). He sells us the stuff, we give him our check, it is placed in the bank and we have to pay it. You can make your soil just as rich with one tenth of the money if you choose to do it. I have land on which I have raised three crops of corn. When I first began to use it, it would not produce more than five bushels of corn to the acre, but now I am getting at least twenty bushels to the acre without one pound of fertilizer. If you can do this in a corn field, it can be done in any other field. I know, no man can gainsay the fact that this is a true statement.

Professor Blair.—I would like to see Maj. Healey raise velvet beans on pineapple land.

Maj. Healey.—If I were raising pineapples, I would raise them the same way I do velvet beans. I have no wish to say what a gentleman should do with his soil, but I wish to say that if you will raise three crops of velvet beans on it, you will have better success with your pineapples.

Now as stated before, we were not so poor in the old days, we found how much of the chemical fertilizer to put on the soil without knowing its use. I say to this audience that I have land that I wish I did not own, for just as long as it is there I am fool enough to do something with it. It was one time what was called

when I was young, an orange grove. It is a sad sight now and I presume it will always be a sad sight to my pocket book. I own it under the "homestead act" and you understand how that is. I said that it was really a good looking grove and since 1895 I have never put one pound of fertilizer on it, it has been made on velvet beans and beggar weeds. There is potash enough in that to make a grove.

Much to my surprise one of my men said to me last year that there were some oranges on my grove, I went over and looked through the grove and sure enough there was a good crop of fruit and I concluded to ship them and am sorry, for they brought me some money and that was an inducement for me to go to work and make another orange grove. This proves to you that while you can put the enormous sum of eighty pounds of fertilizer to the tree, yet you can get good results from the velvet bean and beggar weed.

Now Mr. Chairman, I hope this fertilizer question will be taken up by this audience and let us see if we can get down to absolute facts, and see if the old time fool orange grower cannot thrash this down to \$50 per year for oranges.

Mr. Wood.—Mr. President, I note that on the first paper on this subject the writer recommended the plowing under of green crops. My opinion is that it is much better to let the crop die on the ground.

Prof. Stockbridge.—I am quite sure that the author of that paper through an oversight inadvertently used the word "green" when he should not have done so. In the country from whence he came they term green crop what we call cover crop, and that is what he meant to say.

Professor Blair.—Just one word, I

want to say that the value of both the beggarweed and velvet bean was especially pointed out in a previous paper.

Mr. Hart.—I just want to say that according to my knowledge of things, it is easy to make land rich by growing velvet beans or beggarweed, though I would not advise the former in orange groves. Beggarweed is a profitable crop when the trees are small but when they get larger and shade the ground it will make little growth. In previous years the policy of growing velvet beans for orange trees has been discussed; the beggarweed I indorse fully wherever it may grow, whether in orange groves or any where else, but we have to use commercial fertilizers with it to properly balance the ration. I do not believe we can get the nitrogen we want from beggarweed or velvet beans, after the orange trees interlock their limbs.

Mr. Hubbard.—At the risk of repeating what may already be known by the members, I will relate the experience of Mr. Butler in the raising of beggarweed for nitrogen. He had good trees but no fruit. He had an analysis of the soil made and also for 100 boxes of oranges to the acre. The top foot of soil contained about enough ammonia for one to two crops, phosphoric acid for 3 crops and potash for only 1 1-2 crops. He then began to use commercial fertilizers, He studied this question and decided to use beggarweed to gather nitrogen for the reason that it did not produce any soldier bugs to work on the fruit, the consequence was that after three or four years using only phosphoric acid and potash he gathered so much nitrogen that he had to take a mower and mow down the beggar weed to prevent die back taking his trees.

Report of the Committee on Nut Culture.

BY H. K. MILLER.

Mr. President, Ladies and Gentlemen:

The subject that has been assigned us is rapidly becoming a very live one throughout the South, owing to the great interest now being manifested in the commercial development of the pecan industry. The consumption of nuts in the United States is steadily increasing and we are importing approximately six millions of dollars worth of nuts, in addition to consuming virtually all the home supply. In as much as nuts have been, until recent years, regarded as a luxury rather than a staple article of food, and since the reform movement now existing throughout the country in the matter of more rational foods is strongly advocating the liberal use of nuts as a partial substitute for meats, it may confidently be expected that the demand will rapidly increase. Already the prices have been steadily advancing and the ordinary pecans, which a few years since were marketed at five and six cents a pound are now commanding eight to twelve cents, while the fancy pecans readily sell at twenty cents to one dollar per pound.

A health food company in New York, of about two years standing, is making a specialty of nut food products and heretofore have imported the nuts of the edible pine to be used as a basis for their preparations. However, the demand for their output has increased to such an extent that the company is already considering means by which this constantly in-

creasing demand is to be met. Naturally it has under consideration the pecan and is endeavoring to perfect machinery that will enable the substitution being made.

The Persian or English walnut industry has been firmly established in California and such renumerative prices obtained that land in that state suitable for walnut culture has increased in value five fold. Some of the reported incomes from well established orchards are almost incredible. Not only is nut growing worthy of our most serious consideration and earnest efforts because of its commercial possibilities, but like fruit trees in proper assortment, a few nut trees merely for home use adds materially to the pleasure and interest of the home. Besides supplying a wholesome and palatable food, the trees themselves add much in the way of making attractive surroundings. It is difficult to estimate the value that a few nut trees will add to the home.

In presenting this subject brief consideration will be given some of the more important nut bearing trees that are adapted to this state, giving greater attention to the pecan, which so far as known is capable of forming the basis of an industry of considerable magnitude.

COCOANUTS.

In the southern part of the state along the Atlantic Coast is to be found cocoanuts growing wild. These have been established there by nuts being washed

ashore. By selecting choice strains of nuts for seeds, the cultivation of the cocoanut may be attempted near the shore where only light frosts occur, however, it is questionable if profitable returns can be expected. The nuts may be planted in place fifteen to twenty feet apart or better planted in trenches in moist soil and transplanted after the seed leaf is well developed.

Little is to be done in way of cultivation except to prevent other plants from encroaching on the young palms for a few years. Mulching is advantageous as also is the use of fertilizer, however, the returns will not admit of much outlay. Our supply of these nuts is derived, for the most part, from the wild groves of the tropics. The palm is an attractive plant and finds considerable use as an ornamental.

THE CHESTNUTS.

Three species of the chestnut are cultivated in America: The native American chestnut, the European chestnut, and the Japanese chestnut, besides we have the chinquapin, a dwarf and small fruited Castaneas, though occasionally the chinquapin is found to be a tree of considerable size. A few chinquapins of large size are being propagated which apparently will succeed here, yet it is rather too early to say they will prove of sufficient merit to deserve extensive planting. These are supposed to be hybrids combining the size of the chestnut with the good flavor of the chinquapin. Trees may be set twenty feet and thinned after crowding begins, thus securing several crops on land otherwise unoccupied, else they may be given greater distance and field crops grown between the trees until the land is given up to them entirely. Clean culture is to be recommended du-

ring the spring. Spraying with Bordeaux will hold in check the fungus diseases, but for the weevils, which are the most serious pests, there apparently has been no satisfactory remedy proposed.

WALNUTS.

The commercial growing of the walnut in this country is confined to the English or Persian walnut and while this species is hardy in the east as far north as New York, and trees known to bear frequently in the southern and eastern states, no attempt is made to grow this nut on a large scale in these localities. In southern California, however, the production of walnuts has assumed important proportions and perhaps ranks only second to the citrus production of the state. Little encouragement for growing the English walnut in a commercial way in Florida can be given, but in as much as bearing trees are reported to exist in the state it is worthy of trial in a limited way. A rather open alluvial soil seems best for this species. One disadvantage here is root-knot, but this may be avoided by using the black walnut as a stock. Trees bear in four to six years.

The Japanese walnuts will thrive in our state and should have a place in every nut growers collection. The cordiformis is the most desirable variety and may be grown from seed. This tree is attractive and is being used as a shade tree. Some towns and cities in the south are now planting them on their streets. The Black or native walnut of the east does well here and while the nut is exceedingly rich the thickness of the shell is against it as a commercial nut. It is held in greater favor in the north than in the south and there commands a price, but one that is too low to make the cultiva-

tion of this variety for its fruit profitable. The chief value of the black walnut lies in the character of its wood which is useful for furniture. The high price of this timber it seems would induce a liberal planting for timber purposes on much of our waste land. The chief obstacle seems to be the long time necessary to grow salable trees. Little attempt has been made to improve the Black walnut or to seem to be an inviting field for the plant breeder.

HICKORY NUT.

There are a number of species of this nut other than the pecan, which is by far the most important, and some are prized for their delicate flavor, yet, excluding the pecan, very little has been accomplished in cultivating these native trees. The hickories are for the most part of slow growth and the wood is useful on account of its toughness for manufacturing purposes. Some effort has been made at cultivating the shellbark and shagbark, but the trees are difficult to propagate and are slow growers, however, the nuts are of delicate flavor and the shells comparatively thin. Of all the species of hickory the pecan is easily the most important from a horticultural standpoint; indeed it may well rank first in cultural value of all our native nuts. Possessing as it does so many desirable qualities such as rapid growth, productiveness, hardiness, long life and comparative freedom from disease and insect pests, and yielding a nut with thin shell having a plump, nutritive and delicately flavored kernel, it seems strange its possibilities were not earlier recognized. Only within the past thirty years has any systematic effort been made to establish commercial orchards,

and even now, by far the greater part of our supply is derived from the wild trees of Louisiana, Texas and Mississippi. Besides finding the pecan native in these states, it is also indigenous to the lowlands of the Mississippi river and its chief tributaries extending as far north as Indiana and Iowa. It has been introduced in the southern states east of the Mississippi and in general, where proper soil conditions prevail has been found to succeed throughout the cotton area. The tree under favorable conditions attains a height of one hundred to one hundred and seventy five feet with spreading branches so as to produce a majestic dome-like appearance. The foliage is bright and pleasing, thus making the in many of the southern states. These were set with seedling trees, and in many cases, the soil was not wisely selected. This with the prevailing notion that the trees required no attention, and hence neglected, resulted in disappointment in a majority of instances, and interest in planting almost died out. Still a few pioneers persisted in their efforts to master the situation. Grafted trees were substituted for seedlings, which had proven so unsatisfactory, and greater care given to cultivation and selection of soil. So much better results followed that interest began to slowly manifest itself once more and has been steadily increasing. A number of growers in different sections have been making special study of the pecan within the past decade with a view to solving the problems involved, with such happy results that many of the barriers to success have been removed and reliable

information is now available. Previously little that was authentic was to be found. Only in recent years has it been possible to secure trees of good varieties in quantity and still the supply is short of the demand, on account of the scarcity of grafting scions and the difficulty of successful propagation.

By means of improved methods of grafting and budding the output has increased very much in the past four years. In the attempts to grow trees from seeds the greatest variations were met with, few if any producing nuts like the one planted. In most cases the nuts were inferior to the original, the trees were of different character, some growing rapidly, others making ordinary growth, and still others very slow growers. On this account the seedling orchards present a very irregular and unsatisfactory appearance, with trees of same age ranging from a few feet to thirty feet in height. Equal variation exists in the time of bearing, some bearing at the age of five years and others still barren at twenty. Very different the results from varietal stock. With budded or grafted trees growth is more uniform and even faster than that of the parent tree. Bearing begins much earlier, generally at from three to six years from planting, and the nuts are uniformly like those from the original tree. Attention is here called to the fact that an opinion prevails, that nuts from an isolated tree will produce trees which bear nuts identical with the one planted. This is partly due to parties owning such trees advertising the nuts for seed, perhaps ignorant of the well established principle that a self pollinated tree is the surest one to yield inferior seeds. The range for pecan planting in this state extends southward to the lake region.

Planting south of this region should not be attempted, except in a small way, until a more thorough trial has been given. In selecting a soil for a pecan orchard preference should be given to a sandy loam with a sand mixed clay subsoil, the richer the better. Success may be had on a great variety of soils, ranging from almost pure sand to rather stiff clay. A thirsty soil or one that is always wet is to be avoided. A soil that will admit easy penetration by the roots and retain moisture in liberal degree is to be desired. Planting, care, cultivation and methods of propagation will be discussed in papers by the other members of the committee.

The parent trees of the named varieties of pecans were of course seedlings and it is rather strange that among the vast number of seedlings that exist throughout the south, such a small number have been found of sufficient merit to be given a name and be propagated. Among the older varieties Stuart, Van Deman and Frostcher represent the best. Van Deman is superior to the others for table use but for commercial purposes in the ordinary sense Stuart and Frostcher are in the lead. Among the varieties more recently introduced Schley, Success, Russell, Dewey, Delmas, Georgia, Curtis and a number of others may be mentioned. It is beyond the scope of this paper to describe the different varieties but among the ten above mentioned can be found varieties that are adapted to all requirements. Proper appreciation for the differences existing between varieties is lacking, and the prospective planter might consider this subject thoroughly, with profit to himself. There are varieties that are worthless and it will be a happy day when all these are discarded.

There are other varieties which are ex-

cellent in some localities and worthless in others. In this state, however, most any variety that has merit may be expected to succeed. It is good policy to plant at least three varieties in an orchard; what these are to be can only be best determined from a knowledge of the object in view and the location of the land. Some of the more recently introduced varieties are much superior to any of the older standards, especially in quality of the nuts. Each of the good varieties has its disadvantages, as well as points of merit and it can be said the perfect variety is yet to be found.

Successful pecan culture like all other remunerative enterprises is not to be had without effort. The same problems are to be met as in other lines of horticulture, the only difference being that at present there is prospectively smoother sailing ahead than in other lines. Cultivation, care, fertilizing and warfare on insects will demand attention. Fortunately the list of insects is not so large nor are these so serious as those which affect the apple, yet there is sufficient injury to warrant a declaration of war on our part. In connection with this paper a Spray Calendar by Prof. H. A. Gossard will be presented.

In conclusion, it is to be remembered the pecan industry is young, in fact, very young, considering the possibilities that have been lying dormant so long. With many of the difficulties removed by a better knowledge of the requirements for successful culture, we may expect rapid

progress in the next few years. Young orchards now coming into bearing yielding nuts of superior quality that command a fancy price is giving impetus to the movement. The returns to be expected have largely been a matter of speculation and single trees have been made the basis of estimates. Sufficient progress has been made to furnish reliable information and in a few more years exact data may be expected. The expectation of enormous profits is not to be indulged in, yet, compared with other lines of a horticultural nature, very profitable returns may safely be expected and after the trees are large enough to occupy the land, a few acres should yield a good income with small annual outlay.

The question of overproduction seems to cause some concern, however, when we consider the time that must elapse before any very great increase can be expected, the rapidity with which the demand is increasing and remembering that we have the world for a market, with exportation not yet begun, there need be little fear from this source in our day. Besides, the millions of pounds of common pecans must first give place to the improved varieties.

There are many features of nut culture that might be dwelt upon but it is beyond the scope of this paper. From a careful review of the subject there seems to be no more inviting field of endeavor awaiting the young horticulturist than the culture of nut trees in the south

NUT CULTURE.

BY J. H. WYLIE, INTERLACHEN, FLA.

Mr. President, Ladies and Gentlemen:

The Chairman of our Committee on Nut Culture, some time ago requested that I make a short report at this meeting as to planting and cultivating Pecan trees.

I regret to state that this subject has been neglected by our Society for the past two years, we receive a great many inquiries regarding the setting out, care and cultivation of Pecan groves in this State, and it is now considered "an important industry." Increasing and more intelligent attention is being given each year to the planting and cultivation of the Pecan. The permanent and increasing value of the tree is realized. We believe the outlook for the industry is brighter than ever. The demand for fine nuts for table and confectionery purposes is constant, and the supply of fine nuts is entirely inadequate.

WHEN AND HOW TO PLANT.

In this State Pecan trees may be set any time after the leaves drop in the fall varying with the season, but nearly always by the first of December until the end of March. It is essential however that the trees be dormant. As to distance apart we prefer to set the trees 40x40 or 50x50 feet.

In setting out a Pecan tree, a hole twenty-four inches in diameter and deep enough to accomodate length of tap root is usually large enough although larger holes and wider may be dug with advantage, more especially where any fertilizer

is used in planting the trees. Well-rotted manure or good commercial fertilizer may be put in outer sides of hole, an inch or two beyond the lateral roots when the hole is being filled, but not in direct contact with the roots, work and firmly press the soil among the roots, laying each root in its natural position, no holes or cavities should be left and the soil should be in close contact with the tap root after watering and it is also very important that no part of the crown or root be left exposed to the air. It is better to plant them an inch or two deeper than they stood in the nursery than to have the crown roots exposed.

In Pecan groves low growing crops such as peas, melons potatoes, peanuts, cotton, truck etc., may be planted profitably.

BUDDED AND GRAFTED TREES COMPARED

WITH SEEDLINGS.

This covers an important feature of the Pecan Industry. Grafted and budded trees have advantage over seedlings because they usually begin to bear much earlier than seedlings they reproduce the variety from which buds and grafts were taken; perpetuation of the early, heavy and annual bearing of the parent tree is obtained; also greater care and attention usually given them on account of their greater cost.

As a result of the variable success attending the propagation of Pecans by budding and grafting and the compara-

tive slowness of the processes as compared with the simpler propagation of peaches and plums oranges etc., the trees must necessarily sell at a price which allows a margin to cover great losses in budding and grafting from unfavorable weather such as droughts or excessive rains, another consideration the cost of grafting and budwood, which is a sacrifice of nuts from choice bearing trees by the cutting therefrom of scions or budding wood. Again the disfigurement of seedling trees where buds or grafts fail to take the first season.

DISAPPOINTMENT.

There will be many disappointments in Pecans to those who have planted the "cheapest" trees they could buy without investigating source of variety of trees or reliability of party who follows the business of selling them.

Now is it not very plain to all that it is folly for anyone to risk the use of land for years expense of cultivating etc., to save a few cents on a tree, when for a trifling increase in the price he can get the very best warranted stock?

Most of the worthless stock is worked off by strange agents, who sell on their own account and are not authorized by any responsible firm to take orders for them. Such men buy up refused stock from large nurseries for almost nothing and fill their orders with it claiming it to be good. They also frequently warrant the stock, but as they the unknown or irresponsible, their warranty is absolutely worthless. If people would consider this fact, and buy only from agents who can show a certificate authorizing them to represent a responsible firm, there would be less danger of being cheated.

Our attention has been called to certain tree peddlers in this State buying seedling Pecan trees that had been grafted but grafts having failed to take new sprouts would naturally come out and make a nice healthy top; such trees being worth about ten to twenty cents, have been sold for grafted stock at \$1.00 to \$1.50 each.

It will be heart-breaking to those who have planted such trees relying upon them to support them in their old age to find they have been cheated and swindled and all hope of rest and peace in their declining years vanished. Men will die and leave "Pecan Groves" of this kind to their widows and children—with what result?

HOGG'S MONUMENT

The accompanying clipping from the daily press dispatches is very significant and means much, not only for Texas, but for the entire country. It shows an appreciation of the value of nut trees by a prominent man who had the welfare of the masses at heart and who chose the time of his departure from earth to impress the injunction upon his family and, through them, on the public at large.

"I want no monument of stone," he said, "but let my children plant at the head of my grave a pecan tree and at the foot of my grave a walnut tree, and when these trees shall bear let the pecans and the walnuts be given out among the plain people of Texas, so that they may plant them and make Texas a land of trees."

Such a monument will not only perpetuate the memory of Gov. Hogg—generations to come will share in the beneficial results which will follow the stimulus thus given to the nut growing industry, which is only now beginning to attract the at-

tention it merits from every one who owns a farm or village home.

Gov. Hogg was a man of wide experience, a close observer of cause and effect and he doubtless saw in the future of nut growing much to interest him and much of prospective good to his state. We like monuments of this kind, that help others to better lives and more profitable and pleasant surroundings.

The statement is generally made that the Pecan will succeed wherever the large species of hickory are found in the State, and this is doubtless true, as the Pecan belongs to the same family of trees.

Our experience in a small way in grafting some of the choice varieties of Pecan on young Hickory has been very satisfactory, as to the growth, and we trust in

a few years to be able to make a good report as to our success in getting them to bear fruit.

In working the pecan on hickory we find it an advantage to graft under ground and for this reason advise selecting the small trees in the forest where a grove may be desired on account of the hickory being plentiful.

There is no doubt that the Pecan is extremely hard to work, and only when the budding or grafting is done by an experienced hand is it likely that good results will be obtained.

The Pecan will grow on any soil except springy boggy land where the water stands near the surface or where the soil is underlaid with ledge rock at a slight depth.

AN ENTOMOLOGICAL CALENDAR FOR THE PECAN.

BY H. A. GOSSARD.

Mr. President, Ladies and Gentlemen:

The following calendar is approximately accurate but must be admitted to be in a measure conjectural, because observations on pecan insects have not yet been sufficiently thorough to make possible an absolutely authoritative schedule. We hope that this imperfect one will stimulate observation and thereby contribute to the making of a perfect one in the near future.

JANUARY.

The twig girdler is at this time, a larva tunneling in the fallen twigs which were severed in the preceding fall. These

infested twigs may be gathered and burned.

Other fallen limbs may contain larvae and pupae of the oak pruner, hence, should be collected and burned.

The larvae and pupae of various borers are in their tunnels in the heart-wood of the trunks. The burrows may be located by the particles of sawdust on the ground and clinging to the bark beneath the external openings; also by the discolored bark below the orifices, caused by the oozing of the sap. By means of a spring bottom can or in some similar manner, inject bisulphide of carbon or chloroform into the furrows and at once stop the openings

with grafting wax or with a wad of clay mud.

The larvae and pupae of the hickory shuck worm are in the fallen and decaying hulls beneath the trees, which may be raked up and burned. The larvae and pupae of this insect, are known to be found in the fallen hulls in December and therefore presume they remain here until early in the summer when new hulls are forming.

Two or three budworms and case-worms are hibernating in small brownish, blister-like cocoons and saber-shaped cases on and about the bud-scales and on the bark of branches. Reasoning from analogy, spraying with the lime-sulphur wash would probably be useful against them. Grafts may be cleansed of the cocoons and cases by means of a knife point, before being used.

The cottony scale is in the larval form on the branches at this season. The dormant winter period is the time to treat it; spray with kerosene emulsion, one part of emulsion to five or six parts of water. Pruning can also be effectively used against this pest at this season, the infested twigs being cut out and burned.

FEBRUARY.

Calendar and practice ditto as for January.

MARCH.

Practically the same as for February.

APRIL.

Simultaneously with the bursting of the buds in late March and early April, the different species of bud worms and case-worms commence a most destructive attack. They burrow into the buds and also into the tender twigs. Two of these insects are caseworms, one of them being

commonly observed and of considerable size, the other being much smaller and finally maturing a case resembling a miniature cigar. The third species, after quitting the buds, becomes a leaf-roller and lives in a tube made by folding over itself the border of a leaf. Later it gathers a cluster of leaves to the original one, making a conspicuous nest. The larger case-worm also clusters leaves together into a nest and several caterpillars may be found in the same cluster. If these insects can be successfully treated in the same way as the better known budworms and case-worms, a spraying with arsenicals should be made while the leaf-buds are swollen, just before they burst. A second spraying should be made about a week later than the first, just where the leaf-buds begin to show green at the tips. A third application should be made as soon as the leaves are expanded. Owing to its adhesive qualities, arsenate of lead will doubtless prove more satisfactory for spraying pecans than Paris green. It will be wise to make one of the first two and the third of these sprayings a combination of an arsenite with bordeaux mixture.

The large, leathery skinned caterpillars of the Catocala moths, sometimes known as "alligator" worms, begin their depredations this month. They feed at night and by day lie concealed in crevices of the bark, or under trash on the ground. This protective coloration makes their discovery difficult. Spraying with the arsenites ought to check them. The bud-worm spraying will catch these insects also. Right after a rain when the bark is discolored by wetting, the lighter color of the worms renders their detection more easy and it is possible to collect and destroy many by hand. If the trunks are

kept wrapped with burlap bands, many caterpillars will retreat beneath these for hiding and the next morning they can be collected and crushed or thrown into a pail containing kerosene and water. If a sticky band of some kind, such a "tree tangle foot," made by the O. and W. Thum Co. Grand Rapids, Michigan, be put around the trunk below the band to prevent any of the worms passing to the ground, it would seem possible to catch nearly all of them in a very few nights. Thus far, we have heard of no complaint that "tree tangle foot" injures the tree.

In late March and early April, the eggs of the fall webworm are laid on the leaves in clusters of 400 to 500. In a week or ten days, these eggs hatch into very hairy, large-headed caterpillars, which always live in webs that are enlarged according to need, where spraying with arsenicals is regularly practiced they are not apt to become numerous, but where no spraying is done, the young nests should be pruned out and burned; or a torch of fat pine, attached to a pole, may be held beneath the nest until the worms are destroyed.

The eggs of the Pecan tree borer, *Sesia scitula*, are probably laid in April and early May. Since the young borers usually enter the sapwood through some wound in the bark, such as a graft union, all such scars should be well covered at this time with grafting wax with which white arsenic or Paris green has been mixed. Coat over the wax protection with whale oil soap which has been diluted with enough water to give it the consistency of thick paint. Pour into this soap paint enough crude carbolic acid to give it a strong odor, and apply with a brush at the beginning of a bright, sunny day. Before night a tough, sticky film should form which is not readily dis-

solved by rain. Any wounds inflicted during the course of cultivation should be at once covered with some such mixture as this.

MAY.

All of the species, hatching in April, will extend their damage over into May, spraying with arsenicals may be continued against caseworms and caterpillars if the previous treatments were insufficient. Many of the measures already suggested for April work against other insects will need to be continued into May. The moths of the caseworms, budworms, etc., begin to appear in numbers this month and may be started up from their resting places on the leaves, on the trunks, in the mulch at the bases of the trees, etc.

The different species of heartwood and bark borers are apt to commence egg-laying this month, hence it will be wise to keep the trunks and larger limbs covered with white-wash which may be applied with a spray pump. Some portland cement added to the whitewash will doubtless add to its efficiency, since our object is to fill the interstices of the bark and make a covering over the whole trunk which the young borers cannot penetrate when they emerge from the egg. Possibly a further addition of one pound of Paris green or white arsenic to every fifty gallons of the white-wash would be good.

During the first half of May, the eggs for the walnut caterpillar are laid on the tender surfaces of the leaves, usually those of the lower branches. These are found in clusters of several hundred and before hatching become of a glistening white color. The young caterpillars feed gregariously and when first observed, the few leaves on which they are found may

be plucked and the whole colony destroyed. At a later stage, spray with arsenicals.

JUNE.

The young caterpillars of the budworms and caseworms are hatching from the eggs and would seem to be amendable to treatment with arsenical sprays. Though some of them must extend their bodies out of their encasing tubes to feed, and others have in a measure the habits of leaf miners, all consume more or less on the epidermis, hence can possibly be killed with poisons. Continue the work of May against webworms and the walnut caterpillars collect in masses on the trunks of the trees to moult, kill them by means of a burning torch or by crushing. A ring of "tree tangle foot" put around the trunk above the mass before beginning the slaughter will prevent any escaping worms from reascending the tree, though they may seek other neighboring trees and here continue their development. If necessary repeat the whitewashing against the borers so as to keep the coating intact.

JULY.

Young caseworms and budworms working on leaves and can likely be checked by spraying with poisons. Because of copious rains in spring it may be found more advantageous to spray for these insects during the drier months of summer and fall. The second brood of webworms may be expected to put in their

appearance about this time. It is probably that a second brood of catocalas or "alligator worms" also appear at about this time, since the moths of at least one species issue in June and early July. Examine the white-wash coating on the trunks and renew if necessary.

AUGUST, SEPTEMBER AND OCTOBER.

Budworms and caseworms continue feeding during August and part of September, but usually ensconce themselves in winter quarters before October. The whitewash may need renewing in August but this is unlikely if cement was used the preceding application. The second brood of webworms become conspicuous during this period, so also does the second brood of walnut caterpillars. The twig girdler is busy in September and October laying their eggs and girdling the twigs in which the eggs are laid.

NOVEMBER AND DECEMBER.

Insects and practice about ditto as given for January and February.

Inspect the roots carefully to ascertain if root borers are present. If any are found, treat with carbon bisulphide. Fill up all cavities in the trunk with cement, first cutting out all rotten wood and singeing the cut surface with a blast lamp to destroy the spores of any rot fungi that may be present. This will do away with a favorite hiding place for hibernating forms, such as the pupae of the fall webworm.

REPORT ON NUT CULTURE.

BY C. F. BARBER.

Mr. President, Ladies and Gentlemen:

Having been appointed by the President as one of the committee on this important committee and being satisfied that the question will be thoroughly covered by the other distinguished committeemen I shall make my report very short and shall deal with the growing of Pecans and leave the question of the growing of other nuts to the other committeemen.

I believe that the Pecan is the only nut that can be raised for a profit in the state of Florida and I do not think it advisable to attempt to raise a seedling Pecan grove. My observation has been, that the bearing qualities are very uncertain. I will not attempt to explain what varieties are best to plant in Florida; that part of our report I will leave to the other committeemen.

Budding and grafting has proven to be very expensive to nurserymen therefore, to plant out a grove with budded or grafted Pecans is much more expensive than it would be to plant the same grove with seedlings but the assurance of having trees bearing earlier with chances of a crops of nuts each year will more than pay the difference in putting out the grove. My experience has been far more satisfactory with buds than with grafting. Where a nurseryman has irrigation, I think the grafting has proven to

be as satisfactory and possibly more so than the budding. Most all land in the state of Florida has proven to be very satisfactory in raising Pecan trees. The low stiff soil with a clay subsoil anywhere from two to five foot seems to be the best land to grow Pecan trees on. Pecan trees will stand most any amount of water on low land without any injury to the trees. They will not do much on land that is underlaid with quick sand or land that is better known as sand soaked land. The Pecans are usually regarded as a difficult subject to deal with in transplanting; after they have been transplanted for twelve months and get started to growing then a rapid growth can be put on them each year with the proper attention paid to them. I find that barn-yard compost is the best fertilizer to use around the Pecan trees. I raised one year old buds last season on two year old roots that grew five to six foot and some larger. Pecan trees should be transplanted in December or January to get the most satisfactory results in growing off. I don't think it advisable to transplant late in the spring after the sap has started to flow in the stock. My opinion is that it will cause the trees to dwindle and finally die. Plant out budded or grafted trees of the best varieties and the results will be satisfactory in years to come.

Report of Standing Committee on Citrus Fruits.

BY L. B. SKINNER.

Mr. President, Ladies and Gentlemen:

When I was notified of my appointment as a member of the Committee on Citrus fruits, I made up my mind that I should surely be there, and even up to today I was of the opinion that I would be there, though there has been creeping into my consciousness, the idea that something was going to happen to prevent my getting there after all.

It is with exceeding great regret that I give up the pleasure of meeting the fruit growers of the State from whom I always learn something of value, and with whom I always enjoy the time spent. I say time spent, but I ought to rather say, time saved. The towering practical, Mr. Waite, the golden, Mr. McCarty, with his pleasant smile, and hearty ways, the faithful, hard working, Mr. Painter, all these I shall miss.

I had intended to make a verbal report, as I had been unable to get any replies from my fellow committeemen, as to what form our report should take. The wise men from the East, Phelps, Hart, Hubbard, have recorded, in time past, about all there is to know of orange culture and perhaps a little more, and we, that are learners, would rather sit still and listen that we may learn more, like Sampson, or Boardman. Perhaps in the past year I have learned some things that will be interesting to fruit growers.

I have extensively used a power duster, and I find that it keeps fruit bright, but

it induces scale, and a good deal of it. I find that in a multitude of varieties of the orange there is decided trouble. It were better that a good many of these varieties had never been born.

I hear Parson Brown fruit talked up, it is a pretty poor fruit to my notion, and Marsh Seedless grapefruit, be sure you want it before you plant it. There is none better than the Duncan Grapefruit, but I am afraid that there has been a large quantity of buds, not accurate to name, of this variety sent out. Not intentionally, but by error, and I suppose that this often happens, in other cases too. It is disappointing to plant Tardiffs, and find that you are going to reap Sweet Sevilles, or Parson Browns, and find you have an ordinary seedling.

The Enterprise seedless orange, sometimes called Stark Seedless, is one of the best bearers, and of a very good quality, of the ordinary oranges, and commercially, has given me the best of results.

I have been interested in the comparison of the Valencia and the Tardiff oranges. I thought for a long time that they were one and the same variety, but under a different name. I find upon looking them carefully over, that they are really distinct. That they are different in several ways. The Valencia is of a deeper color, less of the lemon in color. Then too the inside of the fruit is better colored than the Tardiff. On the other hand I think that the Tardiff is the better

keeper, both as to season, that is time of shipping, and as to its ability to hold up en route. And as to keeping qualities the fruit en route, that remark opens up to me the one question that occupies my thinker these days to the exclusion of any other. How shall we make our fruit keep and carry better? What is the reason of the epidemics of rot such as attacked us at times the last two years? If I knew, and could answer these questions aright, you would have a paper worth your listening to. I would like to ask your agricultural chemists what effect nitrate of potash would have on the stability of fruit? I think from a test made for two years that it is decidedly favorable to the keeping quality. I would like to ask some of the professors whether paraffine would tend to keep the fruit from rotting.

I would like to ask whether, in the opinion of growers, late cultivation tends to make fruit rot in transit?

The markets are all practically done with Florida citrus fruits, and yet we could just as well grow enough Tardiffs to keep them supplied for six weeks yet. Suppose there is some waste, what of it, we can stand it. And grapefruit—I ate

grapefruit in July last year from off the tree that was the finest thing I ever ate on a hot day in my life. I expect to eat it again this year, and if we can get a grapefruit in April, May and June, I am willing to risk its selling at a paying price.

I believe the variety to be a distinct variety, but will know better when it is tested longer. We ought to ship citrus fruits from October to June continuously, and when we do, the fruit industry need fear no competition.

James Russell Lowell has an eleventh Beautitude "Blessed is he that has nothing to say and cannot be persuaded to say it." I am reminded that I would rather work at growing oranges than talk about it. I grow a considerable quantity of fruit, and some of it is the best I ever saw and some of it is the worst, I am sorry to say. I know a very little, I am hoping to learn a great deal more, and again I want to express my regret at not being able to be with you. I wish you a very interesting and profitable meeting. I know that your officers have been untiring in their efforts at the proper preparations for such a meeting.

Report of the Committee on Strawberries.

BY R. F. RIGDON.

Mr. President, Ladies and Gentlemen:

Strawberries are now one of Florida's staple crops and brings in to the State each year many thousands of dollars, and at a time of the year when there is not very much other fruit to be had.

The soil best adapted to the growth is a dark sandy loam, underlaid with clay,—if it can be had—if not, any piece of good lowland that can be well drained.

The best varieties as to flavor and shipping qualities, as far as I have tested, are Klondike, Hofman, Improved, Lady Tompson and Excelsior.

The yield per acre is, with a fair season, about five thousand quarts, if you have home grown acclimated plants, and about three thousand quarts if you have to get northern grown plants.

Method of culture.—First, the land should be plowed from eight to twelve inches deep and then well pulverized before being bedded, which should be done at least four weeks before setting of plants,

as well selected ground gives a greater assurance of a good stand of plants and they will grow off more quickly and more thriftily.

The plants should be cultivated after each rain very shallow, about one half to one inch deep.

Method of marketing.—The best and safest way to get berries to market is in ice boxes containing sixty four quarts each as they will arrive in the market three days after as fresh as the day that they were picked.

The growth and extent of culture has been very much checked by the rates that the express companies have placed on carrying berries to market.

Draw backs are many. — Drought, freezes and late frosts are all very much against the berry grower, but the worst of all is the express company in their charges to carry berries to market, and at the end the comission men keep the rest and send back for charges.

BY R. K. MUIRHEAD.

Mr. President, Ladies and Gentlemen:

I regret exceedingly that I will not be able to be present this year. In former years I told the society all I knew about strawberries. The only new thing I know of is the time of planting; this should be done in spring instead of fall and the plants worked all through summer. This will insure large plants and

about four times if not ten times the yield. I have tried it with the best results but the cultivating through the summer costs money.

The difficulty of getting plants is another difficulty but they can be got at almost all the northern nurseries, and when planted then the northern grown plants do very well.

Report of the Committee on Vegetables.

BY W. N. GIST.

Mr. President, Ladies and Gentlemen:

I cannot in this paper, convey to your minds a comprehensive idea of the vegetable industry of the State. It is varied. It is a deep subject calling forth much energy and "gray" matter, and let me accent the latter if the grower wishes to be successful. It calls for as much care, thought and energy as the raising of children of which we expect to make men and women of the highest types; that may be an honor to the community in which they may be cast.

The vegetable industry is too varied to be discussed fully here at this time, but I may say that it is one of the moneyed industries and possibly would be pardoned for saying that it now brings more dollars into the State than the orange crop. The movement of truck (you know we grow truck and ship stuff), commencing in November and continues until July, giving nine month's shipping season for the State; some part of the State having suff that is wanted by the

man who has the dollars; all through this period, and the market demand for all our produce is increasing. Twelve years ago the growers around Gainesville would not have thought of shipping a carload of lettuce to New York at one time, now that market can take care of a trainload at paying prices and I might mention other crops, for instance, what effect would Hasting's potato crop have had on the market even five years ago.

The demand has increased and also the means of distributing, and I might say this part of the business has been seriously neglected. It should be a business separate from the growing. The growing and packing is a job big enough for one man, but nearly every trucker thinks (and I'm one of them myself) he can ship his stuff to better advantage than the man who keeps up with that end and makes it a business, giving his entire time and attention to distributing.

There is money in the business! There is also sleepless nights and gray hair to the one who falls a victim.

The Geology of Florida in Relation to Artesian Water Supply.

BY DR. E. H. SELLARDS.

Mr. President, Ladies and Gentlemen:

In its general geology Florida is fortunately of comparatively simple structure. The formations of the state have suffered no great distortion since their deposition and lie for the most part nearly horizontal as formed, or with a slightly accentuated dip. For a clear understanding of the water supply problem a conception of the leading features of the geology of the state is essential.

The underlying foundation rock throughout the state is a massive and very thick limestone. In character the limestone is granular, soft and with many shells, and, for the most part porous. Borings indicate that water circulates freely through it. The conditions of formation, as indicated by the rock itself, were, clear water free from land sediment in which shell life flourished abundantly. This foundation limestone is commonly known as the Vicksburg limestone, or in recent years the Peninsula limestone. This formation we may expect to encounter by borings in all parts of the state. Beyond the coast line the formation is known to extend to Costa Rica, and there is no reason to doubt that it extends to the east into the Atlantic and to the west into the gulf basin much beyond the present Florida coast, and

is the one formation that is of universal distribution throughout the state lying at the surface in small areas, but for the most part buried at slight to considerable depth beneath later rock deposits. The peninsula limestone is exposed at the surface except for a more or less thick covering of sand in local areas throughout Marion, Alachua, southern Columbia, and Suwannee Counties. In other parts of the State it is covered by later formations, indicating that while most of the state remained somewhat longer under water, the areas named appeared as islands at the close of the formation of the peninsula limestone.

On top of the peninsula limestone around these islands and throughout the state in general there accumulated subsequent marine deposits some of them of considerable thickness. These later formations are, however, more or less local in character and while reaching a considerable thickness in parts of the state no one of them extends uninterruptedly throughout the state as a whole. Immediately following the peninsular limestone in the central part of the state is the Ocala limestone, best exposed at the lime kiln at Ocala where it is something more than twenty feet deep. The Chattahoochee limestone is perhaps a little later than the Ocala and occurs along the Appalachaco-

la river. The Tampa Silex beds and Tampa Limestone are seen at Ballast Point, Tampa. Another thin formation, the White Beach is exposed along little Sarasota Bay. These several local formations are included along with the peninsular limestone to make up what is known in the more recent classification as the Oligocene of Florida. The rocks of these several local formations taken together make up the surface rocks, except for the mantle of sand over a very considerable area of the central and western part of the state.

The Micoene next above has an increased proportion of clay and shales along with some limestone and sandstone. The principal area of Micoene extends along the East Coast from Jacksonville to Lake Worth or below, and reaches in some localities a thickness of five hundred feet. The same time interval is represented by a thinner deposit along the Appalachacola river and west of the river towards Pensacola.

Formations of still later date cover the extreme south of the state and local areas throughout the state in general.

The Florida deposits are all among the more recent of the geology time divisions, all falling within the Cenozoic or last of the large time divisions. The state as a whole lies entirely within and is a part of the general coastal plains deposits reaching from New Jersey on the north along the Atlantic coast to the Gulf, and west to Texas, embracing as a whole a strip varying in width, but averaging about 100 miles along the coast covering the eastern part of New Jersey, Delaware, Maryland, Virginia, North and South Carolina, Georgia, all of Florida, much of the southern part of Alabama, Mississippi,

Louisiana and Texas. The formations of the coastal plains area as a whole are sedimentary containing much clay and shales and sandstones, lying nearly horizontal or with but slight dip. The sediment forming these deposits came evidently from higher lands to the north and west.

Owing to the fact that Florida, especially peninsula Florida, was farther removed from the source of sediment the proportion of wash from the land was very much less, and in the resulting seas an abundant shell life was able to develop. It thus happens that Florida is exceptional among the other gulf states in the large proportion of limestone it contains.

As will be gathered from this brief review the Florida peninsula has been elevated above water slowly. That the uplifting began at the close of the formation of the peninsular limestone is evidenced by the appearance of the island areas at that time. That the further elevation was also gradual and slow is indicated by the successive deposits of later formations around the island areas. It is assumed that the slow upward pushing has brought the peninsula up as a large anticlinal fold with the highest part of the fold forming the central area of the peninsula. Actual observation of anticlinal structure from the rocks themselves is difficult owing to the mantle of sand covering, and the limited exposures of rock. That there is a dip, however, is indicated by the depth at which any recognizable formation is encountered in borings. Thus the peninsular limestone which is found at the surface in Alachua or southern Columbia county is encountered in wells at St. Augustine at a depth of 224 feet. Farther to the south along the coast an even great-

er thickness of later formations rest on the peninsular limestone. At Lake Worth the limestone is reported at a depth of 1000 feet. A dip to the south is likewise indicated from the fact that the peninsula limestone in that direction dips under later formations towards Tampa and the Manatee region.

The features of the peninsula area bearing most directly on the question of underground waters are as follows: The Florida peninsula has as its sub-formation a porous cavernous limestone. On top of this is a varying thickness of sedimentary rocks of alternate pervious and impervious layers, limestone, shale, clay and sand horizons, and that these horizons dip in general to the east, south, and west from the central area.

Artesian supply: Artesian water is properly water confined and under pressure, usually pressure of its own weight, so that when the stratum containing it is tapped the water will rise in the opening thus made.

Artesian flow occurs when the head is sufficient to cause the rise of water to and above the surface level of the mouth of the well.

The conditions necessary to bring about artesian water may be grouped for brevity under three heads as follows:

Dip of the strata.

Alternating impervious and pervious strata.

Some condition or combination of conditions bringing the water under sufficient pressure to supply the necessary head.

This latter condition may result from the sagging of a series of these strata at the middle allowing the edge to be exposed at either side, so that the water will flow at any point lower than the exposed

area of the horizon. Such a trough like structure is an artesian basin. The same result may be brought quite as effectively by an inclined porous stratum wedging out between two impervious strata, or by the pervious stratum itself grading into an impervious or less pervious condition, as a sandstone grading into a finer sandstone, or a sandstone grading into a shale. Even a local variation in the thickness or texture of the containing stratum may result in considerable head. The friction of water threading its way long distances through the pores of a pervious formation affords sufficient head for an appreciable rise of water through a boring. (Chamberlin, 5th An. Rpt. U. S. G. S., p. 143).

The term, artesian slope is applied to such an area. It is apparent that the pressure of the Florida artesian water is explained by artesian slope rather than an artesian basin.

The dip of the Florida formations whatever may have been its cause furnishes the first of the essential structural features of artesian water accumulation. The second condition necessary, the alternating impervious and pervious strata, is met in the varied nature of the Florida deposits in which water tight clays and shales are often succeeded by porous and water bearing limestones and sandstones. The head necessary to induce artesian flow is doubtless due to pinching out of strata or change to fine texture of the water carrying layer.

Source of artesian water:

The catchment area.

The general gathering ground for the artesian water of the coast is naturally the interior region of the State. Of the rainfall of an area a part is evaporated and returned to the atmosphere; another part is carried off immediately to the ocean as

surface drainage; while a third part finds its way into the ground.

Owing to the generally porous nature of the Florida formation, that part of the annual rainfall going directly into the ground is an unusually high percentage. While the part passing off as surface drainage is a correspondingly small part of the annual rainfall.

It is not to be assumed, however, that all of that which passes into the earth is available again as artesian supply. The amount of water reaching the surface through an artesian well is necessarily less than that entering the ground, owing to friction in flow, to lack of completely pervious strata above and below and owing to the evident fact that there is in all cases sources of escape for the water through channels other than the artesian wells.

The area covered by the outcrop of any horizon will vary according to the thickness of the horizon, the topography of the area at which the outcrop occurs, and the dip of the strata. The dip of the Florida rocks is slight and the catchment area for any collecting horizon is therefore proportionately large.

In addition to this usual or normal catchment area an added supply in some cases, probably of considerable importance is received from sinks reaching through to the conducting horizon.

Of the great number of sinks throughout the State receiving regularly surface drainage many evidently reach no great distance downwards and the water after a more or less extended underground course reaches a river or otherwise returns to the surface. On the other hand it is equally evident that some of these

sinks are waterways leading through impervious strata and connecting with porous horizons, below which conduct water readily and are capable of becoming artesian horizons. Thus if the water of a sink is observed to rise to a definite level and to be unaffected by any amount of water going into it, and especially if the level of the water in the sink is found to agree practically with the level to which artesian water rises in borings in the immediate locality it becomes evident that the sink leads to the artesian horizon. The added supply of artesian water received through such sinks is doubtless very considerable.

In this connection should be mentioned also a second unused artesian supply, namely the drainage of inland areas through deep borings. As is well known this plan of drainage involves sinking borings to such depth as to encounter a conducting stratum which carries the water readily. Obviously the probabilities are that the water is thus being turned into a horizon capable of becoming an artesian supply horizon in some lower area of the State. Some such wells are recorded in which the water is turned directly into an artesian stratum, the artesian water rising in fact within a few feet of the surface. Some of these wells present the unique feature of being, during wet weather drainage wells, and during dry weather, through the medium of pumps, irrigation wells. In these cases it is impossible from the data now at hand to affirm that the water thus added is available as an addition to the artesian supply at any nearby region of lower level having artesian flow, but the inferences are very strong that the artesian supply is directly increased in this way.

Available supply of artesian water: Fortunately Florida with its heavy rainfall and with its formations especially adapted for taking up and holding a store of water is subject to an annually added supply not likely to be over drawn. It must not be supposed, however, that

more water can be taken from the artesian horizon than enters it. On the contrary the supply available is necessarily much less than the supply received. Fortunately the rainfall is sufficient to assure an underground water supply among the States most valuable assets.

Florida Immigration—What Shall It Be?

BY CAPT. R. E. ROSE,

STATE CHEMIST.

Mr. President, Ladies and Gentlemen:

The subject assigned to me, "Florida Immigration, What Shall it Be?" is one that is not commanding much attention, not only in Florida, but throughout the entire South. We have recently had several conventions of representative men on the subject: Seldom do we have a gathering, or convention of any kind, agricultural commissioners, cane growers, turpentine producers, timber men, saw mill men, railroad men, ticket agents, traffic managers, farmers, cattle growers, agriculturists or horticulturists, but the subject of Immigration "crops out" in one shape or another.

In fact, the Southern States have agitated this question of Immigration—Foreign Immigration—to a very considerable extent during the past few years, much has been said upon the subject, numerous plans have been proposed to turn the tide of foreign immigration, from the West, to the South. The establishment of direct lines of immigrations, from Southern ports to Europe; with agents of the Southern States established in foreign countries, to secure immigrants, is probably the most popular plan suggested. To avoid the "contract labor laws," the States are asked to do what the citizen (or corporation), is prohibited from doing; and also to tax the people of the State, to secure cheaper

labor, to compete with the working men of the State.

Florida, I am glad to say, has not become hysterical, or anxious, in this matter. She has displayed no great haste to receive the influx of foreign immigrants—Japanese, Italians or Chinamen, so ardently desired, and earnestly advocated, by some of our sister States—urged on by Land Syndicates—mining and manufacturing corporations, desiring to secure cheaper, and more servile labor, than is now obtained in the South, outside the cities.

While the phenomenal development of the South, during the past decade, along all lines of industry, agriculture, mining, manufacture and transportation, has created a large demand for labor, and has largely increased the wages of our working people, it is questionable if it be for the best interests of the South, and particularly Florida, to encourage foreign immigration.

The South is now the only distinctly American section of the Union; where the traditions, habits, prejudices, virtues and vices; courage, chivalry, independence and love of freedom so characteristic of the early settler or pioneer, can be found in its purity. Where the true American character, begat by the "pioneer," "Puritan," and "cavalier," can still be found. The descendants of those adventurous men and women, who at their

own cost of deprivation and hardship, established the original thirteen colonies, on the Atlantic Sea Board; who first occupied the land, drove back the Indian; threw off the yoke of the old country—with its limitations, political and religious, to establish a Republic of Freemen, where liberty in its truest sense should prevail.

The true American type—we certainly have such a type—is now found principally south of "Mason and Dixon's Line"—In the South Atlantic, and Gulf States; and is most strongly marked in the rural districts of the cotton growing States; particularly in Florida, where most of our people can trace their lineage, directly to the founders of the Republic, with little if any admixture of foreign blood—Descendants of those grand old pioneers—rugged, capable, stubborn, courageous and honest, who lone handed, and by mere force of character, conquered the wilderness, as an heritage for their children, and children's children.

The descendants of whom fought the bloodiest war of modern times, to preserve the constitutional liberties of the Republic founded by their fathers. Those fathers, who by their sacrifices, made it possible for the foreign immigrant to flock to the States—the North and West—after the establishment of religious and political liberty, by our Revolutionary ancestors.

Florida has had a large increase of population, during the past fifteen years; she has increased from 391,000 to 620,000—a little more than 58 per cent.—From 1890 to 1900, she increased 35 per cent. (391,000 to 528,000). The State's census taken last year, now being completed, will show a greater proportionate increase.

Florida gained a larger percentage of

population, than any other Atlantic State, during the last United States census period; namely, 35 per cent. She exceeded the average of all the groups of States—that is the North Atlantic group—20.90 per cent. The South Atlantic, 17.90 per cent.; the North Central, 17.50 per cent.; the South Central, 26.10 per cent., and the Western Division, 31.90 per cent.

Her percentage of increase in population was exceeded only, by Arizona, Idaho, Indian Territory, Montana, North Dakota, Oklahoma, Texas, Washington, and Wyoming, from 1890 to 1900; while the indications are that her increase for the present decade will be far greater in proportion.

The census of 1900, shows Florida's total population, as 528,542.

| | |
|------------------------------------|---------|
| Of Native born Americans | 504,710 |
| Foreign Born | 23,823 |

| | |
|--------------------------------------|------|
| Percentage of Native Born | 95.5 |
| Percentage of Foreign Born | 4.5 |

Our State census of 1905, will show a total of 62,000 approximately.

The most remarkable feature of Florida's population is the very large percentage of native born Americans; particularly natives of the Southern States—notably from the States of Georgia, South Carolina, Alabama and North Carolina.

| | |
|------------------------------------------------------|---------|
| In 1900, we find Florida born in-habitants | 342,818 |
| Born in Georgia | 57,692 |
| Born in South Carolina | 26,798 |
| Born in Alabama | 24,721 |
| Born in North Carolina | 13,339 |
| Born in New York | 4,463 |
| Born in Virginia | 3,754 |
| Born in Ohio | 2,721 |
| Born in Tennessee | 2,445 |
| Born in Illinois | 2,176 |

| | |
|-----------------------------|-------|
| Born in Mississippi | 2,102 |
| Born in Pennsylvania | 1,843 |
| Born in Massachusetts | 1,402 |
| Born in Louisiana | 1,357 |

All the other States and territories are represented in Florida's population, though the above list embraces all States that have 1,000 or more representatives in our population.

What I desire particularly to emphasize—is that Florida has had a greater proportionate increase in population than any other State, except the few Northern States mentioned previously, that have been filled up by foreign immigrants; exploited by the railroads and immigrant ships—for simply "business reasons." The "Foreign Immigrant" is exploited by the "Immigrant Ship" and railroad like any other commercial commodity. Lumber, merchandise, beef, or pork; cattle or hogs. And were it not for the laws prohibiting individuals (or corporations), importing contract labor, the question of foreign immigration would be solved at once by the importation of millions of coolies—not Chinamen, Japanese or Malays necessarily, but millions of "Redemptioners," from all parts of Europe, who would be sold for a term of years, to those desiring labor, miners, manufacturers, planters, saw mill and turpentine operators, for simply enough to pay their passage and a profit to the transportation lines, as was done during the early years of the last century.

Another remarkable feature of Florida's population—not only the great preponderance of American born citizens, is the great number of native born children; a population of 528,000 in 1900—shows 270,293 children, or youths less than 20; 197,600 of school age; and 72,693 less than four years old, more than half of our

population. Such facts are potent arguments against foreign immigrants, particularly when we know that thousands of our best American citizens are now seeking homes in the State. That this domestic immigration is rapidly increasing is patent to any one who is noting the rapid filling up of the whole State. I think the State census of 1905 will surprise many of our people, when the increase of population is noted, particularly the natural increase. Race suicide can by no means be charged against Florida, where over one-half of the population are school children, or younger.

That Florida needs, or can comfortably care for—more people, is true; that she is obtaining them more rapidly than any other Atlantic State, is also true; that by natural increase and by American immigration—men and women from the Southeastern States particularly, she is rapidly filling up the vacant places is also true.

Speaking of vacant lands, United States lands, I desire to call your attention to the fact that there is comparatively little vacant land, State or United States, remaining. The State has little left, no homestead lands at all, and has claims against what remains unallotted of some four millions of acres more than she has to meet the claims with.

United States homesteads are being rapidly exhausted. Most of the desirable homesteads are now occupied. The recent "Stone and Timber acts" are rapidly absorbing the remainder of the United States lands. Ninety per cent. of the public domain has passed into the possession of individuals, syndicates and corporations, during the past twenty years. Not only in this, but in other States.

Though Florida had probably a greater acreage of State lands than any other State, except Texas, some twenty-seven million acres, more or less, practically five-sevenths of all the land in the State—less than twenty-five years ago, she today is practically bankrupt in her landed possessions, and has claims against her for millions of acres more than she has to meet the claims with.

At a recent convention held in the Southern part of the State, the statement was made by several gentlemen; men well-informed and familiar with conditions; that one of the principal reasons why young men were flocking to the cities, was that lands for homes could not be purchased. This was not denied, though repeated by several members, and in the presence of representatives of several of the larger Land Syndicates.

Our public domain—once the boast of our State and Nation—has dwindled until now it is difficult for a young American to find 160 acres to homestead. We have parted with our heritage, our vast domain of productive soil—our own children—to say nothing of the foreign immigrant—are left without homes, to become the “bond servants” or “tenant farmer” of land syndicates, corporations or trust magnates.

Do we need immigrants? Yes; American immigrants; particularly from the Southeastern State—men who will own their own homes; maintain the true American spirit, a love of liberty, and personal independence. Such men as were recently alluded to by Judge Emory Spear—in charging a jury in a noted criminal case that has commanded international attention during the past seven years—in charging, the Judge said, “I am told that is has been cynically said by

a famous New Yorker that no man who has a million dollars can be convicted of crime in America. The verdict of this jury of plain, clear-sighted, honest Americans has falsified such a pessimism. Of that jury it may be said that there is perhaps not a man who cannot trace his ancestry to a patriot of the Revolution which established American independence. It is true, as I have often declared, that to the homogeneous Americanism of these Southern States when they are plainly shown their duty, our country may ever look with confidence for the enforcement of its laws and for the maintenance of its institutions.”

True they will have to purchase their lands—and pay several thousand per cent. profit to the present owners; and in a few years, find it difficult if not impossible, to obtain a free hold, by purchase or otherwise.

Doubtless, some of my auditors will consider me an alarmist, and believe my picture overdrawn; let me assure them such is not the case. When but a few years ago—less than twenty—the foreign emigrant, or the native born young American—had tens of thousands of homesteads, from which to select his one hundred and sixty acres; he has today but few to choose from, they are remote, scattered and not desirable, having but little agricultural value.

While our public domain has to a large extent disappeared, foreign immigration has increased until it has attracted the serious attention of thoughtful Americans. I quote a recent editorial from the “Miami Metropolis,” one of the most conservative of our Florida newspapers:

“Foreign immigrants are pouring into Eastern ports in such large numbers the Department of Labor and Commerce has

become apprehensive and has determined to more strictly enforce the regulations for the restriction of immigration."

This is a country of vast territory, and its assimilative powers are very great, but there should be some limit to the influx of foreigners and the crowding of our cities with a population which seriously adds to the gravity of problems that are pressing more and more for solution. The stream of foreigners is not sufficiently distributed. Too few become soil tillers and producers. It can be easily understood why this country is so attractive to the poor of overcrowded Europe, and quick and cheap transportation makes it comparatively easy for them to seek homes. In 1900 there were 10,460,000 people of foreign birth in this country, and over 21,000,000 born of foreign parentage. About 35 per cent. of the total population is wholly or partially of foreign parentage.

Of the foreign-born population, 94 per cent. is resident in the North, and 6 per cent. in the South. In 1900 the total foreign-born population of Allegheny, Pa., was, in round numbers, 30,000; in Atlanta, it was 2,500; in Charleston, S. C., it was 2,500, and 12,000 in Columbus, Ohio. In Louisville, it was 21,000 and in Lowell, 40,000; in Memphis, it was 5,000, and in Minneapolis, 61,000. In Worcester, Mass., it was 37,000; in Rochester, N. Y., it was 40,000; in Providence, R. I., it was 55,000, and 46,000, in St. Paul. In New York City there were 786,000 persons of German parentage, 715,000 of Irish parentage, 245,000 of Russian, 218,000 of Italian, 53,000 of Polish and 52,000 of Hungarian. A considerable per cent. of the total population is German and Irish.

These, as a rule, make excellent citi-

zens, and become thoroughly imbued with American methods and ideals. But there are millions of immigrants who are not desirable as citizens; and even a large inpouring of foreigners who may make good citizens is not wholly unobjectionable. Through immigration and natural increase the country is being rapidly filled, and when it becomes crowded, as it will, it means a change of conditions—from the free and easy methods of living characteristic of Americans, to the close economy and hard life of the crowded countries of the old world and labor will be cheaper and the cost of living greater."

That I am not alone in my position, I quote the language of that typical American citizen, Theodore Roosevelt—that representative American the descendant of the Dutch Founders of Manhattan on the one side, and an equally noted Southern family on the other; in an address to the representatives of Organized American Labor, at the White House, on March 21, speaking of immigration, he said:

"You have spoken of the immigration laws. I believe not merely that all possible steps should be taken to prevent the importation of laborers under any form, but I believe further that this country ought to make a resolute effort from now on to prevent the coming to the country of men with a standard of living so low that they tend, by entering into unfair competition with, to reduce the standard of living of our own people. Not one of you can go further than I will go in the effort steadily to raise the status of the American Wage Worker, so long as, while doing it, I can retain a clear conscience and the certainty that I am doing what is right. I will do all in my power for the laboring men except to do what

is wrong; and I will not do that for him or for any one else."

"We must not let our natural sentiment for succoring the oppressed and unfortunate of other lands lead us into what warped moral and mental attitude of trying to succor them at the expense of pulling down our own people. Laws should be enacted to keep out all immigrants who do not show that they have the right stuff in them to enter into our life on terms of decent equality with our own citizens. This is indeed first in the interests of the laboring man, but furthermore in the interests of all of us as American citizens; for gentlemen, the bonds

that unite all good American citizens are stronger by far than the differences, which I think you accentuate altogether too much, between the men who do one kind of labor and the men who do another kind. As for immigrants, we cannot have too many of the right kind; and we should have none at all of the wrong kind; and they are of the right kind if we can be fairly sure that their children and grandchildren can meet on terms of equality our children and grandchildren, so as to try to be decent citizens together, and to work together for the uplifting of the Republic."

Report of Standing Committee on Ornamentals.

BY MRS. GEO. S. GATES.

Mr. President, Ladies and Gentlemen:

Those of us who have borne the heat and burden of the day, those of us who have been twenty years in Florida, and are thus entitled to the name of "Old Settler," are beginning to rejoice because of the real prosperity that is everywhere showing up over our fair State—at last the time has come when we also have green lawns, ornamental grounds and good roads.

These years of experience have taught us valuable lessons, these lessons are tabulated and crystalized into records and into great nurseries of thrifty stock, available for all kind of horticultural purposes. So now, the wayfaring man, though a "Yankee," need not err. We are greatly indebted to the State Horticultural Society for a large mass of these records, and we should all more earnestly work for a broader field of usefulness for this society.

For from the soil must ever come the sound, healthy prosperity of any State. As the spring is with us still, we must express the joy we have felt from her very first appearance, in the fragrant buds of the Yellow Jessamine, to the present pageant now waving about us in the waxy bloom of the great Magnolia. We have secured much pleasure by availing ourselves of the simple plants within easy reach. In December we secured many roots of the Yellow Jessamine—planted some about old stumps and some

on posts, and it is perfect for old fences and arbors. By March, we had some bloom, and the second year, with care and fertilizer a mass of new growth and blossoms—and I know no miser ever had more joy with his gold, than we, with our mass of golden fragrant bloom.

The wild plum is the next to bloom—about the middle of February. It does not bring a few blossoms, here and there, but great wreaths, bunches and banks of snowy bloom. One can go out and cut great armfulls of feathery blossoms, and fill the house with the very spirit of spring—and one is exalted with that spirit as they pass and repass; those great gnarled branches, that speak of greater life and peace and hope—crowd halls and dark corners with these fleeting joys. The gentle Japanese make the Cherry blossom time the happiest festival of the year. So do all lovers of nature—the pear tree is a marvel just after the plum, and so full of blossoms are all fruit trees, that I feel sure, Nature means that we are to enjoy her blooms, as well as her fruits—she is never stingy—if you ever dare think it of her, look at the spring-time blossoms; and learn there the wonderful lesson of the large, full glorious development that is certainly in common with all Nature. Let me plead for the arrangement of blossoms when we bring them indoors—for the busy housewife gets the most of her enjoyment from her cut flowers. Don't crowd several kinds in the

same holder. A perfect rose; a perfect branch of blossoms have as strong and refreshing an individuality as have our human friends, and they repay us as gracefully for respecting it, as they do. Next to bloom is the pink Azalea, or Wild Honeysuckle, as it is called all along the Atlantic States—simply delightful in a great mass—grown ten or twelve feet in low land, but with care, a thrifty bush on high land. The same can be said of the Dogwood Lily of the Valley tree, Spirea, or Bridal Wreath, the Oleander, Cape Jessamine, Crape Myrtle, and the Sweet Myrtle. These are all fragrant, hardy and close at hand. We find December planting most satisfactory for trees and shrubbery. We have had the best success in planting Oleanders, by getting a stake about two feet long, stiff enough to drive, sharpen it at one end and drive into the ground just where you want it to grow, leaving out two or three eyes or buds, they will put out from them and you have a tree at once.

I want to recall Mr. Taber's paper of last year, to your mind. It is well worth another reading. It was about the joys of a thicket, he called it, "A Message from the Woods." I saw the thicket before I read the message, and I felt then, that every Nature-lover had just some such spot—I have. It is a human instinct to keep a bit of nature's work close at hand, from whence can be drawn inspiration, strength and hope.

It may be a bit of pond, full of gleaming white lilies, or a bit of virgin forest in its strength and grandure, or a thicket full of the riotous profusion of trees, shrub and vine, that in its blending of shape and shade, is the despair of all our timid efforts. Let me suggest the greater planting of the Wistaria, both

white and purple, there again the Japanese have produced wonderful effects, their arbors are simply dreams. You do not realize you are looking at anything man has done, it looks like magic. Some of the flower stems are three feet long, and hang above the head like a purple and white sky. It will grow rampant here, even with little care—of course it is not as early as the plum, or as evergreen as the Yellow Jassamine, which I heartily recommend—the Wistaria blooms in early April and the Jessamine in early February, both are valuable for wiring to scrawny tall trees, and for covering unsightly objects. But chief among vines in this land of "Creepers," is the wild Smilax, or Bamboo Briar, as it is called here. I spoke of this vine last year, and wish to call your attention to it again. I have found four varieties, a plain green one, and a variegated one without thorns and mostly roots, they are worthless, never grow more than six or eight feet, then there is a strong rampant growing one with briars, and covered with blackberries in the fall, ornamental, but cruel. But the bamboo, or Wild Smilax, that is shipped from the entire South, for decorating along with Holly, Palm leaves, gray moss, long leaf pine, etc., is a most beautiful and satisfactory plant—grows just like cultivated Smilax, but is hardy, evergreen and a smooth vine, no berries, latter part of April has small, greenish blossoms, very fragrant, much like the Mignonette—if the roots are planted in December the vine will grow from thirty to sixty feet in a season. It comes up in the spring with a head like Asparagus and is edible, rather a good substitute for that vegetable, the vine runs along with this head and gets its growth before putting

out its side branches. You must be up and doing, for it is a rapid grower, it stays awake nights to grow. But a daintier, cleaner, more satisfactory vine, I have never found.

A beautiful, hardy, flowering border that is very effective along a fence, is the hardy Verbena, purple, it will grow almost two feet high. A neighbor has one on three sides of a town lot—it is a surprise and a delight to all who behold it, a mass of soft purple splendor, it reveals the value of flowers in a great mass.

There are wonderful possibilities for Florida, I can only hint at them, and give a bit of cheer and experience from my own little corner in Putnam county, and urge you to plant things that will also be a joy to others after we have passed away.

That brings me to the Village Improvement work. This work for a higher life for our village, for tree planting and the making of good roads, is one where men and women must work together. It is certainly the mother's anxious concern that her town, her county, her State be clean and up-to-date as well as her home, for in them she must continue the education of her boys and girls. It is the environment of the young that makes us have men and women with proper ideals of civic pride, and of partiotism. Mothers know instinctively how important it is to give children the right appreciation of beauty and cleanliness. When our boys and girls get the right education in Florida, our towns will be too nice for hogs and cattle to run in and not until then. But mothers sometimes fail. You can find this out by getting an ordinary man to clean up a bit of road-way. You will most likely find his idea of "cleaning

up" means to "dig up" everything living in sight, leaving a nice, clean bed of sand, without the slightest idea of the use for which the cleaning was made. We don't expect all men to see beauty, any more than we expect all women to sing, but we do ask, if you find a beautiful, young tree or Palmetto, that can remain in the clearing, just as well as not; please let it stay. In this village improvement work, we deal with matters of fact, not of opinion, so there is only the common inertia of humanity to overcome, and it is enough. Our study of how to get the most out of what we have, and for the comfort and happiness of all, has brought the Christ spirit much closer to us, in our homes and in our public work, for working with Nature, not against her, we are one with the birds and the trees, and we become as little children, simple and trustful. Surely Chas. Wagner would love Florida, for one soon learns here the "Simple Life." and cannot worry long if he tries.

As woman is the maker of the home "atmosphere," and man the strength, the foundation of the structure let us make the most of these great forces, that the environment may be the most perfect for the proper development of our children. Not stopping at the home but demanding and struggling for better conditions in our towns, our villages and our State.

Give me a man whose mother has taught him to love the birds, the trees, the beauties of nature, he is the man for road commissioner, for park work, he can see and save what nature has given us so lavishly on every side. But without the right environment and the earnest love implanted in the child-heart, our efforts will be slow and faltering.

Joy is in my heart when I read of

this good roads agitation, this work is the most important work before us today, the home, the mill, the mine are all handicapped terribly, without good roads. Life is without sociability and work a drudgery. There are many lovely spots in our State, beautiful villages, ideal in every way, but the tourist or settler are driven to other localities by the awful sand roads. This is a question for each town to settle for themselves for the needs and conditions are all so different.

We are greatly indebted to Senator Mann and Senator Morgan, for their heroic work along this line, and we feel sure they have the earnest support of every member of this Society. Let me suggest when you lay out your new roads, you call a conference of the City Fathers, and the Village Improvement Mothers. Women's studies along these lines are showing them the value of nature's free gifts in all States, by road-side and river, on mountain sides and in valleys. Immense amounts of beautiful and suitable material right at hand. They will be sure to get the trees planted at once and have all our magnificent forest trees represented. We like planting each species by itself, a long line of Water Oaks, a long line of Hollys, a long line of Camphor, Wild Olive, Live Oak, Palmetto, and a long line of the queen of all flowering trees, the Magnolia Grandiflora. This superb tree with its magnificent and odorous bloom should be planted

about every Florida home and village. All the trees I have mentioned are evergreen—what a wonderful collection, perfect for beautifying and shading our roadways. Miles of highways shaded with such a variety of splendid trees would give us, in time, such fame as have the giant Cryptomerians given Japan on her wonderful State roads. There the poor of the cities travel for miles on perfect roads and under giant trees, taking in their rude vehicles the babies and kitchen outfit and journeying along for days out of doors and under God's great canopy—they get courage and health to return again to the city struggle. How good it would be if our poor could journey to the ocean or gulf—only a few paltry miles, and it would often bring back health to the fever stricken and hopeless. In the face of the wonderful progress of Florida in twenty years, we feel certain that our good roads dreams will come true. The Times-Union says they will, and the Times-Union ought to know, they say we shall have an automobile track from North to South, and from East to West of the State, and in the near future. If there is anything in Christian Science let us all join heartily in believing in this dream, and if we are good Americans "hustle for it" as well, for nothing can be more ornamental, more useful, more progressive than hard, well-shaded highways.

PLANTS FOR HOME ADORNMENT.

BY W. C. STEELE.

Mr. President, Ladies and Gentlemen:

It is not necessary for me to come before you with any argument in favor of the ornamentation of the home surroundings. That subject has been so often discussed here, that nothing remains to be said on that line.

I think that we are all agreed that it is desirable to do the best we can to make our homes attractive and beautiful. It then only remains for us to consider the matter of ways and means. There are a few favored mortals who do not need to consider expense when they wish to have a beautiful home. They give orders that such and such things shall be done, and immediately all the energies of gardeners, landscape gardeners, nurserymen and florists are devoted to the task of completing the job satisfactorily. The result is not always as pleasing, to a cultivated taste, as would be expected from the great outlay of money. Unless directed by a wise controlling mind, effect is often spoiled by crowding, or by the use of unsuitable materials. This, however, does not concern very many of our number.

I have thought it best, at this time, to try to give a partial list of trees, shrubs and vines that deserve a place in our door-yards and are available to every one.

Last year, the present Chairman of the Committee on Ornamentals, recommended the live oak, *quercus virens*, and the water oak, *quercus aquatica*. Both are desirable, the water oak makes the most rapid growth, is symmetrical and beautiful. It is, perhaps, not so long lived as

the live oak, but trees of the water oak that were over 50 feet high and with trunks over a foot in diameter, twenty years ago, are still thrifty and vigorous.

There are two other native evergreen trees that should be added to the list, *magnolia grandiflora* and *magnolia glauca*, the latter is commonly known as sweet bay. If given plenty of room, in open ground, where they will not be shaded by older trees, both species will grow rapidly and form symmetrical heads. They are highly ornamental at any season of the year, but are especially so when in bloom.

The camphor tree, *cinnamomum camphora*, is one of the most desirable shade and ornamental trees that I know. It thrives best on moist soil, but will grow wherever an orange tree will live.

There are two smaller evergreen trees that would be more commonly found in cultivation if it were not for the fact that they are very difficult to transplant, successfully. I refer to the two larger varieties of holly, *Ilex opaca*, the common prickly leaved species and *Ilex Dahoon*: The latter is much like the first except that it is of somewhat smaller growth and the leaves are smooth. Hollies may be transplanted by cutting the trunk off close to the ground, in winter, and then moving the roots at once with as little disturbance as possible. I have known holly trees to be transplanted with the tops on, but there are more failures than successes. Hollies are diecious, that is the staminate and pistillate flowers are borne on differ-

ent trees. None but the pistillate trees ever bear fruit, and they will fail unless there is a staminate trees within a reasonable distance. If you live near a hammock where there are wild trees you may safely set out a pistillate tree with the expectation that it will bear fruit. But if not, it is useless to look for berries unless you have both kinds on your place.

In some locations, shade is not desirable all the year, or at least not necessary in winter, in such places a deciduous tree may be planted. One of the very best of these is the softmaple, *acer rubrum*. This tree always excites admiration when in bloom or in fruit. It usually blooms in February and the fruit ripens and falls before the leaves appear.

A close second to the maple is the sweet gum, *liquidamber staraciflua*. It is not striking in appearance when in bloom, but its foliage is attractive, especially in the autumn just before it drops off. The corky winged branches are quite curious in winter when not hidden by the leaves.

Of course those of you who live below the frost line have at least a few orange trees. If any of you are so unfortunate as not to be able to grow the ordinary sweet or sour oranges, we would recommend that you set one or more trees of the hardy orange, *citrus trifoliata*. As an ornamental tree it has one advantage over the sweet orange, that is the flowers come in clouds while there are no leaves on the tree to hide part of them. The curious thorny branches covered with a sheet of snowy blossoms are beautiful.

Shrubs that will bloom all the season are most desirable. Where it is not too cold, the Chinese hibiscus has few equals for showiness, but they are too tender for some parts of the State.

Altheas, a nearly related family to the hibiscus, are entirely hardy and will bloom throughout the entire season. There are varieties of several colors, but not the range of shades that may be found in the Chinese hibiscus. I can especially recommend the double white as being the best of all.

Tabenaemontana coronaria, that is a long name, but it has no common name in this country, so far as I have ever heard. Henderson, in his "Hand-book of Plant," says that it is known as East Indian rose bay, quite as long a name and but little easier to remember. This is one of the most desirable that I have ever seen. It is very tender, easily killed by frost, but has grown at my home for about 18 years, without protection, except that a few times it has been banked about the base with earth, and it has not failed to bloom each year. When killed by frost, it sprouts up quickly in the spring and soon begins to blossom and keeps it up until cold weather comes again. The flowers resemble those of the cape Jessamine, (*Gardenia florida*), but are not over one-fourth to one-third the size, and are more delicate in appearance. They are very double, pure white and have a delicate fragrance.

Bauhinia acuminata is also quite tender, but in my many years of experience with it, it has not once failed to sprout up and bloom freely.

The flowers are single, pure white, without fragrance, and from two to three inches in diameter. I have only had *Bauhinia Galpinii* for about three years, it comes into bloom earlier in the season. The flowering season, as with the other, lasts until cold weather.. The blossoms are smaller and are orange red in color.

Dauintonia punicea, known in some

parts of South Florida as "red pea-tree," is a handsome evergreen flowering shrub or small tree. It blooms about twice a year, covering itself with long clusters of large pea-shaped flowers, bright orange red in color. It is beautiful when in bloom, but the blossoms are destitute of fragrance.

Duranta plumieri, golden dew-drop, is also an evergreen shrub. It is most showy when in fruit. The flowers are small, a delicate lilac in color and are borne in long racemes. They are quite pretty, but when the large yellow berries are grown the bush is quite showy. The fruit hangs on for months, often until new growth begins again the next season.

There is a desirable class of shrubs that is but little cultivated in this State. I refer to the list of hardy shrubs commonly grown at the North, many of them will do as well, or better, in Florida as anywhere. There is only one objection to them, that being that they bloom but once a year and are deciduous. There is one exception, one of the best of these old favorites, the lilac, *syringa vulgaris*, cannot be successfully grown in Florida, or at least I have failed and have never heard of any one that has made them do well or even live, for any length of time. I can recommend the Japan quince, *cydonia japonica*, common *syringa* or mock orange, *philadelphus coronarius*, *weigelia rosea* and other varieties of *Weigelia*. The different varieties of *Spirea* should also be included. All of these are showy flowering shrubs. The blossoms of the *syringa* or mock orange, are almost as fragrant as true orange flowers.

I am exceeding the limit and must omit many equally valuable species, but I cannot bear to stop without speaking of a few vines. First the *Ipomoeas*, the peren-

nial varieties are all desirable. *Ipomoea learii* is a strong grower and profuse bloomer, flowers large, dark purple. Like the morning glory, on hot days these blossoms fade by noon or soon after, but in cool weather, I have seen them stand up until nearly or quite noon of the second day. A curious fact about them is that when they last until the second day, the color fades into a dull red.

Ipomoea mortoni is, if possible, a more rampant grower than *I. learii*, but is not so free a bloomer. Flowers red and smaller in size.

Both of these species may become pests if allowed to escape into land that you wish to cultivate. They run on the surface of the soil and root along every inch of their length. In that case, the more you plow or cultivate them the more you scatter the roots and the more plants you have. The only effectual way to destroy them is to cut them off, just below the surface, with a hoe, as the roots alone will not sprout. An ounce of prevention is worth not only a pound of cure, but many of them, do not allow the vines to run on the ground at all.

Ipomoea Michauxii, of Chapman's Southern Flora, but *I. jalapa* of the Cyclopedias of American Horticulture, has received the name of "blushing beauty moonflower." It grows from a large tuberous root, often a foot or more in diameter, and has been called "potato-vine." It is a strong grower and a free bloomer, flowers open about four o'clock p. m., color delicate pink. *Ipomoea sinuata* is known in some localities as "noon-day glory." This species can be easily recognized by its foliage, which looks much like that of the rose geranium. It is a vigorous grower, thought the stems are quite slender. It blooms freely, flow-

ers small, white with a dark center, opening about noon.

Rhynchospermum Jasminoides, sometimes called Star Jassamine is a woody evergreen vine of strong growth and hardy throughout this State. In the spring it is covered with small, pure white flowers that are quite fragrant.

I have a vine of this plant that stands about ten feet high by six or eight wide and three feet through, that has been in bloom for a month. During that time the foliage has been nearly or quite, hidden by the dense sheet of flowers which have covered it. In the evening the fragrance is so strong as to be almost overpowering.

I cannot cover the entire list of desirable vines, but there is one more to which I wish to call attention. It is *Pereskia aculeata*, sometimes called "lemon vine," from that fact that the leaves are shaped like those of a lemon tree, and are thick and glossy. This plant is one of the few members of the true cactus family that has leaves. It is really a cactus, though few would suspect it, on account of its vigorous growth and profusion of leaves. It is sensitive to frost and is often killed to the ground, but sprouts up quickly. Where a screen of vines is wanted, this is one of the best. If killed to the ground it will not bloom that season, for the flowers come on new growth that starts from last year's wood. When not hurt by cold, it will literally cover itself with a cloud of small flowers about one and one-half inches in diameter. The color is peculiar, being an almost transparent waxen white,

sometimes with a slight greenish tinge. The blossoms resemble small single roses in general appearance. They have a powerful odor which is unpleasant to some people.

I have barely touched upon the list of desirable plants for home adornment, and have not mentioned any of the more common species. The subject is so vast that it is impossible, within the limits of a paper that would be suitable on such an occasion, to do more than skim over the surface.

DISCUSSION.

Mr. Henderson.—When I first came to this part of the State I saw in Gainesville a very beautiful vine on a veranda, I called at the lady's door and asked for some and she called it the coral vine. This seems to be the common name for it. It begins blooming in June but is killed by frost. One thing I think of value about it is that it is the very best flower for bees that I have ever seen. It does not seem to be very fragrant but the bees will work on it while it is in bloom. The flowers are shaped something like the sweet pea and are of a dark pink color. I would like to know what it is. I think it worthy of consideration.

Mr. Steele.—There is a common vine here known as *Rosa Montana*, I thought probably, from your description that it was your coral vine. But from the dark pink color it is not the same. The proper name of the vine (*rosa montana*) is *antigonon leptopus*.

Report of Secretary.

Mr. President, Ladies and Gentlemen:

At one time it looked as if the membership of the Horticultural Society was going to be considerably behind that of last year as there were not very many remittances received for membership fees during the year. However, the last notice to the members brought out a large response and many of the members did some good missionary work in the way of securing new members and today I am able to make the following report:

| | |
|-----------------------------------|----------|
| Membership fee received for 1905 | |
| reports since last meeting.. | \$ 76.00 |
| Membership fees for 1906 | 436.00 |
| Seven life members at \$10 each.. | 70.00 |
| For 1907 memberships | 2.00 |
| Postage | .10 |
| | <hr/> |
| | \$584.10 |

Draft to the Treasurer to balance 584.10

These figures place our present membership as follows:

| | |
|----------------------------------|-------|
| New annual members for 1906..... | 436 |
| New life members | 7 |
| Old life members | 60 |
| | <hr/> |
| | 503 |

The Society has developed a new friend at St. Petersburg, Mr. James Henry, who at one time sent in 13 members. Mrs. McCarty has also put in good work having sent in 12 members. Mr. E. L. Richardson of Avon Park sent in 4 as also did Mr. F. M. Campbell of Largo. Quite a number of members sent in from one to three.

The following list of expenses since last meeting is respectfully submitted:

| | |
|-----------------------------------------------------|---------------|
| 1905. | |
| Dec. 23. Noble Newspaper Union for printing..... | \$440.35 |
| May 22. Stenographer | 50.00 |
| Secretary's salary | 100.00 |
| Dec. 20. Mailing 1905 reports. | 27.14 |
| 1906. | |
| Jan. 5. E. O. Painter Printing Co., stationery | 4.00 |
| Jan. 5. E. O. Painter Printing Co., stationery | 9.47 |
| Telegrams | .62 |
| Jan. Postage, Printing and Mailing reports ... | 71.05 |
| Mar. 3. S. F. Hall & Sons, printing | 4.00 |
| Apr. 20. S. F. Hall & Sons, printing | 13.25 |
| Cash balance on hand of Treasurer | 274.49 |
| | <hr/> |
| | \$994.37 |
| Treasurer's balance on hand | \$410.27..... |
| Secretary's draft check to Treasurer | 584.10—994.37 |

It will be seen from the above report that the society is going to be considerably short of sufficient funds to meet the coming year's expenses, to say nothing of the expense of presenting a resolution to the State Legislature for an appropriation. It is earnestly hoped that all members of the society will increase their efforts towards getting more new mem-

bers through the year as we should enroll, at least 300 more.

The expenses of the coming year can be cut down by reducing the cost of printing the Report by leaving out the catalogue of fruits and doing away with the illustrations. This feature of the Report,

however, is a very desirable one and if it can be possibly done one or more illustrations should be continued.

All of the above is respectfully submitted.

E. O. PAINTER,
Secretary.

Treasurer's Report.

| | | |
|----------------------------------------------------|-----------------|--|
| 1905. | | |
| May 1. To Balance | \$410.27 | |
| May 1. Membership Fee | 3.00 | |
| 1906. | | |
| May 3. Record of Secretary Painter..... | 584.10—\$997.37 | |
| May 24. By Stenographer's Bill | \$ 50.00 | |
| Jan. 1. Noble Newspaper Union | 360.37 | |
| Jan. 13. Noble Newspaper Union | 79.98 | |
| Apl. 13. Secretary Painter membership fees | 2.00 | |
| May 3. Secretary Painter membership fees | 1.00 | |
| May 3. Secretary Painter Miscellaneous bills | 229.53 | |
| May 3. Balance in Treasury | 274.49—\$997.37 | |

W. S. HART,
Treasurer.

Annual Report Executive Committee Florida State Horticultural Society.

JACKSONVILLE, FLA., May 3, 1906.
Mr. President, Ladies and Gentlemen:

This Committee met in the office of the Secretary in Jacksonville, June, 9 1905. Rev. Lyman Phelps by proxy, E. S. Hubbard, President McCarty and Secretary Painter present. The Secretary

was instructed to have the Annual Report, 1000 copies, published in the same style and form as the 1903 Report.

By request the Committee assisted the President in forming standing committees for the next annual meeting.

The President was requested to make

arrangements if possible for special address and other features that would add to the interest of the next meeting.

Meeting adjourned without date.

This Committee met at the Windsor Hotel March 16, 1906; present, President McCarty, Secretary Painter, exofficio Rev. Lyman Phelps by proxy, E. S. Hubbard, G. L. Taber. Minutes of previous meeting approved, next annual meeting appointed to begin Tuesday May 1st, 1906 at 8 p. m.

Offer of the Windsor Hotel as headquarters and the auditorium for place of holding sessions unanimously accepted. A reception and introduction committee of twenty ladies and gentlemen was appointed. A committee of local arrangements consisting of Messrs G. W. Wilson,

E. O. Painter and C. R. Tysen was appointed. Several bills were audited, Meeting adjourned without date.

This Committee met in the Windsor May 3, 1906; present, Rev. Lyman Phelps by proxy, E. S. Hubbard, G. L. Taber by proxy, President McCarty, Secretary Painter, Treasurer Hart. Remaining bills for the current year were audited. Secretary's and Treasurer's books were examined and finances of Society discussed.

Meeting adjourned.

REV. LYMAN PHELPS, by
E. S. HUBBARD, proxy.
E. S. HUBBARD.
G. L. TABER, by
C. T. McCARTY, proxy.

Report of Committee on Legislation.

BY M. F. ROBINSON.

*Mr. President, Ladies and Gentlemen of
the Florida State Horticultural Socie-
ty.*

DEAR SIR: As a member of your committee on Legislation, I would respectfully report: That it has been suggested by our honored President and Secretary that it is with the greatest difficulty that the expenses of this Society can be maintained from the modest membership fees; That no inconsiderable part of the expense, is the publication of the Society's Annual Report of its meetings; and that the Legislature of the State should be petitioned to make an annual appropriation in aid of these expenses. Such a petition would be entirely proper and in line with the action of the legislatures of other States that aid in the support of similar Societies. That such a petition should specify the amount of funds desired, and name the purpose for which it will be used, is believed by your Committeeman to be highly important. Therefore it is recommended that the Secretary make a careful estimate of the amount necessary for the publication of the Annual Report, and prepare an appropriate resolution, requesting the desired appropriation by the legislature, and submit it to this meeting for action.

Another matter which in the opinion of your Committeeman is highly important to the members of this Society, and which it is the duty of the Society to lay

before the legislature of the State and ask for relief; and that is the deplorable fence laws of the State; whereby cattle, horses, hogs, sheep, and goats are permitted to run at large. Therefore to bring this matter before the Society for its consideration, the following preamble and resolution is hereby introduced. Your Committeeman offers the following and moves its adoption.

PREAMBLE AND RESOLUTION.

WHEREAS, The farming and horticultural community and the towns and cities of the State of Florida are greatly harassed and damaged besides being put to an enormous expense by reason of the fact that cattle, horses, hogs, sheep, and goats are permitted to run at large; and,

WHEREAS, The finances of the State would be vastly improved, if the owners of such stock were compelled to fence, and, directly or indirectly, pay taxes or rent on the pastures used for such stock, instead of being permitted to pasture their stock on the land belonging to others or belonging to the public domain; and,

WHEREAS, It is believed that a large majority of the voters in the State are in favor of a radical change in the present law; therefore, be it

Resolved, By the Florida State Horticultural Society in meeting assembled; that the Legislature of the State of Florida, be and is hereby petitioned and im-

plored to make and inforce such laws as will prohibit the running at large of cattle, horses, hogs, sheep and goats in the State. And if, in the wisdom of the Legislature, it is thought that any County in the State contains a majority of voters in favor of the present law, let it be sub-

mitted to the voters of each County to decide whether the new law or the present law shall be enforced in that particular county.

Resolved, That the above resolution be submitted to the next Legislature, by the Secretary of this Society.

Notes from Abroad.

BY DR. WM. C. RICHARDSON, TAMPA, FLA.

When Doctor W. C. Richardson advised me early in January that he was about to visit the Citrus sections around the Mediterranean I asked him to write something on his observations. He kindly consented to do so and mailed the letter from Paris thinking it would reach me at Jacksonville in time to be read to the Society. It failed to reach me in time and I am doing the next best thing—printing it in the proceedings. Personally and on behalf of the Society I thank Dr. Richardson for his most instructive and interesting letter.—C. T. McCARTY.

PARIS, FRANCE, April 25, 1906.

C. T. McCarty, Esq., President Florida State Horticultural Society, Florida U. S. A.

DEAR SIR: In accordance with your request to write you relative to things of interest that I might see on my cruise around the Mediterranean, in the way of horticultural matters, I take occasion to say that the first stop was at Funchal Island, of Maderia. This island grows some oranges of a rather inferior quality, and all sub-tropical fruits and vegetables flourish as extensively as the small limits of the island will permit. Sugar cane, however, seems to be the principal article of cultivation.

The next place visited was Cadiz, Spain, located on an almost barren little

peninsula, and aside from the splendid harbor, its commerce as the chief port of South Western Spain, and the manufacture of salt by evaporation, it has little of interest in a business way, but is rich in art treasures and historical associations.

A visit to the interior, some hundred and fifty miles, revealed quite extensive orange groves, and many quite large olive orchards. The orange trees are planted in squares in regular order, eighteen or twenty feet apart, and do not seem to grow anything like as large as our Florida trees. In the gardens of the palace of the Alcazar there are many very old trees, one of which is said to have an authentic history of over six hundred years; It is a bitter sweet, and the man showing us through the place said that sweet oranges injected into the bitter stock, he meant budded, were growing in the grounds and bearing abundantly at ages of two and three hundred years. These trees did indeed look thrifty and healthy, but they were no larger than our fifteen or sixteen year old trees. All the unprotected orange and other sub-tropical trees had been nipped with the cold to the extent of losing their leaves, but this did not seem to worry the Spaniards any, and they apparently treated it as nothing unusual, or of any consequence. Spanish oranges are not of the best quality, and aside from color have little to recommend them; they are tender, thick skinned and of a negative flavor.

The next stop was at Algiers, in Northern Africa, where oranges, lemons, guavas, bananas, etc., were found in profusion. All showed the effect of recent cold, but had not suffered as much as in Spain. The orange groves were set out in a much more crowded way, the trees being only 12 or 15 feet apart, and, like in Spain, all pruned up very high. The mandarine oranges are raised very extensively in Algiers, and are of a most excellent quality—in fact all the oranges here are very good indeed.

After visiting Greece, Turkey and Asia Minor, where olives and figs are raised extensively, and oranges are grown in a rather limited way, and where they suffer a great deal from cold every winter, the next place of interest from an horticultural standpoint was Jaffa in Palestine.

Jaffa is the home of the very best oranges we have seen outside of Florida, if an exception be made in favor of a *blood navel* found in a small way on the island of Malta. The cultivation of the orange in Jaffa is more wonderful to a Florida grower than is the delicious character of the fruit. The trees are planted in rows not more than seven or eight feet apart, and not more than five or six feet distant from one another in the rows. All cultivation is done with hoes and spades and they dig deep everywhere, even close up to the trees. They have a loose sandy soil, richer apparently than ours and their only knowledge of fertilizers seems to be confined to barn yard manure.

When the trees get so large as to make them too close together for convenient cultivation and harvesting the fruit, they cut them off alternately in the rows and rebud the sprouts, I do not think any trees are allowed to get more than ten

or twelve feet high before they are thus treated. I was told by a man whose family are the most extensive growers in this country that small thrifty trees close together gave larger returns per acre and better fruit than any other system of culture they had been able to devise.

Egypt was found to be almost as wonderful from an horticultural and agricultural view as it is from an ethnological and historical standpoint. At Cario in latitude 30 degrees north, where it never rains and where the climate is much warmer especially in summer, than in Jacksonville, we found many things to interest us. We were fortunate enough to secure an introduction to the Director of the Botanical and Zoological gardens, who kindly devoted a forenoon to showing us through the wonderfully rich possessions under his management, including rare specimens of all kinds of fruits and plants that grow, in this lavishly productive country. Everything we ever saw growing in Florida seemed to flourish here, including two splendid real American alligators kept in a pool enclosed by wire netting, separating them from the Crocodiles. It seemed like meeting friends from home, and after long association with Arabs, camels, donkeys, etc., it cheered us up wonderfully.

We were also fortunate enough to be in Cairo at the time of the Egyptian Horticultural Exposition, conducted with a great flourish under the auspices of the Khedive, who by the way is a very pleasant appearing, popular and democratic monarch. The Exposition had a few very fine exhibits of fruits and some of the finest kinds of large appetizing appearing vegetables, also a beautiful show of flowers and tropical plants, but taken as a whole it did not begin to come up to the

exhibit of any one of several single counties as shown at the Florida State Fair held at Tampa. Oranges are grown and cared for in Egypt about the same way as in Algiers, except they depend on irrigation entirely. Guava trees are not small bushy things as with us, but quite as large as orange trees and are kept pruned up.

From Egypt we went to Italy and Southern France, where from Naples to Nice, along the shore of the Mediterranean, the orange flourishes in a more or less precarious way, being often found growing on narrow terraces of a mountain side with snow capped peaks in plain view. In fact it appears to me that the Mediterranean varieties of citrus fruits can, and do, stand much more cold than they do with us in Fla. Even in Egypt there had been, shortly before our visit, enough cold to cut down bananas and knock the leaves off the guava and other tender trees. While the cold is always felt it is seldom extreme enough to freeze the fruit, and at Nice in Southern France, where they had recently experienced a real freeze, we were told that all fruit that did not drop off the trees within a couple of weeks was considered as good and marketable as if there had been no freezing. Blooming seems later than with us, and it was after the first of April before we saw any trees in full bloom.

None of these countries produce oranges in quantities large enough to have much apparent effect on our markets, and in fact they do not seem to raise more than enough for home consumption and to supply local and adjacent markets. We only had opportunity to get at the prices of oranges as sold at retail, and found them selling at approximately the same

price as at home. As a table necessity they seem to be well appreciated, and I do not remember a single dinner anywhere in the Orient or Europe that we did not have them.

We noticed surprising and astonishing things that completely upset our ideas, based on experience, of the disposition and nature of orange trees, such as seeing them growing and flourishing luxuriantly out of holes in solid rock pavements with no apparent soil or other nourishment for their support and no possible chance to cultivate or fertilize them. We saw them trained against houses and palaces, and shaded into arbors like vines. In Egypt we saw several large enclosures fenced in with hedges of orange trees pruned and trimmed into various shapes as the owner's fancy dictated.

In conclusion I may say that the most prominent feature of our trip was cold always and everywhere, and with the exception of a few days in Cairo, and one day clambering over lava and in warm volcanic ashes on Mt. Vesuvius, the very day before the great and destructive eruption, we have not had a chance to get warm !

In the lower end of the Jordan Valley, near the Dead Sea, around the towns of Jericho and Gillgal, was the only place where we did not see evidence of frost. In this small territory are a few lemons, guavas, etc., but the Turkish system of taxation is so oppressive that little is undertaken by the wretched inhabitants in the way of fruit growing. They told us that each and every fruit tree was taxed the same, no matter whether it was large or small, barren or productive. Many were cutting down their trees and selling the wood as the only way to escape this ridiculous method of taxation. With

irrigation and better laws the Valley of the Jordan, now a howling wilderness in possession of wild animals and fierce Bedouins, could be made one of the most productive and delightful places in the world.

With kindest regards to you and yours, and best wishes for the splendid society of a splendid State over which you preside, I am,

Yours truly,
W.M. C. RICHARDSON.

Question Box.

A VARIETY OF QUESTIONS FROM A VARIETY OF SOURCES, ANSWERED BY
VARIOUS MEMBERS.

i. What is the cause of thick-skinned grapefruit or oranges? Can the trees be fertilized in a way to produce thin-skinned fruit?

Mr. Taber.—Mr. President, I think Mr. Sampson should be called upon to answer this question.

Mr. Sampson.—There are a number of causes for thick-skinned fruit. The first crop might have thick skins while the second would not. If you put on too much ammonia in proportion to phosphoric acid and potash, you might expect coarse-skinned fruit.

Mr. Sample.—I would like to know if cultivating it is conducive to thick skin.

Mr. Sampson.—I think it is. We had a portion of a natural sour grove where trees were left too thick for anything but hoe cultivation—three times a year—that invariably grew much thinner-skinned fruit than same variety where trees had clean cultivation till rainy reason. They produced much less fruit but it was solid, handsome fruit and ripened earlier.

Maj. Fairbanks.—I have noticed that where I had my stables the land was very rich and the trees planted near there bore very thick skinned fruit. I concluded that too much ammonia was the cause of this thick skin.

Mr. Connor.—In my last report I said something about cultivation. I think the

matter of cultivation can be overdone to a great extent. I have some old soil and I think it is as poor as any in the State. My plan has been to cultivate it without cultivation, in other words, to make use of the growth of beggar weed etc., mow it down in summer and use what I want for hay, then in the fall and spring run over it with cutaway harrow and chop it into the soil. After three years such treatment it now looks like good soil.

Mr. Cook.—I did not hear all that Mr. Fairbanks said in reference to thick-skinned grape fruit. My experience has been this; in cultivating the citrus tree and its fruit the use of a highly ammoniated fertilizer with constant and late cultivation produces a vigorous growth of wood and a large, coarse, thick-skinned fruit either grapefruit or orange. By the free use of potash this result can be modified somewhat as to the fruit.

Mr. Painter.—The thickness of the orange peel depends on several conditions—fertilizer, cultivation and moisture, or a combination of the three. Young trees that are highly fertilized and thoroughly cultivated will bear thick skinned fruit if the season is one of abundant moisture. A dry season would produce thin-skinned fruit because the tree cannot take up as much of the plant food from the soil—a lack of moisture means a lack of nitrification. Old trees that have but little cul-

tivation generally produce the thinnest-skinned and best appearing fruit.

Mr. Hart.—I will say my groves have not been plowed in many years. I do not cultivate deeply after the second year from setting a grove.

I wish to speak of budding the orange, more especially the Washington Navel on rough lemon stock. This variety is a shy bearer on sweet or sour stock but fruits well on lemon yet my experience is that on stock the navels are very coarse and poor. My navels were so poor on this stock the past season that I would not have shipped them at all had I known just how poor they were. The fruit may be better on pine lands but for hammock I would say, don't use lemon stock at all.

I am cutting down my navels and putting in other varieties.

2. Citrus trees in a grove eight to ten years old have grown so thick limbed that it is almost impossible to gather the fruit grown inside of the trees. Would it be well to prune out a lot of the inner branches and twigs? Would it be a good time directly after the blossoming season is passed?

Mr. Hart.—The older I grow in orange culture the more I find that I am not positive of many things I thought I had settled in my mind, I have not settled. I believe in letting the tree grow, I do not think it was born depraved and has to be cut to pieces every year. I do hardly any pruning at all except to take out dead wood and I am very much pleased with results. Now as to the second question, I would say this much, I would not prune right after the trees bloom, if I were going to prune at all it would be right before the starting of new growth.

Mr. Connor.—I was with Mr. Waite while he was pruning some trees in Manatee Lemon Co. Grove at Palmetto three years ago. If he has made it pay—after the use of the knife in what I called at that time a very free manner, it would convince me that pruning is a good thing. I would like to know what his success has been.

Mr. Waite.—If the grove is situated near, or in the white fly belt, I should advise pruning out the centers of the orange trees, for the fly likes these thick places, and we have noticed that almost immediately after it gets started in a grove the scale insects kill the most of this inside wood and unless the tree is cleaned out you will get but little fruit.

With us the grapefruit and lemon trees do not grow as compact, and the lemon especially, sheds a great deal of its inside foliage from the fruit spur wood, yet these will invariably produce bloom which is well protected from cold, and the fruit thus produced is of the finest quality. As the fly is quite severe on the lemon we have found that the scale soon kills a greater portion of this inside wood.

We have no set time for pruning, but I believe that January is the best month in which to prune, as the tree at that time has enough sap flowing to enable it to heal the wounds thus produced.

Mr. Longley.—Mr. President, I do not want to interfere only to prove as near as I can that pruning is very objectionable. I had a neighbor who had a grove of about 85 acres who is always pruning and today he claims four thousand trees, but he will not average one box of fruit to the tree. I do not prune at all and have a good crop of fruit all through my trees. I claim that pruning is good in the fore part of the winter before blooming time.

3. What will labor and material cost to spray 5000 medium sized orange trees?

Mr. Connor.—During the last three weeks I have had some experience in this line, just the experience fruit growers would have who have not the complete apparatus for spraying. The cost of spraying for about 500 trees was something over \$7.00, with an additional cost of \$8.00 for material used, or about \$15.00 which would be an average cost to depend upon. Trees bearing from two to four boxes.

4. Will whitewashing orange trees with pure carbonate of lime be detrimental?

Mr. Hart.—I remember twenty five or thirty years ago there was quite a discussion in regard to whitewashing orange trees. In California several years ago I saw where they had cut back their trees to bud them, and that they had whitewashed the trunks eight or ten feet high to protect them. This might be all right but I remember there were objections found to white-washing but they have gone out of my mind just now and I cannot state them. Perhaps Maj. Fairbanks can give us something on this line.

Maj. Fairbanks.—I wish to say that I have no information whatever. I like the orange tree and think it is the most beautiful tree in creation and it is a sacrilege to white-wash it.

Mr. Painter.—Anything put on the orange tree to cover up its pores is injurious, especially during the growing season. White-wash your fence and out-buildings but wash the trunk of your trees with water and whaleoil soap.

5. I have Mexican clover in my grove and would like to know how to get it out.

Maj. Healey.—Let more of it grow and you will not want to get it out.

Mr. Painter.—I would suggest that if he really wants to get rid of it he move to another county.

6. Explain how, when and what quantity of blue vitriol to use for dieback.

Mr. Brown.—I suppose that the regular Bordeaux formula would be used; it should be used just previous to the starting of new growth, I should say the latter part of January, but it could be used later in the season. If the tree is in a very bad condition, inoculate the tree, but my plan is to use a spray.

Mr. Longley.—I would like to know what quantity to use in this inoculation.

Mr. Brown.—I use a quantity about equal to that of the size of a pea inserted right under the bark of the tree.

7. What is the best remedy for foot rot? Is it best to resort to remedies for the cure of this disease, or pull out the tree and plant a new one.

Mr. Phelps.—Some time prior to 1895 I set out ten trees. I found this foot rot on them later. I happened to meet Mr. M. F. Robinson who advised me to apply sulphuric acid to the ground and rake it in well, this I did and the very worst tree I had came out fine, in fact better than any of them.

I should dread very much pulling up a tree as it is no little job, and shall do everything I can to save them otherwise and I have saved a good many so far; I still believe in the sulphuric acid well raked in.

Mr. Painter.—The sulphuric acid remedy referred to by Mr. Phelps is a dilute form. Three gallons of 50 per cent. B. acid is diluted with seventeen gallons of water.

Mr. Blackman.—I have tried a good many remedies, spraying, cutting away the wood, sulphuric acid, in fact almost everything I could hear of; but the only effective remedy I have found for this disease is blue stone. I inoculate the tree close to the ground, cutting the bark the same as for budding and inserting a piece of blue stone about as large as a grain of wheat. This must be done when the sap is up and the tree in a growing condition. I think that for foot rot blue stone is a grand panacea. In some cases it will scar the tree badly, but in time it will heal over and the tree will put on a most vigorous growth. I have found quite a good many trees that were affected; but in every case they were trees grown on low land. I have never seen a tree in our section that was grown on high pine land affected by this disease.

Dr. Bessey.—What is the appearance of a tree with foot rot?

Mr. Brown.—They become yellow and drop their leaves. I did not know just what it was at first, but I wish I might tell every grower who has foot rot in his grove that if they will put blue stone in the root just at the surface of the ground, it will surely do the trees good.

Prof. Rolfs.—About four years ago we tried some experiments in treating die-back by inserting a small piece of blue stone under the bark of trees. In this experiment a certain number of trees were chosen to work upon, a number of trees were treated as described above and along side of these an equal number left untreated, careful notes as to the extent

of dieback and the location of the lesions in the tree. About three months elapsed before it was practicable to return to take notes on the work, and it was found that treated and the untreated trees were entirely free from dieback. The point I wish to make here is, that it is absolutely impossible to draw a reasonable conclusion from any experiment unless we have checks upon our operations. Die-back or citrus tree indigestion, may be brought on by a variety of causes, even different trees in the same grove may have dieback from entirely different causes. The matter of first importance in treating dieback is to ascertain what caused it and then to remove the cause. Often times this is all that is necessary. The recovery of the tree may, however, be hastened by an application of weak Bordeaux mixture to the upper surface of the leaves. Among the most frequent causes of dieback I may mention plowing during the rainy season, applications of organic ammonia, hard pan or a rather hard sub-stratum under the tree. A tree that has a tendency to dieback may be set over into a case of dieback by pruning or cases of dieback have been known to be brought on by root pruning. In other cases of dieback have been known to be able them to secure too much organic ammonia are apt to have dieback.

Mr. Hart.—In this matter of foot rot, the time to cure the disease is in its early stages; look out for it, examine the trees and if you find gum exuding at or near the ground, dig the dirt away and expose the roots, this will usually cure it. I think when a tree has foot rot so as it loses its leaves it is best to dig it up and set sour stock in its place that is budded eighteen inches above the collar.

Mr. Frink.—I would like to hear from

Mr. Wilson as to his experience with this foot rot in Porto Rico.

Mr. Wilson.—We have a kind of foot rot in Porto Rico which we have fought with carbolic acid and Bordeaux mixture, but whether this is the same foot rot you have in Florida or not I do not know. We discovered it a few years ago only on a few trees. When I first found this foot rot on my trees my men put on the carbolic acid too strong and killed the tree but since then I have used this carbolic treatment, superintending it myself, and found it very successful. A neighbor of mine has found this remedy very successful by pulling the dirt away from the trees and washing them with this mixture.

8. Will Dr. Walker please give the society a report of the camphor experiment at Huntington?

Dr. Walker.—Mr. President, I am afraid the subject on which I am going to speak, will place me in rather a false light. I have in my possession a sample of camphor prepared in Huntington and purified in Washington, but first must tell you how this came into importance (and must confess that it is of great importance to us.)

Most of the camphor used in the United States today comes from Formosa. Recently several Japanese authorities were quietly sent over here to see how much camphor was grown, and whether we could raise it successfully or not.

The results of their visit were so serious that the celluloid manufacturers—our great camphor consumers—said, in their report to Washington that they must have American camphor or move to Formosa. Camphor, up to this time had been

worth about thirty cents per pound, but immediately advanced to \$1.00 per pound.

In 1898 I met Prof. Hubbard who was our State Entomologist and he showed me the results of his experiments. I found that one pound of camphor could be extracted from 70 pounds of leaves. It was at this time, when it was worth only thirty cents per pound, that people thought it would be a profitable business to plant camphor trees here.

The camphor trees are very beautiful, and I got rather enthusiastic over mine, which were growing well. When I heard that another grade of camphor—a chemical product could be put on the market at fifteen cents per pound, so thought it would be useless for us to try and raise the trees. Camphor is very similar to turpentine. Many people have tried to make camphor out of turpentine and think it will yet be done.

We waited for a year or two, during which time the camphor workers were said to be hard at work, but no camphor was produced. Then, at a very opportune moment, these works were burned and we do not think they will be rebuilt.

Camphor is also very essential in the manufacture of smokeless powder. Altho' other substances might be used yet if anything should happen to draw us into a war, when we would require a quantity of powder immediately, we would be in a dilemma if Japan decided not to provide us with the camphor.

About a year ago, a gentleman came down from the experimental station—Washington—to see what the camphor outlook was in Florida. After a general look around he took samples of this Florida made camphor back to Washington and purified it. The celluloid people were interviewed and shown the samples which

resulted in an order from the president of the company for 500,000 pounds of Florida camphor at \$1.00 per pound. But unfortunately it was not procurable, and we are out that \$500,000. (Laughter.)

The gentleman from the experimental station came down, later to experiment in Huntington. I was only too willing to offer him all the facilities I had for the experiment, as this was such an important question, and should be pushed forward. In six weeks time he (and his assistant) returned to Washington and purified this camphor. I had gotten 1.42 per cent of camphor from my own trees but am told they can do better at Washington. I did not expect to go into the matter very thoroughly, but just pass this information along.

Other trees may be cut down by severe cold, and that is the end, but not so with the camphor trees, as we can use them even four months after they are cut down. I used some old trees that had been cut down three months, and obtained 1.021 per cent of camphor, so I know that this is true. So, if we go extensively into the business, and a severe frost cuts down the trees, we can still obtain the camphor from them.

I wish to call attention to the value the camphor tree will be to us within the next ten years. It will be worth millions of dollars, if we only take hold of it. Japan has all the trade now, but can we afford to let her keep it? If Japan says they must pay \$2.00 per pound for their camphor, we, who are obliged to have it, will be obliged to pay. And if she says we cannot have any at any price we will not get it. If we do not stop the growth of camphor in Formosa, for use in this country, it means the loss to us of millions of dollars.

I will take my chances on the camphor growing. It is surprising what can be done, and the only thing we need worry about is that this Synthetic camphor may be made. Yet if it should be, we still have our ornamental trees.

I would like to have the opinion of this association on this subject.

Scattered about in different parts of Putnam county are groves of these trees, varying in size from a dozen trees to several acres. If we can get the government to take the matter up, you see of what great importance it will be to us. I have offered them every inducement to come to Huntington and experiment on my trees. I am willing for them to cut them down, dig them up, or do anything they like with them. I would like expressions from this society in favor of having this work pushed forward and suggest that they show the government their approval and appreciation of the experimental work being carried on.

Mr. Steele.—On what character of soil is the camphor grown?

Dr. Walker.—It will grow well on any high pine land. I have beautiful trees growing on my place at Huntington. The cost of extracting the camphor cannot yet be determined, as we were only experimenting. I do not know how the government sample was extracted, but will know in the fall, how it was done. In about two weeks I expect to have a sample of the first celluloid made from this Florida camphor. (Applause.)

Mr. Steele.—Mr. President, I had a large camphor tree that was killed down in the freeze of 1899, but now it has grown up and is as large as ever. If you will give a camphor tree a fair start, it will grow right on, almost anywhere. There is hardly any soil on which it will

not grow. It does not do so well on dry soil.

Mr. Frink.—I would like to supplement what Dr. Walker has just said on the subject of camphor, I have recently had letters from two different gentlemen connected with the United States Department of Agriculture, who stated that recent experiments in producing camphor gum have been extremely successful and they seem to think it highly feasible to produce camphor gum here on a profitable commercial scale. As a result of those experiments I have recently had inquiries for trees in lots of five to twenty thousand. From these letters and inquiries I think within a comparatively short time camphor production will become quite an extensive industry here.

9. Have any of the members of the society seen the nitro culture that is being introduced by the United States Department of Agriculture, and with what success?

Mr. Hubbard.—I would like to ask the gentlemen from the State Experiment Station what success they have had with Alfalfa and nitro culture.

Dr. Bessey.—In behalf of the department I would ask that a distinction be made between nitro culture and nitrogen gathering bacteria.

Mr. Hubbard.—Either one of them.

Mr. Henderson.—I did not know there were two kinds, I want to know if their use is satisfactory to the department of agriculture.

Mr. Hubbard.—Prof. Connor said that they were experimenting with alfalfa at Lake City and I wished to know if they

could give us any report that would be of advantage in growing alfalfa.

Mr. Merriam.—I have had some experience with nitro culture, some of it is very good. There has been a great deal of discussion about this commercial nitro culture and some of the experiment stations claim that it is not as good as that sent out by the government. I tried some last spring on beans and English peas and it was a success on my peas, I tried it very fully putting it on the seeds and in connection with this I used fertilizer without any nitrogen and right along side of it I put in some that contained five percent. nitrogen, but the phosphoric acid and potash, with the nitro culture made better peas than the fertilizer. I do not know why it was but I did not get very good results. I used this on some beans but the cold killed the beans so I could not tell about them. I could not see any difference on cow peas at all, one was as good as the other. I presume that the reason was that the ground was already well inoculated. I understand that it is necessary to have the nitro culture fresh as it will not keep very long in the shape the department puts it up.

Mr. Ellis.—Mr. President, I have used the commercial nitro culture on both cow peas and velvet beans and I planted one half with and one half without the nitro culture and we could discover no difference at all. The nitro culture was bought from a good reliable firm who claimed that it was fresh. The bacteria seemed to develop all right in the jars, but I could see no difference in the crops at all.

Mr. Henderson.—I tried peas similar to Mr. Merriam with a commercial nitro-culture but could see no difference.

10. Has any member of the society had any experience in growing "Ginseng"? With what success? Can it be successfully grown in Florida?

Mr. Painter.—Ginseng has been tried in Florida but the only one who made money out of the deal was the firm who sold the roots for planting.

11. Can a grove be cared for and fertilized so that it will give a full crop each year, if so, how and when to fertilize it?

Mr. Blackman.—Mr. President, I can answer that in part, not from my own experience, but for another. This gentleman take it one year with another, has good to heavy crops of grapefruit. The first few years his grove bore, it would produce a heavy crop one year, the next lighter. The owner commenced experimenting in fertilizing and for the past three years his grove has been loaded almost to the breaking point. I do not know what kind of fertilizer he uses, or how many applications or when applied. He uses a fertilizer manufactured in this State. He works his grove in the spring, allowing the weeds and grass to grow through a portion of the summer. I do not know how much fertilizer he uses to the tree; but I do know that he gets a full crop each year.

Mr. Connor.—I do not know that I can give any light on this subject but I wish to say that there are so many things that have to be taken into consideration to produce a full crop of fruit that I do not think we can lay it altogether on the kind of fertilizer used for the reason that there are so many other things that we have to take into account. If we do not have moisture then we are not apt to have a full crop of fruit, then again I think

the time, and quality of fertilizer used has something to do with it. My idea is that the time of fertilizing is in the fall of the year, it seems to get the grove in better shape to set fruit and then I would follow that with a light application in the spring, then feed the tree gradually all along the year. If you feed the trees well, being careful to have suitable analysis, you will have no trouble in getting a good crop each year.

Mr. Gist.—All of Florida is not so fortunate as to have a rock foundation to put their groves on, therefore some suffer for the lack of moisture. I think Mr. Connor's remarks were well made, for my observation is that a tree that has been well fed winters well. Down in Miami they do not have to consider the winters as we do. A well fertilized tree will stand a lower degree of temperature than a poorly fed one and thus better crops will be the result the next year.

12. How are bamboos propagated? Will they grow from cuttings, if so what time should they be put out?

Dr. Walker.—They are propagated by taking the roots. This can be done at most any time.

Mr. Steele.—I saw in a neighbor's yard a large clump of bamboo, from which it was impossible to get a sprout. I took some cuttings, slender twigs, and planted them in moist soil and all grew.

13. Given a sandy soil of a tidewater island that is too salt for growing oranges is it possible to neutralize the excess of salt by the use of a special fertilizer? The soil is so salty that the kelsey plum after being transplanted when matured will taste as salty as if it had been pickled

in brine. Larger pear trees planted in this soil in February continue to grow, putting on a large crop of fruit and again blooming and fruiting, as did the plums, and dying the second year after having fruited three crops; the third crop of the second year being immature. This land is well above the ordinary tide and has a fine growth of palmettoes, live oak, cedar, accacia and camphor but it is of a peculiarly dry character getting dry immediately after being soaked, seeming to lack nitrogen also. I would be glad to know how I can make oranges and other fruits grow on this land.

Mr. Painter.—There is no hope for your ever being able to neutralize the salt in the lower strata of your soil. It is evidently there from salt water from below. The only "neutralizer" salt has is water. This dissolves it and would eventually clear the soil if you had perfect drainage and no return of salt water from below.

14. What is the best size of budded stock of the orange or grapefruit to transplant.

Mr. Frink.—In reference to size of budded trees, I wish to say that there is considerable difference of opinion as to most desirable for planting. Some people prefer a two year bud and others one year bud. The demand is heavier for four to five feet one year buds than any other size, and two year buds probably come second. My own observation and experience goes to show that a four to five foot one year bud is easier to transplant and everything considered the most desirable size.

Mr. Connor.—We all know that the smaller the plant is or the closer it is to the seed, the better it transplants. When

it is removed from the seed bed, and is tough enough to be transplanted I think this is very true with the orange tree, for this reason; you can get nearly all the fibrous root with the young tree but if you wait until the stock gets to be of large size the feeding roots are necessarily thrown out farther from the plants and it takes a tree in that condition longer to adopt itself to its surroundings and start new roots. My opinion is that stock from two to two and a half years old well supplied with fibre roots will adopt itself better and receive less shock by transplanting than the large ones with no fibers. I do not care so much about the age of the bud it may be one or two years old.

Mr. Hart.—My interests simply call for the best tree I can get and my experience has been that the size of stock is of more importance in successful transplanting than size of bud. I would prefer the stock to be two inches through. I have trees bought from nursery stock that were not larger than my finger after the freeze of 1899 and they are not much larger yet, but I have some trees of my own growing that I planted out three years ago, these buds were thrifty, the stocks of good size and the trees now are many times larger than the smaller ones set years before. I came to this State when the trees for our groves were all taken from wild hammock and we did not take any stock less than two inches in diameter and some were six inches through. We set them out and budded them as they were set out, you cannot do that with the small nursery trees. It takes them some time to start new growth but you take large trees at the ground, not too large say about three and one-half inches through and you will get your

grove quicker and make more fruit. You bud the trees after they are transplanted and your buds start right to growing and in three years you have profitable bearing trees. I would not cut the old stock down close to the bud until the buds get to growing rapidly, then cut them off and wax them and the wound will soon be covered over and a smooth trunk result. You will get thrifty bearing trees from large stock, while the small stock will give away to drouth or any of the ills to which the trees are heir.

Mr. Connor.—Did you ever try transplanting smaller trees from the nursery?

Mr. Hart.—I certainly have. Have you ever planted four inch stock? That is well worth trying.

Mr Connor.—Take a good tree and at the end of three years you cannot reach the tops of them. I have some now that I tried this with and I cannot reach the tops of them. I have never seen finer trees than I have in my grove planted three years, and I used the ordinary four or five foot bud, one year old in nursery.

Mr. Longley.—It makes a great difference in conditions. I suppose Mr. Hart's place is on hammock land. On my pine land I have taken stock three eights of an inch thick and planted between trees that had been planted two years, that had grown from one and a half to two inches. In three years from that time the small trees were the finest by far and all planted in the same row.

Mr. Chilton.—In the past few years I have set out in groves about 20,000 trees of different varieties and I certainly must bear out the view of Mr. Hart in reference to a good large thrifty stock with a two year old bud in preference to a small stock and bud. I have been in the busi-

nness for the past thirty years and came to this State in the old time, which Mr. Hart speaks of when we had large wild groves of the orange scattered all through our hammocks and know the time when we set those large sour stumps, six and eight inches in diameter and after budding they made a quick bearing grove.

In three years we could count on a good crop. It takes too long to wait with small stock. I prefer a good thrifty four year old stock with a two years old bud of not less than three inches in diameter to start with and a two year bud. The stock should be vigorous which is one of the main points to beginners.

Mr. Blackman.—Is it possible to lay down any iron clad rules that will govern all conditions in the different parts of the state?

Mr. McCarty.—No, of course not.

Mr. Blackman.—The first two years is the critical time with orange and grapefruit trees in Dade county and my experience is that a year old bud is the best for planting in that climate and soil. In Marion county I used three year old buds with good success; but not so at Miami.

Mr. Hart.—Mr. President, I have a few government hybrid buds here that I cut last winter, if I remember correctly about six hundred. I now have permission to distribute these and if any one present would like to try these oranges I will be glad to give them some buds. Many people have been writing and asking me for these varieties and some seem inclined to go into these new varieties heavily. I would not advise that yet, we do not know enough about them. Orange trees when they first bear do not

show just what the fruit will be later. I am the only one who has fruited these two varieties the Trimble and Weshart and both of them have been earlier in former seasons than the ordinary tangerine and of larger size. The fruit has been large this year but not quite so early as heretofore. It may develop later to be an early orange or it may not, we do not know, I would advise testing them in a small way on different soil.

Mr. Taber.—I would like to ask again what these two varieties are, as conditions were so unsettled we did not get them.

Mr. Hart.—They are Trimble and Weshart, I will give a few buds to any one who would like them; they are hybrids, crosses between the Parson Brown and Dancy Tangerine but are practically tangerines. I took it for granted that most of the members had read of them. As I cannot supply them by mail I take this opportunity.

No. 15. Will some one tell us what basic slag is and how much available phosphoric acid it contains? Is it as good as lime to sweeten sour soils?

Mr. Painter.—Basic slag is a by-product in the manufacture of iron. It is also known as odorless phosphate or Thomas slag. It was introduced into Florida about fifteen years ago but did not become popular. It was then manufactured at or near Philadelphia but is no longer made there. Basic slag does not contain any water soluble phosphoric acid. About one-half of the total phosphoric acid is soluble in citrate of ammonia, being tri-calcium phosphate or reverted phosphoric acid. It would be impossible to have water soluble phosphoric acid and lime in the same mixture as the lime would at once revert the phosphoric acid. Slag is good for sweetening sour land but lime is much cheaper. One ton of lime will neutralize about seven times as much acid as one ton of slag.

30.6
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Transactions

OF THE

FLORIDA STATE

Horticultural Society

FOR

1907

LAWRENCE

FEB 27 1907

ALFRED M. LEE
BOTANICAL COLLECTION



CHARLES TOBIN McCARTY.

(See page 120.)

*To the memory of our
deceased President
Charles Tobin McCarty
this volume
is affectionately dedicated*

PROCEEDINGS

OF THE

Twentieth Annual Meeting

OF THE

Florida State

Horticultural Society

HELD AT

St. Petersburg, May 14, 15, 16 & 17, 1907

COMPILED BY THE SECRETARY

Published by the Society

DeLand, Florida:
E. O. PAINTER PRINTING COMPANY
1907.

CONSTITUTION.

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

ARTICLE 2. Any person may become a 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.

ARTICLE 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.

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

ARTICLE 5. The duties of the President, Vice-Presidents, 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.

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

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

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 standpoints, 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.

Florida State Horticultural Society.

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Methods of Packing and Shipping Citrus.—W. S. Hart, Hawks Park; W. E. Bryan, Bellair; F. G. Sampson, Boardman.

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Ornamentals.—Prof. Nehrling, Gotha; Theodore Meade, Oviedo; W. C. Steele, Switzerland; Mrs. Emma J. Leonard, Hastings; Mrs. Jessie L. Moore, Cocoanut Grove; Mahlon Gore, Orlando, Roses for Profit and Pleasure.

Nut Culture.—Prof. H. K. Miller, Monticello; Dr. J. B. Curtiss, Orange Heights; J. A. Bear, Palatka.

Cultivation and Fertilization of Citrus.—John J. Beers, Emporia; J. D. Bell, St. Petersburg; Mrs. T. C. Prange, Vero.

Florida Weeds—Useful and Useless.—Prof. E. L. Richardson, Avon Park; Rev. B. F. Marsh, Daytona.

Irrigation.—F. L. Willes, Sutherland; J. W. Hoard, Gotha.

Efforts to Secure Better Shipping Facilities and Rates.—F. D. Waite, Palmetto; F. D. Warner, Gainesville; W. E. Heathcote, St. Petersburg.

Nursery Inspection.—L. B. Skinner, Dunedin, The Fruit Growers' Side. C. B. Thornton, Orlando, The Nurseryman's Side. Dr. E. W. Berger, Gainesville, The Inspector's Side.

Vegetables : Methods of Growing, Packing and Shipping.—W. E. Robinson, Palmetto, Celery, Pepper, Etc.; A. F. Wyman, Bradenton; N. O. Penny, Vero; P. J. Wester, Miami, Roselle.

Tropical Fruits.—J. E. Andrews, Fort Pierce, Exporting Pineapples; John B. Beach, West Palm Beach, Mango Propagation; George B. Callon, Miami, Propagating Tropical Fruits; B. K. McCarty, Eldred, Pineapple Growing and Shipping.

Peaches and Deciduous Fruits.—G. L. Taber, Glen St. Mary; D. R. Andrews, Gainesville; G. S. Hollingsworth, Arcadia.

Fertilizers.—E. O. Painter, Jacksonville, Sources of Ammonia; E. S. Hubbard, Federal Point; B. M. Hampton, Lakemont.

Diseases and Insects.—Dr. E. A. Bessey, U. S. Subtropical Laboratory, Miami; W. L. Baldridge, Winter Garden, Fumigation for White Fly; Cyrus W. Butler, St. Petersburg; F. P. Henderson, Arno.

STANDING COMMITTEES---CONTINUED.

Organizing Local Horticultural Societies.—L. C. Moore, Roseland; H. B. Stevens, DeLand; C. K. McQuarrie, DeFuniak Springs.

Reports From—Pinellas Orange Growers' Association, Pasadena Farmers' Club, St. Johns River Fruit Growers' Association, West Florida Agricultural Society.

SPECIAL PAPERS.

Plant Improvement by Selection.— Prof. R. W. Clothier, Gainesville.

Climatology of Citrus Fruits.—Dr. W. C. Richardson, Tampa.

Perfumery Industry in Florida.—E. Moulie, Jacksonville.

Adorning the Home Place.—Lecture, Illustrated by Stereoptican.

Special Address.—Capt. R. E. Rose, State Chemist.

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 Harris, Mrs. W. H., Tibbals, Fla.
 Harrington, A. B., Winter Haven, Fla.
 Harrison, Harry D., Dade City, Fla.
 Hartman, F. M., Lacrosse, Fla.
 Harvey, H. H., Seffner, Fla.
 Hasson, Harry, Jacksonville, Fla.
 Hathaway, Warren W., Cleveland, Ohio.
 Havens, H. E., Herradura, Cuba.
 Hayward, E. H., DeLand, Fla.
 Heathcote, W. E., St. Petersburg, Fla.
 Hefner, L. C., St. Petersburg, Fla.
 Helm, Johnson, Oneco, Fla.
 Henderson, F. P., Arno, Fla.
 Henderson, A. E., Chicago, Ill., 1146 Till Ave.
 Henry, James, St. Petersburg, Fla.
 Hepburn, H. S., Davenport, Iowa.
 Hess, Wm., Gainesville, Fla.
 Hibbs, H. W., St. Petersburg, Fla.
 Hildrup, W. T., Pomona, Fla.
 Hill, L. L., Gainesville, Fla.
 Hinkley, B., Avon Park, Fla.
- Higgins, P. M., Astor, Fla.
 Hobert, Clarence, Clearwater, Fla.
 Hoke, R. D., Jensen, Fla.
 Hole, H. Frederick, Fulton, Fla.
 Hole, Mrs. H. Fredk., Fulton, Fla.
 Holland, B. F., Bartow, Fla.
 Hollingsworth, G. S., Arcadia, Fla.
 Holly, R. J., Gainesville, Fla.
 Howard, Mrs. Hattie J., Winter Haven, Fla.
 Howard, W. T., Winter Haven, Fla.
 Howard, Mrs. M. L., Jacksonville, Fla., 625
 Julia St.,
 Howard, J. W., Gotha, Fla.
 Hoxie, A. E., St. Petersburg, Fla.
 Hoyt, R. D., Seven Oaks, Fla.
 Hubbard, E. S., Federal Point, Fla.
 Hubbard, Mrs. E. S., Federal Point, Fla.
 Huddleston, J. H., Geneva, Fla.
 Hudson, J. E., Gainesville, Fla.
 Hudson, J. W., Dade City, Fla.
 Hulett, C. B., Orlando, Fla.
 Hume, H. Harold, Glen St. Mary, Fla.
 Hume, Mrs. H. Harold, Glen St. Mary, Fla.
 Hume, E. Grisdale, Glen St. Mary, Fla.
 Hunt, C. M., Eaton Rapids, Mich.
 Hunt, D. E., Cincinnati, Ohio., care Victor Safe
 & Lock Co.
 Hydes, Prof. E. M., St. Petersburg, Fla.
- Ibs, Mrs. Emma, Orlando, Fla.
 Icenhour, J. A., South Jacksonville, Fla.
 Inman, S. C., Winter Haven, Fla.
- Jannock, C. O., Sewals Point, Fla.
 Jannock, Mrs. C. O., Sewals Point, Fla.
 Jarvis, J. H., Gainesville, Fla.
 Jernigan, W. P., Glen St. Mary, Fla.
 Johnson, H. L., Port Tampa City, Fla.
 Johnson, M. A., Syracuse, N. Y., 914 James St.
 Johnson, Roy, Palmetto, Fla.
 Jones, Cyrus, Bowling Green, Fla.
 Jones, Mrs. Cyrus, Bowling Green, Fla.
 Jones, W. H., Orange Bend, Fla.
 Jones, L. D., Greenland, Fla.
 Julian, F. G., Clearwater, Fla.
- Keck, Irving, Bowling Green, Fla.
 Kellogg, E. W., Denaud, Fla.
 Kelly, J. M., Tampa, Fla.
 Kendig, John, Philadelphia, Pa., 1220 Market
 St.
 Kennedy, Dr. G. W., St. Petersburg, Fla.
 Kilber, F., Angleton, Texas.
 Kilgore, J. E., Largo, Fla.
 Kimball, D. S., Madison, N. Y.
 King, Wm., Avon Park, Fla.
 Kingsbury, J. G., San Antonio, Fla.
 Klemm, Richard, Winter Haven, Fla.
 Klemm, Mrs. Marie, Winter Haven, Fla.

- Knight, John T., Miami, Fla.
 Knox, D. B., Bulow, Fla.
 Knox, L. B., Bulow, Fla.
 Kribbs, Geo. F., Kissimmee, Fla.
 Lamoreaux, John, Volois, N. Y.
 Langdon, E. N., St. Petersburg, Fla.
 Lartigue, E., Gainesville, Fla.
 Leach, Robt., Largo, Fla.
 Lee-Bryant Co., Asheville, N. C.
 Lee, Mrs. Ella, Hawks Park, Fla.
 Lejeune, Chas., Miami, Fla.
 Lennard, W. H., Eden, Fla.
 Leonard, Mrs. Emma J., Hastings, Fla.
 Lewis, J. B., St. James, Minn.
 Lewis, W. J., Limona, Fla.
 Liles, A. G., Terra Ceia, Fla.
 Lipp, Frank, Cocoa, Fla.
 Lindsay, J. E., Davenport, Iowa.
 Little, J. S., Keystone Park, Fla.
 Littlefield, S. C., Little River, Fla.
 Livingston, Mrs. L. F., St. Petersburg, Fla.
 Long, A. L., Arredondo, Fla.
 Longley, N. H., Seminole, Fla.
 Longley, Mrs. N. H., Seminole, Fla.
 Lowe & Co., F. G., Nashville, Tenn.
 Lubrecht, Herm, Island Grove, Fla.
 Luttichau, H. Von, Earlton, Fla.
 Lyman, Dr. A. E., Melbourne, Fla.
 McBride A. D., DeLand, Fla.
 McCasley J. A., Boardman, Fla.
 McClelland, Robt., Gainesville, Fla.
 McClung, J. M., Dunedin, Fla.
 McComb, Jas., Jr., Pompano, Fla.
 McCoy, Wilbur, Winter Haven, Fla.
 McDaniel, H. C., Orlando, Fla.
 McDonald, C. W., Gainesville, Fla.
 McElveen, D. R., Albion, Fla.
 McIrvin, L. S., Guanabacoa, Cuba 214 Corral
 False.
 McLean, W. C., Grenada, Miss.
 McLean, W. H., Winter Haven, Fla.
 McLean, Mrs. W. H., Winter Haven, Fla.
 McKinney, J. Y. Candler, Fla.
 Mace, J. P., Lake Helen, Fla.
 Mace, Mrs. J. P., Lake Helen, Fla.
 Mace, Miss Marjory, Lake Helen, Fla.
 Mace, L. P., Lake Helen, Fla.
 Macklin, Wm., Dinsmore, Fla.
 Makepeace, A. D., W. Barnstable, Mass.
 Mallary, E. Y., Macon, Ga.
 Manners, J. H., Gainesville, Fla.
 March, W. E., Miami, Fla.
 Maris, G. L., Sanford, Fla.
 Maris, Mrs. G. L., Sanford, Fla.
 Market Growers Jrnl. Co., Louisville, Ky.
 Mason, F. C., Santa Fe, Isle of Pines, Cuba.
 Matheny, C. W., Sarasota, Fla.
 Matheny, Geo. H., Sarasota, Fla.
 Mattison, W. N., Ridgeway, Pa.
 Mead, Theo. L., Oviedo, Fla.
 Means, A. S., Largo, Fla.
 Means, M. A., Gainesville, Fla.
 Means, L. E., Largo, Fla.
 Meshlahn, H., Clarcona, Fla.
 Mendall, Mrs. Geo. E., Hawks Park, Fla.
 Merrell, Herman, St. Petersburg, Fla.
 Merrell, Mrs. Herman, St. Petersburg, Fla.
 Miller, C. Y., LeRoy, Fla.
 Miller, P., Gainesville, Fla.
 Mixon, S. M., Gainesville, Fla.
 Mixon, Robt., Gainesville, Fla.
 Moffett, D., St. Petersburg, Fla.
 Moffett, R., St. Petersburg, Fla.
 Montgomery, Chas., Buena Vista, Fla.
 Monz, Frank J., New Haven, Conn.
 Moore, Mrs. Jessie L., Cocoanut Grove, Fla.
 Moore, L. C., Roseland, Fla.
 Moore, W. R., Geneva, Fla.
 Morrell, A. W., Orlando, Fla.
 Morris, W. O., Gainesville, Fla.
 Morse, Fredk., Miami, Fla.
 Morse, Geo., Earlton, Fla.
 Moseley, W. P., Gainesville, Fla.
 Moses, W. R., West Palm Beach, Fla.
 Moses, Mrs. C. N., West Palm Beach, Fla.
 Moses, Elwyn, West Palm Beach, Fla.
 Moses, Mrs. Ethel, West Palm Beach, Fla.
 Muirhead, R. K., Pasadena, Fla.
 Murphy, Dr. H. A., St. Petersburg, Fla.
 Murrell, J. C., McIntosh, Fla.
 Nash, C. H., Tampa, Fla.
 Neeld, Wm. P., Riverview, Fla.
 Nehrling, H., Gotha, Fla.
 Nevins, Thos., Brooklyn, N. Y., 350 Clinton
 St.
 Nickerson, H. Guy, Florence Villa, Fla.
 Nichols, J. G., Gainesville, Fla.
 Nordman, Fred, New Smyrna, Fla.
 Norsworthy, W. G., McIntosh, Fla.
 Nye, A. J., St. Petersburg, Fla.
 Nylands, J. J., Thonotosassa, Fla.
 O'Brien, W. S., Thonotosassa, Fla.
 Olcott, H. H., Franklin, Pa., (P. O. Box 23).
 Page, Geo. H., Peoria, Fla.
 Painter, Miss Okle, Jacksonville, Fla.
 Palen, Peter, Hains City, Fla.
 Palen, Mrs. Peter, Hains City, Fla.
 Palmer, Jerome, Orlando, Fla.
 Palmer, R. A., Bradenton, Fla.
 Parker, J. Eugene, Sorrento, Fla.
 Peacock, Dr. R. H., Winter Haven, Fla.
 Peacock, Mrs. R. H., Winter Haven, Fla.
 Parrish, A. R., Maywood, Ill.
 Pearce, E. L., Clearwater, Fla.
 Peck, P. E., Jacksonville, Fla.
 Pedrick, C. C., Gainesville, Fla.

FLORIDA STATE HORTICULTURAL SOCIETY.

- Peeler, R. B., Gainesville, Fla.
 Peer, Miss Emma J., Satsuma Heights, Fla.
 Pennock, H. S., Neptune, Fla.
 Pennock, Mrs. H. S., Neptune, Fla.
 Penny, N. O., Vero, Fla.
 Penny, Mrs. N. O., Vero, Fla.
 Perry, D. W., Pomona, Fla.
 Peters, G. T., Geneva, Fla.
 Pfyffer John, Pulaski, Ind.
 Phifer, J. A., Gainesville, Fla.
 Phillips, H., Clearwater, Fla.
 Phillips, C. A., Largo, Fla.
 Phillips Mrs. Olive, Largo, Fla.
 Phillips, Dr. P., Orlando, Fla.
 Phinney, Jas. P., South Boston, Mass.
 Pierson, N. L., Pierson, Fla.
 Player, Harry, Tampa, Fla., care U. S. Engineers Office.
 Pomeroy, Miss May C., St. Petersburg, Fla.
 Popple, W. S., Estero, Fla.
 Porcher, E. P., Cocoa, Fla.
 Porcher, Mrs. E. P., Cocoa, Fla.
 Porter, W., Gainesville, Fla.
 Potter, C. P., St. Petersburg, Fla.
 Potter, R. B., West Palm Beach, Fla.
 Pounds, W. T., Gainesville, Fla.
 Prang, Mrs. T. C., Vero, Fla.
 Pratt, E. E., Limona, Fla.
 Prevatt, A. B., Seville, Fla.
 Prother, G. C., St. Petersburg, Fla.
 Purdie, Geo. A., Ormond, Fla.

 Ramsdell, Joseph, Miami, Fla.
 Ramsey, Henry, Gainesville, Fla.
 Rankin, W. H., Punta Gorda, Fla.
 Rash, W. R., Winter Haven, Fla.
 Reasoner, E. N., Oneco, Fla.
 Reed, Dr. E. A., Eustis, Fla.
 Rice & Co., M. A., Citra, Fla.
 Richards, B. P., Jr., Gainesville, Fla.
 Richardson, C. O., Miami, Fla.
 Richardson, E. L., Avon Park, Fla.
 Richardson, Dr. W. C., Tampa, Fla.
 Ricker, Mrs. B. B., South Lake Weir, Fla.
 Robinson, C. A., Eden, Fla.
 Robinson, Mrs. C. A., Eden, Fla.
 Robinson, M. A., Lakeland, Fla.
 Robinson, W. E., Palmetto, Fla.
 Rolfs, Mrs. P. H., Gainesville, Fla.
 Rollins, C. A., Thonotosassa, Fla.
 Rose, R. E., Tallahassee, Fla.
 Rose, Mrs. R. E., Tallahassee, Fla.
 Ross, J. H., Winter Haven, Fla.
 Rou, S. F., Lowell, Fla.
 Rowe, Dr. J. H., St. Petersburg, Fla.
 Rumble, Alfred, Winter Haven, Fla.
 Russell, H. M., Washington, D. C.

 Sadler, F. A., Clearwater, Fla.
 Sadler, O. W., Johnstown, Pa.
 Sampson, F. G., Boardman, Fla.
 Sampson, Mrs. F. G., Boardman, Fla.
 Sanchez, E. C., Gainesville, Fla.
 Sartorius, L. G., Clearwater, Fla.
 Saunders, Mrs. N., Eden, Fla.
 Schabinger, J. J., Delray, Fla.
 Scheltz, H. T., Canal Zone, Panama, care Auction Hospital.
 Schmelz, V., Paola, Fla.
 Schnarr, J., Orlando, Fla.
 Schnieder, Chas. F., Ocala, Fla.
 Schooter, H., Earlton, Fla.
 Scott, David, Arcadia, Fla.
 Sellmer, Chas., Zellwood, Fla.
 Shepherd, F. W., Winter Park, Fla.
 Shepherd, S. B., Winter Park, Fla.
 Shryock W. P., New Smyrna, Fla.
 Sides, Uriah, Bartow, Fla.
 Sill, A. C., St. Petersburg, Fla.
 Sill, Mrs. A. C., St. Petersburg, Fla.
 Simmons, W. P., Jacksonville, Fla, care E. O. Painter.
 Simms, Mrs. Geo., St. Petersburg, Fla.
 Simon, John H., Philadelphia, Pa.
 Simpson, H. T., Clearwater, Fla.
 Simpson, Jas., Mt. Dora, Fla.
 Simpson, R. C., Monticello, Fla.
 Sims, G. M., St. Petersburg, Fla.
 Skinner, L. B., Dunedin, Fla.
 Smith, Erwin, Winter Haven, Fla.
 Smith, Miss Maud, Winter Haven, Fla.
 Smith Mrs. Josephine, Winter Haven, Fla.
 Smith, W. E., Winter Haven, Fla.
 Smith, Wm., Orlando, Fla.
 Snell, C. P., St. Petersburg, Fla.
 Snow, G. E., East Lake, Fla.
 Snyder, A. S., St. Petersburg, Fla.
 Soar, J. J., Little River, Fla.
 Spencer, H. S., Tarrytown, N. Y.
 Sperry, E. F., Orlando, Fla.
 Springstead, J. E., Palmetto, Fla.
 Standard Fertilizer Co., Gainesville, Fla.
 Stanton, W. E., Miami, Fla.
 Steckert, W. R., Gainesville, Fla.
 Steenburg, A. O., Gainesville, Fla.
 Steele, W. C., Switzerland, Fla.
 Stevens, H. B., DeLand, Fla.
 Stevens, Mrs. H. B., DeLand, Fla.
 Stewart Fruit Co., Baltimore, Md., 118 E. Pratt St.
 Stewart, I. A., DeLand, Fla.
 Stillman, H. Y., Daytona, Fla.
 Street, A. W., Ormond, Beach, Fla.
 Stringfellow, I. D. Gainesville, Fla.
 Trout, H. L., Fruitland Park, Fla.
 Strouder, H. G. Eldred, Fla.
 Strowger, S. A., St. Petersburg, Fla.
 Sundell, J. F., Bowling Green, Fla.
 Sutherland, T. J., Bowling Green, Fla.
 Switzer, W. A., Pt. Tampa City, Fla.

- Taber, Mrs. G. L., Glen St. Mary, Fla.
 Taylor, G. L., Palmero, Fla.
 Taylor, J. L., St. Petersburg, Fla.
 Taylor, Mrs. M. J., St. Petersburg, Fla.
 Teed, Dr. C. L., Estero, Fla.
 Tenney, Mrs. F. F., Federal Point, Fla.
 Tenney, Mrs. F. F. Federal Point, Fla.
 Tenney, Lloyd S., Washington, D. C., care
 Department of Agriculture.
 Thomas, T. F., Gainesville, Fla.
 Thomas, W. R., Gainesville, Fla.
 Thompson, C. H., Winter Haven, Fla.
 Thompson, Mrs. C. H., Winter Haven, Fla.
 Thompson, T. O., Oneco, Fla.
 Thompson, W. B., Oneco, Fla.
 Thornton, C. B., Orlando, Fla.
 Tillinghast, B. F., Davenport, Iowa.
 Tischler, P., Jacksonville, Fla.
 Toms, J. P., Miami, Fla.
 Torode, John, Gainesville, Fla.
 Townsend, C. M., Philadelphia, Pa., No. 500
 N. Broad St.
 Townsend, C. W., Pittsburg, Pa., No. 34 Penn.
 avenue.
 Trefry, Thos. C., Milford, Conn.
 Truby, J. M., Starke, Fla.
 Tucker, F. N., Santa Fe, Isle of Pines, Cuba.
 Tucker, R. M., Orange City, Fla.
 Turner, E. D., Gainesville, Fla.
 Underwood, Dr. R. R., Pierson, Fla.
 Upham, E. S., South Lake Weir, Fla.
 Van Wyck, Miss Mary, Federal Point, Fla.
 Van Houten, S. C., Orlando, Fla.
 Vidal, A. L., Gainesville, Fla.
 Villard, R., St. Petersburg, Fla.
 Vose, Mrs. Florence H., Hawks Park, Fla.
 Vose, Z. P., Hawks Park, Fla.
 Wakelin, Amos, Philadelphia, Pa., No. 200
 Bullit Bldg.
 Wakelin, G. M., Lane Park, Fla.
 Wakelin, Mrs. G. M., Lane Park, Fla.
 Wakelin, Miss Grace, Lane Park, Fla.
 Walker, G. E., Huntington, Fla.
 Walker, Mrs. G. E., Huntington, Fla.
 Warner, F. D., Gainesville, Fla.
 Warner, S. C., Palatka, Fla.
 Warren, J. B., Gainesville, Fla.
 Warren, S., Gainesville, Fla.
 Webber, A., Gainesville, Fla.
 Webb, F. F., Winter Haven, Fla.
 Webeking, Henry, Gotha, Fla.
 Weidman, Jacob, Pittsburg, Pa., 319 Lexington
 avenue.
 Webster, I. E., Gainesville, Fla.
 Wells, N., Gainesville, Fla.
 Welsh, G. W., Gainesville, Fla.
 Westlake, J. Willis, Lake Helen, Fla.
 Wheeler, Wm. W., Winter Haven, Fla.
 White, Miss L. M., Dupont, Fla.
 Whitfield, W. B., Bowling Green, Fla.
 Whittle, J. E., Largo, Fla.
 Whittle, Mrs. J. E., Largo, Fla.
 Williams, E. S., Ft. Pierce, Fla.
 Williams, Mrs. C. M., St. Petersburg, Fla.
 Williams, John H., St. Petersburg, Fla.
 Williams, Miss Myra, Rockledge, Fla.
 Willes, F. L., Sutherland, Fla.
 Wilson, John A., San Juan, P. R.
 Wilson, S. B., Hawks Park, Fla.
 Wilson, W. N., Gainesville, Fla.
 Windsor, Lester, Winter Haven, Fla.
 Winters, R. Y., Gainesville, Fla.
 Wightman, L., Tampa, Fla.
 Wolcott, A. D., Auburndale, Fla.
 Wood, Geo. H., Tangerine, Fla.
 Wood, F. A., St. Petersburg, Fla.
 Woodall, W. H., St. Petersburg, Fla.
 Woolwine, E. M., Seville, Fla.
 Worcester, S. E. H., Pomona, Fla.
 Wykoff, Jno. S., Citra, Fla.
 Wylie, J. H., Interlachen, Fla.
 Wyman, A. F., Bradenton, Fla.
 Yerkes, F. G., Jacksonville, Fla.
 York-Whitney Co., Boston, Mass.

PROCEEDINGS

OF THE

TWENTIETH ANNUAL MEETING

OF THE

Florida State Horticultural Society.

For the twentieth time the Florida State Horticultural Society held its annual meeting, and the place of meeting this time was within the gates of the delightful city of St. Petersburg. Owing to the poor schedules for getting to St. Petersburg it was thought that only a small number of members would be at the opening session, but in this every one was disappointed. The first session was well attended, and each meeting up to the close the attendance was above the average. In fact, there were more members in attendance during this session than at any time since the meeting was held at Miami. So many of the members had never visited St. Petersburg or seen the Manatee section, therefore they were delighted with all they saw while on the trip, as well as entertained by the splendid program offered.

The good people of St. Petersburg

chartered the Steamer Favorite and gave the members a delightful ride up the Manatee River. Owing to the rain no one was able to get off and view the country around, but they were able to put in the more time regaling the inner man with the good lunch the St. Petersburg people sent along and served by the Ladies' Improvement Society. The brew of the coffee was perfection, the salads were superb, the sandwiches just right, and a plenty of everything for everybody.

The "next place of meeting" was an interesting topic and was frequently discussed between meetings, in the boat, and whenever a few gathered together. When the voting time came, however, Gainesville won with a good majority and was announced as the next place for holding the twenty-first annual meeting of the Florida State Horticultural Society.

Minutes.

FIRST DAY. **Evening Session.**

1. Called to order by the President, Prof. P. H. Rolfs.
 2. Opening Prayer by Rev. A. E. Drew.
 3. Address of Welcome, on behalf of the City, by the Mayor of St. Petersburg, Hon. T. J. Northrop.
 4. Address of Welcome by Mr. A. F. Bartlett.
 5. Response by Dr. George Kerr.
 6. Annual Address of the President.
 7. Introduction of Question Box.
 8. Social Hour.
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SECOND DAY. **Morning Session.**

1. Grapes, Figs and Kaki—P. J. Wister, Miami.
 2. Discussion.
 3. Citrus Fruits—G. M. Wakelin, Lane Park; E. A. Bessey, Miami.
 4. Discussion.
 5. Appointment of Statistics Committee: P. Phillips, A. H. Brown, Wm C. Richardson.
 6. Question Box.
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Afternoon Session.

1. Diseases, Insects and Methods of Control.
2. Discussion.
3. Appointment of Committee on Nursery Inspection: Wm. C. Richardson, H. B. Stevens, J. D. Bell.
4. Question Box.
5. Appointment of Committee on Final

Resolutions: W. N. Wilson, Geo. Kerr, J. F. Farley, P. J. Wister, J. B. Curtis.

Night Session.

1. Control of the White Fly by Fumigation—Dr. A. W. Morrell, Special Agent, Bureau of Entomology, Orlando.
 2. Control by Natural Means Especially the Fungi—Dr. E. W. Berger, Florida Experiment Station, Gainesville.
 3. Control by Natural Means.
 4. Discussion.
 5. Question Box.
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THIRD DAY. **Morning and Afternoon.** Excursion up the Manatee River.

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- ### **Night Session.**
1. Some Principles in Pruning—H. Harold Hume, Glen St. Mary.
 2. Discussion.
 3. Camphor Production in Florida—Dr. W. O. Richtmann, Huntington.
 4. Discussion.
 5. Peaches, Plums and Pears—Aubrey Frink, Macclenny.
 6. Discussion.
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FOURTH DAY. **Morning Session.**

1. The Influence of Packing Methods on the Carrying Qualities of Citrus Fruits—Lloyd S. Tenny, Assistant Pomologist.
2. Discussion.
3. Appointment of Committee on Legislation: A. F. Bartlett, W. C. Richardson, H. B. Stevens, G. M. Wakelin, H. Harold Hume.

4. Japanese Matting Industry—Mr. Bull.
5. Discussion.
6. Ornamentals—Mrs. E. S. Hubbard, Federal Point.
7. Question Box.
8. Report of Committee on Necrology.

Afternoon Session.

1. Fertilizer and Irrigation—E. S. Hubbard, Federal Point.
2. Discussion.
3. Report of Committee on Entomology.
4. Report of Statistical Committee.
5. Election of Officers.
President—Prof. P. H. Rolfs.
1st Vice-President—Dr. Wm. C. Richardson.
2nd Vice-President—H. Harold Hume.
3rd Vice-President—Aubrey Frink.
Secretary—E. O. Painter.

- Treasurer—W. S. Hart.
- Executive Committee—E. S. Hubbard, G. L. Taber, H. B. Stevens.
6. Selection of Place of Meeting in 1908—Gainesville.
7. Secretary's Report.
8. Treasurer's Report.
9. Executive Committee's Report.
10. Lime and Some Effects of its Use—A. W. Blair, Florida Experiment Station.
11. Letter from Cuban Horticultural Society.
12. Letter from Jas. A. Bear.
13. Report from Pasadena Farmers' Club.
14. Report from Pinellas Fruit Growers' Association.
15. Report of Legislative Committee.
16. Strawberries and Miscellaneous—J. L. Brownlee.
17. Report of Committee on Final Resolutions.

Address of Welcome on Behalf of the City.

By Hon. F. J. Northrop.

Mr. President, Ladies and Gentlemen:

I presume it is one of the chief pleasures of the executive of any city to welcome the various bodies of people that gather in the city in convention or otherwise, and I assure you that it is an especial pleasure for me in this particular instance to welcome to our city this distinguished society; not alone for the honor you have conferred upon us by holding this convention here, but for the beneficial results we expect to derive from your presence among us, and your particular purpose here. I commend at all times any gathering together in convention of any representative body of people, because we all recognize the fact that it is the rubbing together of the minds and the study of our neighbors that brings advancement;

and advancement is certainly the order of the day.

We are all well aware of the fact that cultivation of the soil is the world's greatest and most valuable industry, and we are also aware that there is vast room for a higher education of our people in this industry, and we look forward to beneficial results from these state conventions. I feel sure that the benefits we expect to derive from your gathering among us will be manifold, and for these reasons I extend to you the courtesies of our city, and assure you that we appreciate the presence of yourselves, and the importance of your purpose. The keys of the city are yours, and I trust that you will be able to remember with pleasure your stay with us.

Ladies and gentlemen, I thank you.

ADDRESS OF WELCOME ON BEHALF OF PINELLAS ORANGE-GROWERS' ASSOCIATION.

By Mr. A. F. Bartlett.

Mr. President, Ladies and Gentlemen:

I was just congratulating myself that I was to escape having to make this address. The notice came to me a very short time ago that I would be expected to say a few words in place of the President of the Pinellas Orange Growers' Association, who was not able to be here on account of a sad calamity to some of

his friends. I had tried to persuade the Secretary that it was his place and duty to do this, but while I was attending to some important business connected with the Society, he conspired with the president and substituted me for himself. I have been at a loss to know how to get out of it. I supposed I had succeeded until I was just called on, so you will

understand how unprepared I am for this momentous occasion.

I realize that we are before a body of representative people; people that I have learned to admire, and whose wisdom I have been trying to drink in for a great many years. The splendid courage that has been manifested by the Association during its twenty years of existence (for this is its twentieth birthday we are gathered together to celebrate) is a remarkable thing. This organization has lived through all the disasters that have ever visited Florida since it has become a state of any importance—going back to the drought of 1890, the great freeze of 1894-95, the varieties of bugs and insects that have afflicted us, and everything you can think of to discourage an organization devoted to this interest; but it is still in existence and doing business at the same old stand.

The people who have done this are the class of people we meet here. I have lived in the West, in the states where they do not know the meaning of the word "fail," some of the states standing high in the catalogue of industry and wealth, and a short time ago I read a statement in some journal that the people of South Dakota were making more money per capita than those of any other state in the Union. I was in that state at a time when contribution boxes were passed around in the city of Chicago to help the people of that state. I have known the troubles of other western states—Nebraska and others. They appealed to the nation to help them out at their time of sorest need, but I have never known Florida to appeal to the nation or any organization to help her out in the time of great disasters. I think

this is a credit to her and her people, and I am proud to claim a citizenship in the state. I am not recognized as a genuine "cracker," but I hope to live long enough to be known as one; to be known as belonging to their creed and their clan.

The people forming this organization are the people who have been leaders in thought and action; they have, perhaps, represented the greatest industry in which Florida is engaged, and to them is due more than any other, perhaps, what we get out of the soil. They have done a splendid work. I mean by that, that the most important things we know about fruit culture, orange growing and truck growing in this state, have been learned principally through this organization. This has been the leader, and has led the state, and as I see what things have been accomplished and see where we have been benefited, the more I see what is still to be done on these lines, and the more I feel the need of the people for an association of this kind.

I took out a life membership, because I was afraid that I might possibly not live long enough if I didn't take out one, to be considered a member at all. I want to go down on the records as a life member.

As I think of the splendid work this Society has done, the more I am inclined to believe that we will overcome the greater problems that are before us. It is a good thing for us to have these problems. If we were always fortunate in our deals, and sold our oranges and vegetables at a big price; if we had no trouble with the transportation companies, the white fly and other insects, we could come together and have a "Hoorah," but nothing would come of it. It is in over-

coming difficulties that we become strong and great, both as individuals and as a nation. We must always expect them and be ready to meet them. We have them now. We have just suffered one of the greatest droughts that ever visited the state of Florida, and we have suffered a great loss, but we are going right on just the same. We propose to do more than we have done in the past, and to bring our land up to the highest point of production.

That brings up, perhaps, the problem of irrigation, not only in orange culture, but in trucking. Those of us who have been through the West and know what irrigation has done for those states, believe that there is a great future for Florida. I think that we will be able to solve this great problem. We also have to consider the problem of getting our fruit and vegetables to market. These are some of the problems that I believe the Association can take up and can solve. I think we can take them up and have a hearing. Let us see to it that our agricultural schools and our experiment sta-

tions are given an opportunity to work along the right lines. Let us see that our Legislature makes an appropriation that shall enable us to make our work of ten-fold more value than what we have already accomplished. Let us put it up to the state to see that our agricultural schools and our experiment stations are supplied with the proper materials and opportunities to make their work of the greatest value. Let these come in closer contact with the farmer; let farmers' institutes be held everywhere, and be supplied with the paraphernalia to go on with these experiments which will enable the farmer to compete with all his enemies of heat and cold, insects and drought. These are some of the problems that come to the farmer or horticulturist, and I think this Association can, and should, and will, help him to solve them.

Now, in the name of, and in behalf of the Pinellas Orange Growers' Association and of the Board of Trade of the City of St. Petersburg, I extend to you all a most hearty welcome.

RESPONSE.

Dr. George Kerr, Pierson.

Mr. President, Ladies and Gentlemen:

We come among you, not as strangers, but as friends. Permit me to say that it was a happy moment in my existence when, at last year's meeting, I cast my ballot with the great majority to hold this year's annual meeting in this place. We have many valuable members in St. Petersburg and vicin-

ity; indeed, all over South Florida. They are valuable because of the untiring interest that is taken by them in the business of the Society, its increase of membership, its larger attendance at annual meetings, and also in the general welfare.

These are strenuous times, when one is judged by what he can do and by

the "square deal." I take it, that this is our platform. What we can best do for the good of all, and the "square deal" between man and man.

I am authorized to say on behalf of the president, officers and members of this Society, that we accept your declaration of fealty and appreciation of our efforts, with all their heartiness and fullness. They are a stimulant to a higher plane of usefulness and greater devotion to duty.

Horticulture as a business ranks second

to none. It came forth in the morning when the sun first kissed the footstool of the Creator as the waters receded, and in splendor brought it into life. This, ladies and gentlemen, is our heritage. It is no gewgaw, or a second handed article. It comes as the free winds of heaven, unheralded, unbound-ed, chaste. Thus, we lead the proces-sion of all other callings.

I say unto you who are not members, come with us, and we will do you good.

President's Annual Address.

By Prof. P. H. Rolfs.

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

Before presenting the address to the 20th meeting of the Florida State Horticultural Society, allow me to congratulate the people of St. Petersburg on the splendid success they have attained in building this beautiful city. It is only the periodic visitor to your city that notes the improvement and progress. Those who call for the first time never knew it to be different, and those who are here always see the changes go on so gradually that it is rather a development than a metamorphosis. I wish also to congratulate the Pinellas Orange Growers' Association on the frequent and instructive meetings they have held. This young Association will make its presence known and felt before the State Society adjourns.

Amid all of these congratulations, we feel deep down in our hearts the absence of our late genial president, whose invaluable advice has guided us. Always ready as a peacemaker; foremost among the progressive; just entering upon a wider and more useful life for his county and state. Personally, it is a loss of a kind friend and an able counsellor. To the Society it is an irreparable loss. In this hour, when the shadow is over us, we cannot see the design. We can only bow our heads in meek submission, and meekly say, "Thy will be done." I would urge

every member of the Society to read again his masterly address, which came to us as a parting advice. Let me quote one paragraph from this address, which sums up the whole thought in a rounded expression:

"I have felt strongly impelled at this meeting to press upon your attention these important matters. To give vent to the thought that has been growing in my mind for some years, that the most vital and far-reaching questions now calling for solution by Florida producers were not cultural questions, but commercial; not planting, but marketing; not fertilizing, but transportation. Let us think about these things, talk about these, study them, conquer them. If this thought, talk and study, take not the form of action, then have we labored in vain."

Those of the Florida Horticultural Society who are favored with information on the commercial side of horticulture, especially with marketing and transportation, should come forward and discuss these problems, just as our chemists have come forward year by year and given us the best their laboratories and brains afforded. The botanists, the entomologists, and the plant breeders, all have placed before us information that required years of toil and untold disappointments, until our reports are quoted and looked up to as standards, even in far-off India and New

Zealand. What we need is a careful, concise, and methodical study of this subject from the commercial point of view. Prof. Tenny will present to us a paper dealing with some scientific features connected with transportation. Why can we not have an equally able paper discussing this from a commercial point of view?

CHEMISTRY.

I have confidence in the ability of this Society to study and master all problems connected with successful fruit growing. Almost from its birth, has it taken up problems for discussion and study that would have been considered heretical by the Old School Horticulturists. The Society has certainly shown its adaptability to new conditions as they arose.

Chemistry, one of the oldest sciences, was among the first to be laid under tribute by the advanced horticulturist. At one time it was thought that all causes for crop failure, excepting those arising from climatic conditions, could be discovered by an analysis of the soil. Hence, we were taught that a chemical analysis of the soil would tell us exactly what elements were lacking, and what elements were present in too great abundance. The small amount of truth upon which these assertions were based gave sufficient grounds for voluminous articles to be written in a most lucid language. Unfortunately, the most voluminous writers were deficient in scientific training, and proficient in literary work. These men were unable to understand the restricting language in which the scientists had stated their proposition. Consequently, they builded up wonderful theories and hypotheses, all of which had to fall because their

major premise was only partially correct. Unfortunately for the true scientist and the receptive reader, it is frequently impossible for the lay reader to distinguish between scientific fact and scientific fancy. The whole structure, the scientific as well as the fanciful, fell into disrepute. This condition led to such terms as "Book Farmers," "Theoretical Farmers," "Newspaper Farmers."

"Truth crushed to earth shall rise again. The eternal years of God are hers."

After clearing away the debris, the foundation truth stood there firm and immovable. We have learned not to trust in the flimsy paper structure that some still try to erect. The basic truths, founded in the science of chemistry, are so much a part of our knowledge now that there is no horticulturist in my hearing but would rise in just indignation should any legislator introduce a bill looking to the abolition of the office of State Chemist. There are still many discourses written which are purported to be founded on facts from the science of chemistry. Usually, these discourses imperfectly veil their advertising nature. In addition to advertising essays, we have the pseudo-chemical and pseudo-horticultural essays constantly thrust upon us. These are often a serious menace to our progress. They usually contain a few grains of truth in a stack of chaff.

PHYSICS.

One of the most recent departures from the old school horticulture is the study of soil physics, or a study of the soil from the standpoint of the physicist. At first thought it would seem difficult to form any connection be-

tween pure physics and horticulture; but chemistry as a science concerns itself with the composition and materials that make up the soils, while physics concerns itself about the make up and conditions under which these various materials are found. The border lands of these two sciences overlap one another, so that a field may be approached from the realm of chemistry on the one hand, and from the realm of physics on the other hand, and find savants from both kingdoms rightfully encamped on the same ground. Battles for the mastery of these overlapping fields sometimes occur, resulting in loss of time, and sometimes a loss of temper; all of which is a loss to horticulture and should not be tolerated. There is really no harm in exploring a field from as many points of view as possible, and frequently a very great gain to all concerned. The able address before this Society last year by Prof Blair, shows how little we actually know about what goes on in the soil from a physical point of view. We had all along felt that there was a considerable loss of fertilizer from the soil, due to leaching; but had been told repeatedly by trust-worthy witnesses that potash and phosphoric acid became fixed in the soil. It is now demonstrated from a physicist's point of view that a considerable amount of fertilizer is actually washed out and carried into the static water in the soil, from which it is impossible to reclaim any considerable portion.

SOIL PHYSIOLOGY.

The chemist has told us faithfully what he found in his crucible. The physicist is likewise telling us how different natural and inert materials behave in the soil; how the water

moves; what effect different elements produce in the soil when applied; but all of this still leaves us in the dark as to what role different living subjects play in the economy of plant growth.

For the solution of these problems we shall have to look to the soil bacteriologist and botanist. I need here only to mention the rather recent work that has been done on the nitrifying organisms, or the organisms which enable leguminous plants to make use of the atmospheric nitrogen.

We have here three distinct sciences, chemistry, physics, and botany, which are each laboring actively to subdue the same realm, the soil. These three, however much they may discover, will not complete the work for us. What we shall need when these three have secured the vast store of scientific information locked up in the soil, is the physiological botanist to tell us what effect a variation of these factors has on our cultivated crops. Of what use is it to us to raise an orange that turns even the stomach of an insect, or to raise a variety of celery that has such a thick epidermis that even a fungus cannot pierce it?

FERTILIZERS.

There probably never has been a meeting of this Society during which the question of fertilizers was not discussed, and it is to be hoped that this Society will not let the question rest, until all superstition and misconceptions have been cleared away. This ideal state will not be reached however, until we know more about our soil; until we know more about the needs of our plants; and until we know our fertilizers. What we believe as true of certain elements today, may tomorrow

be proven to be a fallacy; and our beliefs of tomorrow may likewise on the following day be shown to be incorrect. Let me cite a single illustration. During the early history of our Society, we found earnest and eloquent advocates of the use of ground rock phosphates as a fertilizer for citrus trees. These advocates have either been converted to the use of soluble phosphates, or have been silenced. Ground rock is no longer being actively advocated by any one. Now comes Prof. H. J. Patterson, Director of the Maryland Experiment Station. He used nine different chemical fertilizers as sources of phosphoric acid—all that are ordinarily found on the markets. Included in this list are acid phosphate, dissolved bone black, bone black, raw bone meal, and Florida soft phosphate. The plots were laid off in the regular form which is usual for such work, the same chemical being applied year after year since 1895 to each plot, making eleven years of continuous use of the same chemical on each particular plot. Now comes the most startling part, his conclusions. Two of them are of special interest to us. The third of his conclusions is that,—“Insoluble phosphates produce a slightly higher total average yield than soluble phosphates, and at about one-half the cost.” The sixth of his conclusions is that,—“Florida soft phosphate produced the best yield of corn.” Let us not, however, conclude that the use of insoluble phosphates is the best for us. In these experiments annual plants alone were used, and the soil upon which the fertilizer was applied was clayey, and for the most part contained considerable humus. The conditions therefore, are not exactly the same as ours; but these

experiments do show us the necessity for careful scientific work, even on subjects that we regard as closed questions.

Wheeler and Adams of the Rhode Island Experiment Station, working under different conditions, find that ground rock (or floats) is the best form of phosphates for squash and better than any of the soluble or treated phosphates for corn.

COMBATING DISEASES AND INSECTS.

The question of combating insects and of controlling diseases is as old as the fertilizer question, and both are older than our Society. We have published valuable contributions on both of these subjects annually. Whatever we have attempted has been carried to a full and creditable consummation. Every year we have advanced slowly but surely. Sometimes our speakers have been a little too far ahead of the average, but the foremost have usually been abreast with the leaders. One of the leaders has not had a spraying machine in his grove for years. Last year there was a large exodus from the camp of sprayers to the camp of those who use the natural enemies for combating scale insects. We must look upon use of the spraying materials for controlling insects and fungus enemies as temporary expedients, which for the most part under our present knowledge are unavoidable. In certain cases it is absolutely necessary to spray in order that we may avert certain failure, but we are gradually learning how to keep our groves and vegetable fields from getting into such distressing conditions.

The natural method of combating scale insects is meeting with most flattering success, and can be economically applied. It is far cheaper to keep a

grove from becoming affected with die-back than to cure the disease. Many diseases and insects cannot be treated in a similar way economically, because we have not yet learned enough about them. The cottony cushion scale, which at one time seriously threatened the sub-peninsula, has been reduced to a negligible quantity by introducing the Vedalia cardinalis, an Australian lady-bird. California spent thousands of dollars in attempting to subdue this pest by artificial means.

CONCLUSION.

It is our province as a Society to teach every member of this Association what to grow, and how to produce the best of everything. The old adage that, "There's plenty of room on top", was never more true than it is in horticulture today. The man who markets the best product never has to complain of poor prices. It takes brains to do this, and brains will count whenever they are correctly applied. Sometime ago we had a call from a gentleman from Michigan who controlled considerable capital, according to his representations. He was in Florida with a view of investing and had visited every vegetable growing and fruit growing section, and closed his visit to the state by calling at the Experiment Station. We discussed the various crops. Citrus growing, in his opinion, was not desirable, since it took a long time to get returns from the investment, and then he was also told that the whitefly attacked the trees. Peach growing was also discussed, but that was given up because peach trees had to be fertilized. One crop after another was passed in review, every one having some weak

point. Celery growing he considered to be remunerative, but he had seen some fields destroyed by blight. Finally he said what he wanted was to learn of some crop that would not be frozen out; that did not need to be fertilized; that was free from insect attack and fungus infection. He was very confident that this information could be given him at the Experiment Station, and so came to get it. The Director told him that this was a very easy proposition and advised the man to plant saw palmettoes. I do not want any vegetable or fruit that is not relished even by a bug, or one too tough to be attacked by fungus, or too hard to freeze. Give me the pineapple that has to be packed in excelsior to keep from being squashed in transit; give me the orange that has to be scraped with a wooden bladed knife to keep from injuring the peel; give me the cauliflower that has to be wrapped in tissue paper.

Horticulture is affected more or less by nearly every science, and by nearly every art. Every walk in life is affected by the horticulture of the country, and in turn as we are able to take advantage of the best of everything, will we be able to prosper. During some periods, our greatest needs lie in the direction of better methods for controlling insects. At other times, information on diseases is needed most urgently. At one time we were in great need of information on fertilizers. It seems to me that what we are now needing most of all is information that will enable us to put our crops into the hands of the consumer at the least possible cost. We need a sort of horticultural political economy.

Report of Committee on Grapes, Figs and Persimmons.

By P. J. Wister.

Mr. President, Ladies and Gentlemen:

Appointed Chairman of the Committee on Grapes, Figs and Persimmons, I communicated with the two other members of the committee, Mr. Bacon, of Ormond, and Mr. Steele, of Switzerland, for their co-operation with reports of the northern part of the state where my experience with these fruits has been none. The requirements of these fruits and their culture have at a previous meeting of the Society been so well and ably discussed that it would be only a repetition of what others have already said to indulge on these points; and I have, therefore, limited myself to a report relative to our experience with these fruits on the lower east coast.

The southeast end of the peninsula has been settled, as you all well know, at a comparatively recent date, and as the settlers were attracted more by the culture of citrus fruits and pineapples, the grapes, figs and persimmons have been practically neglected altogether. As a side issue to citrus and pineapple culture, the majority of settlers seem to have taken tropical fruits, such as mangoes, avocados, guavas, etc. Only in a few isolated instances have I found anyone planting the fruits under consideration. Very little systematic culture has been given these fruits, and the following notes have been made from very few plants and not large plantings.

Of grapes, a number of Eastern varieties, as well as vinifera, or California

grapes, have been tried. The experience of all who have tried growing grapes is that severe pruning is injurious, causing the vine to die back; and this is no more practiced by those who are acquainted with our local conditions. Most of the vines that I have noted of late are trained on a trellis, or overhead, allowing the vines to grow, pruning away only dead wood, which system is being practiced on a trial vineyard at the Subtropical Laboratory. Our experience has only confirmed that of others, that the vines fruit well the first two or three years, and after that begin to die back and set very little fruit. The vigor and adaptability of the different varieties vary greatly. The vinifera grape, which has been more under my observation than the eastern grapes, is very much subject to attacks from blackrot and mildew. Only by frequent sprayings with Bordeaux mixture is it possible to obtain good fruit. Again, the berries mature very unevenly in the bunches, which tends to make the fruit less salable, and I consider it very doubtful whether we will ever find a vinifera grape that will prove satisfactory. I have not noted any insects attacking the grape severely enough to be called a pest. Mr. Thomas Spence, Buena Vista, Florida, who has had more experience with grapes in the lower part of the state than any other person I know, writes me: "Generally speaking, I am, as you know, through with trying vinifera grapes, as I think

the mildew and other fungoid troubles will not admit of growing them successfully. Last year, as you know, was a very poor one for grapes, and there were none that could be said to succeed. The year previous there were some nice grapes on Black Hamburg, Brighton, Delaware, Duchess and one of Roger's Hybrids ; but I don't consider that any of them have made the growth this season to warrant us in expecting any satisfactory results. They all seem to die back without ripening their new wood properly, and they are very capricious as to starting new growth in the spring."

The scuppernong has not, to my knowledge, been tried. The "Key" grape has been much spoken of at previous meetings, but in addition to dying back, similarly to other grapes, and ripening its berries very unevenly on the bunches, it is very inferior in quality, and not to be recommended for planting. The Angulata (a California grape) and Delaware are (from limited experience) so far the most promising varieties. The ancestors to our cultivated grapes are indigenous to temperate climate, and their descendants have all been accustomed to a resting season in the winter. For plants of this character the winters in South Florida are hardly cool enough for plants adapted to a colder climate, and it appears as if the introduced vines did not quite know whether to grow or not, throwing out feeble growths now and then, and not ripening the wood properly.

There are frequently found vigorous wild vines in the hammocks that bear fairly good-sized bunches of very palatable grapes. I have, during the past two seasons, noted three vines that look very promising and are apparently immune to

the two diseases above mentioned. In the interest of every grape lover in the state I would ask that anyone who knows of such vines would try to get cuttings and try hybridizing these with either California or Eastern grapes. We might, in this way, find a variety more wholly adapted to our climatic conditions than an introduced grape. I am particularly interested in the improvement of the grape by means of hybridization and crossing, and I would be glad to receive communications from those acquainted with wild promising vines.

In looking up the figs, I find that in the upper end of the county (Dade) trees that had been planted eight or more years ago had made good growth the first few years, but later died back, or are doing poorly. The cause has generally been ascribed to the presence of nematodes. While this may be the cause in some instances, I believe that improper treatment is the cause in others. In still others, that they are planted in an unsuitable location. In Miami there were young trees planted in 1903 that now stand 10—12 feet high, with a spread of ten feet, that last year bore well and looked very promising. These trees have received good attention. The fact that these trees are doing so well, and that the fig does well further up the state, seems to prove that the fault does not lie entirely with the nematodes, which are well distributed throughout the southern states where the fig is well established and yearly gives good crops. Fig culture is with us very much in the experimental stage, and there is apparently considerable difference in the adaptability of the different varieties. The fig will hardly attain commercial importance on the lower east coast in com-

petition with citrus and tropical fruits ; but there is nothing more delicious than a well ripened fig or preserves made from it, and every family ought to have a few trees for home consumption.

A year ago the Subtropical Laboratory received a consignment of caprifigs from California, through the Department of Agriculture, of which some varieties did very well last year, when the freeze of last winter killed nearly all to the ground. They have sprouted very well, however, and are making rapid growth. The fruits of these figs are not edible, but the plants are necessary for the propagation of the Blastophaga, which again is necessary in the caprification of the Smyrna figs. Later on, when the caprifigs are well established, Smyrna figs will be tried and Blastophagas introduced from California where this insect is well distributed in the fig region. The progress of this experiment will be watched with much interest.

Persimmons can scarcely be said to have had a trial in the lower east coast. I have seen remains of trees that were planted several years ago, but I am satisfied that the failures in many instances lay with the cultivators.

Trees that I know receive intelligent

culture are now making good headway for their age (four years), and are this year bearing their first crop. The native persimmon grows wild on river banks and moist land, and there is apparently no reason why the Japanese persimmon should not do well budded on this stock.

DISCUSSION.

Mr. Gibbs—What is the color of the leaf of that wild grape to which you refer? Is it the wild scuppernong?

Mr. Wister—It is very similar.

Mr. Gibbs—Over on the Indian River peninsula where I live, nearly opposite Melbourne, there is an interesting grape slowly getting a foothold among the wild scuppernong. The foliage is much lighter in color, and the fruit nearly as large as the Concord, and is a dark red. It is very acid, but it is the best jelly grape we have tried. It is not a true bunch grape, but often shows clusters of three to five berries. It is sometimes found bearing heavily, but generally seems to be a shy bearer. I have heard it called the "Missim" grape, but have suspected it was an escape from some of the Munsons that were brought in by Dr. Hall, an early settler.

By W. C. Steele.

Mr. President, Ladies and Gentlemen:

I have very little to say on the subject of grapes, figs and Japanese persimmons. There was a time, years ago, when I was familiar with all the varieties of figs which are grown in Florida, and with most of the northern varieties of grapes. But for several years I was engaged in other

business, which prevented me from keeping up my acquaintance with them. During the last three years, circumstances have enabled me to learn something of present conditions. But the subject has been so thoroughly and ably discussed by previous committees, that there is but little left to report. So far as I know, no

new varieties of any of these fruits have been introduced within the past year. Possibly it may be well to call attention to some facts in regard to grape culture in this state. There is no difficulty in making the vines grow, that is, the difficulties are only such as are to be met in the culture of any other fruit, and the vines of most varieties will ripen good crops, beautiful bunches of fruit of excellent quality, and they will ripen at a time when no other grapes are to be found in the markets of northern cities.

About twenty years ago, being at that time connected with the Florida Dispatch, I was in Orlando at the time when the first crop of fruit began to ripen on the vineyard of the Niagara Grape Company. In company with several gentlemen of Orlando, I went by special invitation to visit the vineyard, to inspect the vines and sample the fruit. We found thrifty vines bearing a good crop, fully as large as the age of the vines would warrant. The bunches were large and the berries beautiful in appearance, and of as good quality as the Niagara ever produces. Yet within a few years the vineyard was abandoned. I never heard the full particulars, but understand that it was owing to the fact that the cost of transportation was so great that no profit was left for the growers. Another instance where the express companies put on a rate which was not what the traffic would bear, but enough to kill it, as it did the early attempts at peach growing.

A little later, a number of Niagara vineyards were set out near Moultrie in St. Johns county. Within a few years they also ceased to ship fruit to northern markets, probably for the same reason. That these vineyards have not been en-

tirely abandoned, is shown by the fact that last year the St. Augustine papers contained advertisements of wine made from Niagara grown at Moultrie.

Possibly you may wonder why strawberries can be profitably grown and shipped from Florida, when they must be sent in refrigerators, while grapes can go by ordinary express. The difference is that the strawberries reach the northern markets when there is a scarcity of fruit, while the grapes ripen in midsummer and must compete in the markets with raspberries, blackberries, cherries, etc.; consequently they will not sell for so high a price.

Fig culture in Florida has never become a commercial success. The fruit is so soft, when ripe, that it cannot be shipped to a distant market. So far as I know, no effort has been made to introduce the Smyrna fig, from which the dried figs of commerce are made. They are being successfully grown in California, and I see no reason why their cultivation could not also be made profitable in this state.

The greatest drawback to profitable fig culture in Florida is the fact that the trees are very susceptible to the ravages of root-knot. As was shown in the address of Prof. E. A. Bessey before this society last year (see the annual report for last meeting), the only remedy for this trouble is to starve out the nematodes which cause it.

Japanese persimmon trees grow thrifitily and bear large crops of fruit. Yet very few have succeeded in making the cultivation profitable. The chief reason for this is the fact that the fruit is yet so new in market that very few have acquired a taste for it; hence the demand

is small. But the same trouble exists that prevents grapes from being profitable—the transportation charges eat up all the profits.

DISCUSSION.

Mr. Skinner—I would like to ask on what ground figs grow best in South Florida.

Mr. Wister.—On what we would call low pine lands. The trees that I mentioned in my report have been grown on low pine lands and cultivated the same as you would citrus trees.

Mr. Skinner—I am fond of canned figs and would like to grow enough so that I could have a mess of figs occasionally. I have never been successful with figs grown on pine land, and thought of starting in on hammock land, and wondered if I could do it successfully.

Mr. Wister—I see no reason why the figs should not do well on hammock land.

Mr. Gibbs—I have only grown figs on a small scale, but in 1904 when I began planting, I found it stated in a nursery catalogue that the fig would not stand cultivation in Florida, and should be planted by the side of buildings, or the ground under it be covered with planking or some equivalent; so I gave mine the protection of the fat coquina rocks. For one fast-growing White Adriatic, I disregarded Prof. Hume's advice and laid a floor of an ever-widening circle of saw palmetto roots under it from stem to tips of outer branches, but it grows almost too fast for me. I have to keep carrying to it more big palmetto roots, and don't know as I can find enough to prevent the tree's escape by rapid ex-

tension of its root system. And as for the figs, they are the finest figs I ever saw.

Mr. Hubbard—In relation to grapes, I have heard that in addition to the great expense of transportation, the chief drawback in Niagaras is that the grapes will not adhere to the bunch, but drop off in great numbers and spoil the appearance of the fruit before it reaches the northern market. This, of course, very much affects the sale.

Prof. Rolfs—Mr. Winters, can't you tell us something about those experiments you tried on the kaki?

Mr. Winters—American travellers returning from Japan have frequently told us about Japanese methods of fermenting the persimmons. Almost without exception, these travelers have spoken in the most complimentary terms of the advantages to the fruit from this process. Briefly stating, the process as practiced in Japan is to secure used saki casks. Roughly speaking, the Japanese saki corresponds very well to what we know as beer in this country. The Japanese secure used saki kegs, remove the head, and then pace in it the persimmon fruit. Care is taken by the Japanese horticulturist to select the fruit that has turned red but still very firm. We are told that much of the success in fermenting kaki in this way depends on the expertness of the person who does the fermenting. First, in the matter of selecting the fruit, when it is sufficiently matured, and not over matured; and second, in removing it from the casks at a time when it has fermented sufficiently. With a view of finding out something about this method, some experiments were taken up at

the Experiment Station last year with persimmons in different stages of ripeness. As saki casks could not be obtained, glass jars were taken in place of these, and alcohol was substituted for the saki fumes.

The fruit used in this experiment were of the Costata variety. All of the fruit were mature, but still hard and totally unfit for eating at that time. The lot was made up of three grades according to stage of maturity. First, a lot of slightly bruised fruit which had been gathered for a few days and would have been ripe naturally in about three days; second, a lot of fruit that had been stored for a few days with the ripest fruit gathered on the date of experiment, most of which would have ripened naturally in about five days; and third, a lot of the firmest fruit, which was fresh from the tree that day and which would have ripened naturally in about a week or ten days. Equal quantities were weighed and placed in ten lots, so as to have the fruit in each lot as nearly the same size and stage of maturity as possible.

We then prepared ten 2 1-2 gallon jars in which to do the fermenting. Glass was chosen because this would enable us to make observations from time to time without opening the vessels; and also because it does not give off any gas or liquid as wood might even absorb liquid or gas. Eight of these jars were then prepared by placing some absorbent cotton in the bottom, to which had been applied approximately 1 oz. (25 cc—of 95 per cent. alcohol. A glass plate was placed over the cotton to keep the fruit from coming in contact with the alcohol and yet allow the gas of the alcohol to rise and

fill the jars. The jars were then ready for the fruit, which was carefully placed. Another set of glass plates large enough to cover the jars were then placed on, being made fast and air-tight by paraffin. Two aquaria, to be used as checks, were prepared without the use of alcohol. Each jar was numbered, the stage of maturity of the fruit in each being noted. These were allowed to stand away from the direct sunlight for nine days when one of the checks and a representative number of the others were examined. They were then examined every two days.

In the two check lots, there was no external change to be noted in the fruit, except a gradual ripening which was shown in the darkening of the fruit. When one of these was examined, after standing nine days, the fruit was mellow and some of them even soft, but none of them were entirely free of the puckery taste. As the ripening continued, they became very soft before the astringent quality disappeared, and at this time the fruit had begun to mold. There was no striking internal change in color, except the natural darkening as the fruit became ripe.

Among the fruit treated, the least mature fruit gave the best results. In the two aquaria containing the least mature specimen, the fruit remained very firm, was in excellent condition after sixteen days' standing, and kept very much better than the riper fruit which was carried through the same process. When examined after the nine days, they were mellow through and through, and were free of the astringent flavor. The sickening sweet

flavor of the naturally ripened fruit was replaced by a pleasant sub-acid flavor.

It was in the greenest or firmest lot that the least external change and the greatest internal change took place. After sixteen days' standing in the closed jars, this lot was entirely firm and the flesh was of a darker and richer color than those of the same stage not fermented. They were free from the puckery quality. It was a flavor that one would not as readily become tired of as in the case of the naturally ripened fruit.

From this experiment, it is shown beyond a doubt that the fruit is improved by this process. It also clearly shows that to obtain the best results fresh, firm fruit, free from bruises, should be used. The fermented fruit keeps much better in closed vessels than when exposed to the air. We would suggest, therefore, that the fermentation vessels be so constructed as to allow them to be closed after a portion of the fermented fruit has been removed.

Mr. Gibbs—Had the fruit used in your experiments ripened to its natural color?

Mr. Winters—No, sir. It was firm and totally unfit for eating.

Mr. Gibbs—A good many of them get their full color before they are fit for eating.

Mr. Winters—This was not that variety.

Mr. Rowe—What can I do to prevent my persimmons from losing ninety-five per cent. of their fruit after they are set?

Mr. Hollingsworth—I have always found that non-cultivation is the best

for the persimmons. I have lost all my fruit by cultivation.

Mr. _____ Do you fertilize?

Mr. Hollingsworth—Where you find persimmons growing naturally, I think it is a mistake to fertilize. Persimmons have off years, and some years they will produce heavily, while the very next year their yield will be very scanty.

Mr. _____ What about mulching?

Mr. Penny—Mulching is beneficial. The persimmon feeds almost on top of the ground. The roots spread out almost at the surface of the ground and where you use the mulch it gives them a chance to feed on the surface right where the roots are. It gives the natural conditions of the hammocks and low places where they grow naturally.

Mr. Rowe—Do you have any trouble from dropping under the mulch system of culture?

Mr. Penny—When we have a heavy crop, we usually lose about nine-tenths of the crop and still have too much. I have seen our trees breaking to pieces with the fruit on them, and at the same time they have lost nine-tenths of their bloom. I have shipped several thousand crates of persimmons, but we have cut the trees all down except a few on the outside of the grove. There is not enough money in them commercially in comparison with the citrus fruits such as oranges and grape fruit. There is also the same trouble with persimmons as that mentioned by Mr. Hubbard about grapes; they come in competition with northern fruits, and the transportation costs us too much for the prices realized by the fruit. We find that the persimmon grows well with us, and I cannot think of another

crop in which we can do as well in the quantity of fruit produced.

Mr. Bush—Do you cultivate these persimmons before using the mulch, or after?

Mr. Penny—Absolutely we do not cultivate. Sometimes, though, we work over the land with a mowing machine to keep the weeds down.

Mr. ————What kind of land is best?

Mr. Penny—Low, flat woods that has been drained.

Mr. ————What distance apart?

Mr. Penny—For persimmons, the trees grow well when set about 20 feet apart; 20 feet in the rows and 25 feet apart. They grow to be large trees 25 to 40 feet high if they are not damaged. Their wood is very brittle and a heavy wind will break it down, especially where it is loaded with fruit. We find another difficulty in persimmons. We could get a great deal more money for them if they could ripen on the trees, but the birds are very bad and will ruin a great deal of fruit. Then again, if there is a wet weather, the fruit begins to crack, and that ends the fruit for shipping purposes.

Mr. ————What form of fertilizer do you consider the best?

Mr. Penny—I should say any good orange tree fertilizer that you would use for bearing groves would be excellent for persimmons.

Mr. Painter—Usually the best fertilizer for persimmons is one containing but little or no ammonia. One of two per cent. of ammonia; eleven to twelve per cent. of potash and eight to nine per cent. available phosphoric acid, to be made from sulphate ammonia.

Low grade sulphate potash and high grade acid phosphate.

Mr. ————What is the nature of your soil and sub-soil?

Mr. Penny—Our soil is low, flat woods. The land was originally well timbered. The soil is rather dark and has a depth of three or four feet, I suppose. Occasionally we find a little "hard pan" as we call it, but it seems to be in spots.

Mr. Gibbs—Did you say you underdrained that land?

Mr. Penny—Not with under drains, but with open ditches. As I understand "under-drain," it means pipes under the soil. We have to do that with our orange groves in places.

Mr. Hollingsworth—in California, there is what is called the "muscat" grape and I would like to know if anyone in the State has made a success of raising it in Florida. It is the best grape I ever tasted.

Prof. Rolfs—Lots of people have made a failure of it. But to come back to the persimmon question; it seems to me that it would facilitate our shipping and the sale of the persimmon very considerably if we can put into general practice the process described by Mr. Winters. It seems to me that the question of keeping this fruit for a practicable time is simply excluding the air. That is all this process amounts to. The alcohol or rather the fumes of alcohol, was used to fill up the spaces in the jars that otherwise would have been occupied by the air. The persimmons subjected to this process were better than when allowed to ripen naturally because of the absence of the too sickish taste that frequently accompanies a dead ripe persimmon.

Report of Committee on Citrus Fruits.

By G. M. Wakelin, Lane Park.

Mr. President, Ladies and Gentlemen:

After conferring together the committee decided that every member should present an individual report on whatever of interest had come to his attention. There appeared to be no particular phase of the topic for discussion and besides it was doubtful whether more than one member could be present.

The past eight or nine months have tried the soul of the orange grower. The usual fall drought spread over the whole winter and then, merged with the expected spring drought, has given many sections of the state the driest time known for years. The wonderful vitality of the orange trees has brought them through and will enable them, when properly helped by judicious care and fertilizing, soon to repair the damage. The effects however will be only too evident in a shortage of the coming crop and, where groves have suffered very severely, will reduce their blooming next February.

Well, the lesson is—irrigate. Pipe is high and advancing all the time but it is not nearly so expensive as buying fertilizer at \$30 to \$40 a ton to make bloom and fruit only to have it all fall off. The harrow is a wonderful irrigator and mulching is also very helpful but both are limited and the grower finds he must add water to the soil or else stand by and see the bloom and

fruit he worked so hard to get cover the ground. Especially is watering necessary in old groves where the trees are large and often too close together. Many of the trees of which I have charge are in this category and had they not been watered they surely would have died. I hope the committee on irrigation has some new suggestions as to methods of irrigation.

In addition to the long continued drought the poor orange groves had a freeze to contend with last December. It seemed as if Jack Frost had a particular grievance against those who had tried to escape him by migrating from the old orange belt to the southern counties. But in the eastern half of Lake county where I am located there was slight damage done. The temperature with us did not fall below 27 degrees and fruit was uninjured. In many parts of the state however oranges were badly frozen and alas! shipped to market as sound fruit. A suspicion was thus cast upon sound fruit even when under a guarantee, and buyers generally took advantage of the situation to keep prices down to a frozen level. I am informed that up to a few days ago grape fruit that had been damaged by frost was still going into the Philadelphia market. Unless a grower has a particular trade to supply through some commission man it certainly will not pay him to consign fruit, however

sound it may be, after there has been a freeze in the state.

We need to give more attention to hardy varieties. Trifoliata stock is not a success in light soils so its cold resistant qualities are not always available. But there is a variety of orange that is cold resistant and thrifty above the ordinary. This is the Jaffa. Its heavy, thick, vigorous foliage protects its branches admirably, it bears, even while young, good crops of heavy, fine flavored fruit that is sweet early in the fall and will hang on until late in the spring. The Jaffa has not had the recognition of its value to which it is entitled. It is unfortunate that so many of the trees planted years ago are of no particular variety but just orange, like the man's hound that was mostly "just dog." Such trees not infrequently are characterized by second grade fruit and not much of that.

In uniformity of quality of product California is away ahead of us despite the fact that a good Florida orange is without a peer, here or abroad. In California the growers are effectively organized, and the various citrus unions exercise a strict supervision over the fruit marketed. Fruit in any way inferior is not shipped. We need to campaign toward this end and a higher sense of honor among shippers. There is too much green and frosted fruit shipped from Florida. The state is getting the name of shipping inferior oranges.

Have any members had experience with what has been called tuberose blooming? Sometimes trees young or old will put on, on a few branches, close packed bloom enough to cover the whole tree if properly distributed.

Such bloom always sheds off leaving the tree bare of oranges. It is a serious matter for trees to so expend their energy to no purpose. What is the cause of this and what can we do to make a tree properly distribute its bloom?

As a mere curiosity I am going to place on the table a freak orange of some good qualities. It was discovered among some tardiff trees. While it has the navel feature it is quite seedy. But the skin is thin and silky and the flavor of the pulp really excellent. In form it is very flat so that the secondary orange within extends well above the median line. This report is well established as there are a number of trees which bear this kind and no other. If the seeds could be educated out of it we would have a new navel of superior quality.

DISCUSSION.

Mr. Penny—I would like to ask Mr. Wakelin more about that bloom he spoke of. We had last year on our tangerine trees a good deal of bloom that appeared to be very short—the bloom buds. Is that the way yours were?

Mr. Wakelin—No, I never knew tangerine trees to do that. The bloom has been distributed over them. Other trees would put on sometimes fifty blooms all on the terminal shoots, but they would not amount to anything because they all fell off. For all the good such blooming does us, the tree might just as well be dead. The blooms this spring resembled bridal wreath more than an orange tree. There was an exceedingly heavy bloom.

Mr. Thornton—I have noticed that the trees are full of bloom—almost like the bridal wreath as Mr. Wakelin says, and this after the dry weath-

er we have had, too. I think it is the dry weather causes it.

Mr. Hollingsworth—I wish to ask if this is the case this season more than usual.

Mr. Wakelin—Our trees have always done more or less of it, and I have not thought it was on account of the dry weather. We had a drought from the first of February to the first of April. Previous to their bloom they were not suffering for water.

Mr. Hollingsworth—My experience on these lines has been simply and purely practical. I have corns on my hands like a small boy has on his heels because I have got right down and worked with my men. I think the same rules apply to the orange trees in Florida as to the peach and apple trees in Western Missouri, where I was raised. I have found that any abnormal condition such as dry weather, or anything like that will produce an abnormal condition of the tree. If a limb is injured by rubbing or chafing, it tries to reproduce itself and perhaps goes to the other extreme in order to establish its equilibrium. We had an old apple tree back in Missouri that had never borne, and it had a spot on it that I thought made a pretty good target. and I shot at it, and after that, it bore. I think a tree tries to offset the injurious effects and many of them will bloom out fully and never show that it is in an abnormal condition.

Mr. Wilson—I would like to ask if the same thing happened all over the State that happened in my grove this year. An insect appeared, we call it the "thrip" at Gainesville. I noticed it this year for the first time. It is a tiny insect resembling the hen mite.

It looks like what comes in the rose in the spring and makes them blight. I was so very anxious about the grove and bloom on account of the drought that I suppose I noticed the bloom more than usual, and I think it is the same thing we call thrip, which destroyed the strawberry crop around Gainesville about ten years ago so that there have been absolutely none raised on account of it.

I would like to say while I am up that my grove is like the grove the gentleman spoke of; the trees were heavily loaded with bloom, but we had no rain and I devised a scheme to water them. I went down with four teams and stopped at Ocala and got whiskey barrels and put them on the wagons and applied three barrels of water to each tree while the trees were in bloom and thought I had solved the problem of making the fruit stick. Now, the oranges vary in size from one the size of the end of a lead pencil to nearly a full grown orange, and they have never stopped dropping from the time they started. At what period can you tell when the fruit that is on is going to stay on? When can you safely estimate your crop?

Mr. Taber—I think there is one thing we should have settled. Did he thoroughly wash out those whiskey barrels before he began to water the trees.

Prof. Rolfs—And I think we ought to know whether he got them from Ocala or Gainesville.

Mr. Neil—I would like to ask Mr. Wilson if it was after that that the thrip did any harm.

Mr. Wilson—I think it was before. I think there would have been a good

many more if it had not been for the thrip, because they got into the bloom before they cracked open, and I expect in many cases they cracked the bloom. I noticed when the orange began to show itself, it was a very pale yellow, and I believe the thrip destroyed the life of the bloom.

Mr. Neil—He asked when he might estimate his crop. I have had some experience in that line, and I would say that the best time to estimate your crop is the day before you go to sell. There are so many circumstances that may affect your crop at any time, that it is difficult to say just when you can estimate with any degree of certainty. Now, about that dropping he speaks of. I have my very serious doubts whether a tree ever drops any more fruit than it ought to. We used to have these annual droughts; it was exceptional to go through a season without one and we used to fret a great deal about them. I used to water a great deal, but never saw that I had any more fruit than my neighbors who did not water at all. I don't believe that a tree ever throws off any more than it should.

Mr. Longley—I have had a little experience with thrip. Year before last, I had considerable thrip in my bloom, but I had a good crop notwithstanding. Last year I saw a lot of it, and sent for some thrip juice. I sprayed my trees in the bloom and it cut off about half my crop. The thrip punctures the little orange when the bloom opens and you will often notice that the bloom before it opens is punctured as though you had stuck a needle through it. You will find in one bloom a hundred of these little punctures. I believe we

will have a pretty good crop of fruit this year, however.

Mr. Wakelin—We notice our oranges sometimes fall off after they are pretty well grown, and of a bright green color and glossy. They fall off and leave their stems on the tree. It looks as though something had gotten between the stem and the calyx and pried it off. You cannot see anything the matter with the orange, and the tree has not suffered for water, either.

Mr. Penny—I would like to ask the gentleman if he had a good crop of fruit after these fell off.

Mr. Wakelin—No, I don't think so. They robbed the tree. I notice often times where these oranges fell off, they would be the only ones on the ends of twigs and should not have fallen off, for they had no neighbors to crowd them.

Mr. Hubbard—The thrip has always been present with us more or less since I began orange culture some twenty-five years ago. Most seasons it has very little effect on the fruit. The thrip seems to get at and feed on the honey that is secreted at the base of the orange. In some cases, the thrip may be a benefit in mixing the pollen. I do not think it does much damage except to mar some specimens of fruit. They sometimes gnaw snaky little tracks that run around on the peel..

As to the abnormal growth. I think it is caused by shock to the tree. The bloom and the foliage start from the same class of embryo and it depends on the condition of the tree at the time when that embryo is formed whether it will produce leaves or bloom. It depends largely on the climatic conditions. If the shock by cold is great.

it may go to an excess of bloom, and if a drought comes on, it may make more foliage than bloom. An excessive crop is usually caused by some shock, disease or starvation.

Mr. Hume—I do not believe that anything done at the time of bloom has much effect. I am inclined to believe that shock is caused to the tree by cold, drought or some such climatic condition. As far as Mr. Wilson's plan of watering is concerned, I think he should have started watering long before he did, and done it about twice a week. I think his labor was all wasted. I think to get a good crop of fruit to hold on the tree, you should begin back a long time previous to the time that the bloom comes on.

Mr. Hollingsworth—I experimented on the watering question this year for the first time. We had a rain nine weeks ago that caused the bloom to come out in just a few days. Certain parts of my grove were in full bloom and then we had nine weeks drought, and the trees were going to cast their bloom. I took a coal oil barrel, and excavated around each tree in a circle some six or eight feet. We designated six tangerine trees that were heavy in bloom. I gave three barrels of water to them as rapidly as it would soak down and then filled the excavation up with dry dirt so as to hold the moisture. Those trees have set a very good crop of fruit. I have the nucleus of an old grove of about forty-five trees that are about forty-five years old. They have had foot rot, die back, etc. (let me remark in passing that a neighbor of mine said his grove was of no use until the foot rot got into it) but still bearing very heavily. I watered a few of

these trees at the same time we experimented with the younger stock and find the same holds good in both cases. Through the middle of this grove is a ridge, and on the slope of this ridge I had put out about a hundred sweet seedlings some six years ago. This drought overtook these seedlings. They shed their leaves in the tops two-thirds of the way down and directly after the rain, within a week, they put on a bloom. We had watered the trees in the middle of the first drought, and when the rain came, they were so vigorous they reacted again. The second drought caused them to cast that bloom, and then about ten or fifteen days ago they put out a right good bloom, which set the second time on the same limb. That is a freak I cannot explain. They have shed off their bloom and formed oranges about the size of peas and we believe they are going to stick.

Dr. Richardson—I have been much interested in the discussion, and I am particularly interested in the talk of Mr. Hollingsworth. I am inclined to think from his talk that the thinking he has been doing has made corns on his brains as much as hard work has made them on his hands.

An eminent physiologist, when asked what time he would begin treatment of a child to make it a healthy, well developed human being said he would go back one or two generations before the child was born. I think that applies to orange trees as well. It has been argued that the injury which the trees have received has been the cause of excessive bloom. It has also been intimated that shooting into a tree or doing anything to bring

about an abnormal condition will cause bloom. I think our present difficulty can be traced back to the cold of last December. I am of the opinion that it was this that produced the abnormal bloom, and is more to blame than the drought from which we are all suffering. I think that this cold left the trees in an improvident condition, but that when they recover from the shock they received last winter, they will again attend to business. I don't think there is anything to worry about.

Mr. Neil—I presume this will not end the discussion or get off the subject of irrigation. I am afraid that if it took as much as three barrels of water to a tree once a week and we had to apply that three months before the bloom and four months after, it would not be a practical proposition. I have always been opposed to irrigation because I do not believe that orange trees throw off any more fruit than they ought to throw off. I think an orange tree knows how much fruit it can bear and bring to maturity, and if you force it to maintain and ripen more fruit than it is able to, it is an irreparable injury to the tree. We are supposed to have two of the best groves in the eastern part of the county and I do not apply exceeding over one barrel of water, and that only once a week or ten days. Rain water is the best to use, lake water is the next and artesian water is the last. I have some trees pretty well loaded with fruit, but our watering them did not save their fruit, but kept the trees in fine condition. I did not begin to water until the bloom had appeared. We are in hopes of having the second bloom, and

I think we will have two-thirds of a crop in the State this year.

Mr. Skinner—I would like to know how much of a crop we have, from the orange growers' standpoint and the sellers' standpoint. We ought to be able to get at a pretty accurate idea of how much of a crop we will have. I would like to have the men from the different sections get up and say what percentage of a crop they think they will get.

I have tried the kerosene barrel method—not the whiskey barrel—and have abandoned it. If Mr. Neil will go back to the season of 1897-98, he will remember that the drought at that time, was fully as bad as the one we have just had. Around Sutherland and Dunedin whole regions of pine woods and oak woods died. I tried to save my crop with barrels, and worked hard. I poured water under my trees, and my neighbor across the fence did not do anything, and when the time came to bear, his bloomed and mine didn't. If you don't water at the right time, don't do it at all. My experience is that an irrigating plant nearly pays for itself every year you put it in.

Mr. Stevens—I have tried a little watering, and I find that it keeps the wilt off the leaves and keeps the trees in growing condition, but some of the fruit is on the trees, and some on the ground. I don't think they have dropped more than is necessary for them to drop.

Mr. Sampson—I want to speak about a particular kind of dropping. Even where the growth appears perfectly vigorous and healthy, the fruit will drop off, but the stem and calyx will remain green and will draw nour-

ishment from the tree all through the season. It is not a natural drop, but something is the matter with the tree. No insect work as far as can be seen, but a sap disease apparently.

Mr. Waite—In speaking of this dropping. Last year, I think we had as normal conditions as we ever had in Florida; a warm winter, plenty of rain, and one of the heaviest blooms I have ever seen. The trees were white, we had a good crop of fruit set, but about the first of May we had for about ten days a cold wind from the east. The nights were very cold. Immediately after, we found that our trees were shedding their fruit and the same conditions existed as mentioned by the gentleman. The stems were green and kept green during the entire season. I was speaking to one of the oldest growers in that section, and he stated that in 1898 the same conditions existed. Our crops were heavily damaged by the fruit shedding after that cold east wind. I find in some secluded places in our groves (where they had protection) we had a good crop of fruit, while where the wind had a good sweep the trees had only about one-third of a crop. Where we expected 75,000 boxes we had only 25,000.

Mr. Willis—I am not old in the orange industry; only about four years. We put in a twenty-horse power engine and ran pipes all over the grove. We irrigate about every ten days. The trees are in fine condition and holding their crop very well. We began irrigating early in March, and our trees look as good as they would if conditions had been favorable, and growing all the time.

Mr. Skinner—I would like to hear

from Mr. Hume and Mr. Rolfs about that calyx dropping. I don't believe that the east wind does it. I am losing thousands of dollars right now.

Prof. Rolfs—So far as I have worked upon it, I find that there is an irritating agent there that gets in between the orange and the calyx. Under climatic conditions, such as drought, cold, etc., it would shed off below the peduncle so that there would be no calyx left on the tree. My scientific work has been limited to the small fruit, not larger than a hazel-nut and at that time I could not get the fungi that caused the fruit to drop to infect the fruit. After the fruit arrives at about the size of a hazel-nut, from this time until the fruit is colored, there seems to be a period of immunity. It is possible that this east wind or other cold wind has a depressing effect upon the plant and allows these fungi to infect and knock them off.

Mr. Hart—I would like to air my views on these subjects, too. According to my little experience, I think that the distance between the trees in a grove has a great deal to do in deciding whether it needs irrigation in a dry time, or not. My trees are mostly set twenty feet apart, some of them thirty. One of the groves has the trees set eighteen feet apart; that is on a piece of ground that has some oyster shells in it. At times, a few of these trees have the dieback, and I think for the past two years, to correct this, I have hardly put a cultivator in it. We had a dry spell as you all know covering six months, and it was not broken until lately. On that grove, some of the oranges got soft, so that they began to drop from the trees in

February, so I started to pick them. Perhaps I got two hundred boxes of soft fruit and I threw out what we could not ship and sold the rest at \$2.00 a box. That, no doubt, was the result of the drought, and I am convinced that non-cultivation and close planting had a great deal to do with it. The trees are large ones, interlocking their limbs and roots so as to occupy all available space. In my other groves, the trees have come through in fine shape; they show little curling of their leaves and have a good setting of fruit today. If there is a drought on, I would cultivate often and keep the surface very fine where this does not interfere with treatment of diseased conditions. You know it has been said that two cultivations are equal to a rain.

The planting of trees according to the new horticultural method, which I suppose you all understand as the Stringfellow method, is also a matter I would like to speak about. Quite a number of years ago, our former president, Mr. Adams, and myself met Prof. Budd, who was one of Mr. Stringfellow's first converts, at an American Pomological Society Convention in Washington, and we went over the ground thoroughly. Soon after, we planted according to this new method experimentally. On uncultivated ground, it is claimed to work finer than where the ground has been thoroughly cultivated beforehand. The roots put down and go deep and do not suffer from drought; the fruit is finely and highly colored, and will stand shipping better, according to the claims of its advocates. I planted some of them by the Stringfellow method and some

of them by the old method in alternate rows, and during this drought those trees planted by the Stringfellow method have come through and show but very little harm from the drought, while the alternate trees set by the old method have suffered some. I think the conditions have been exactly the same except the difference in the method of planting. Those trees have been planted at least eight years, long enough to have them show definite results.

Mr. ————What is the size of the tree? How do they compare? He (Mr. Stringfellow) claims a larger growth.

Mr. Hart—It is rather in favor of the “new horticulture” style of setting trees. I went over them just a short time before coming here to note that particularly, and it is in favor of those set out by the Stringfellow method, though not very marked. The ground in both styles of planting was thoroughly cultivated.

Mr. Longley—I set out a grove that way some twenty years ago. I did not know that it was anybody's method in particular. I had not found out that the roots went down straight, but that may be the cause my grove did not suffer. I know of a neighbor who was setting out some lemon trees some seventeen years ago and he tried the experiment. He set one of them according to my suggestion. For the first year, the tree that had the roots spread out made the best growth, but the next year the other one came up with it, and the two are very much alike. I do not know that the roots have anything to do with it.

Mr. Kerr—I was about to ask to have

the roll called of those present, so that we might comply with Mr. Skinner's suggestion as to how much of a crop of oranges we can expect this year.

Mr. Rolfs—Suppose you conduct this, Mr. Skinner, as you were the one who suggested same.

Mr. Hollingsworth (DeSoto)—For the last two or three years I have been trying to estimate the orange crop, and have missed it so far, and I have said I would never make another prediction. I think, however, that DeSoto county will not have as much as last year. The immediate neighborhood of Arcadia will grow nearer to last year's crop. Our county had between 700,000 and 800,000 boxes. The county has shipped since 1898 about 25 or 30 per cent. of the state's entire crop. I think, however, this year DeSoto will not have more than half a million boxes, if that much. We hope the condition for the remainder of the season will improve very much, but even in that case we will not have much more than half a crop.

I don't think our grapefruit bloom was up to the average. We see now occasional bloom. The bloom is scattered over a long period. My estimate would be that if the conditions until the time of gathering are favorable, there will be 450,000 boxes.

Dr. Phillips—I am not a member of this association, but for the last two years have made a specialty of oranges. There has always been a haphazard way to estimate the orange crop. Nine farmers out of ten will decide what they are going to have, and their expectations are always colored by their desires, and they will say, "Oh, yes sir; we are going to have a magnificent crop." I know there is a

long-felt want in this state for definite statistics. I know it is of interest to me, and I think to everyone else in the state that is engaged in the orange industry.

Mr. Waits (Manatee county)—We will have about 10,000 boxes. If it had not been for the freeze we expected about 60,000 or 70,000 boxes. I have not been over the whole county. Outside of our own groves the trees seem to be setting a very good crop. From what I can hear, there will be one-half or two-thirds of a crop. The grapefruit crop is shy.

Mr. Brown (Manatee county)—I can not speak for the county, but in our own groves we will not have ten per cent. of a crop; less than ten per cent. due to the freeze and the drought.

Mr. Hampton—I have been traveling around in a good many different sections of the state, and I don't believe there will be on an average twenty-five per cent. of a crop. That is a very conservative estimate, for in many places there will not be ten per cent.

Mr.—(Polk county)—I think there will be about ten per cent. of a crop. I don't think I have seen a grove that has even ten per cent. Only one or two groves have a crop worth mentioning.

Mr.—Our grove has been very late and the fruit is so small it is hard to make an estimate. I would say that the crop at the end of our grove will amount to half a crop; in other words, about 12,000 boxes.

Mr.—(Hillsboro county)—I don't think our crop will be a heavy one, and I doubt if the grapefruit will come to half a crop. I do not know whether the eastern part will have much of a crop or not. I have heard that it would be short.

Mr. Hoard (Orange county)—I think

individually we will have twice the crop we had last year, and I think it is due entirely to our irrigation. Our irrigation plant has more than paid for itself this year.

Mr. Wakelin (Lake county)—Down in Lake county the trees bloomed in the regular time. They continue blooming until about now. The younger trees bloomed at the regular time, and they have done pretty well. There was about two-thirds of a bloom until the latter end of March.

Mr.—(Orange county)—Some trees bloomed pretty well early in the season, but most of it fell. After the rains, many bloomed again, and now a part of the trees are white with bloom. I think in our neighborhood the orange crop will not be more than a third of a crop.

Mr.—(Marion county)—Not over one-fourth of a crop, or less.

Mr. Hart (Volusia county)—I will say that on the east coast where protected there is a reasonably good crop, and more have protected their groves this winter than ever before; but I think that on the west side of Volusia county in groves not protected, there is a short crop.

Mr. Kerr (Volusia county)—In the northern part of Volusia county the groves are showing up well, the trees are looking fine, and we will probably have half a crop. I attribute this greatly to the excellent location of the county, etc.

Mr.—(Lee county)—I do not think there will be more than half a crop.

Prof. Rolfs (Dade county)—I know it is shy in Dade.

Member—How much was the entire crop in the state last year?

Mr. Skinner—It was somewhere around 4,000,000.

Mr. Tilton—How do you regard the June bloom fruit? We have a little of it in our grove.

Mr. Hubbard—The scattering June bloom is usually thick skinned and dry and pulpy and of poor shipping quality.

Mr. Hart—If you have nothing else on the tree it is pretty fair. If mixed up with the regular season fruit, it is poor. It is always thicker skinned. I had much rather it would stay off than come on, although when there is no other fruit on the tree it does very well.

Dr. Phillips—I want to bring up the question again of getting up reliable estimates. I have heard various estimates gotten out by parties in the month of May, and perhaps they will get out another the next month that is entirely different, and when the crop is gathered, it is entirely different from either estimate. I think this society should adopt a method to get the correct statistics, say, in the month of July, when experienced orange men can estimate a crop with a degree of accuracy. Then, I think, each county should be represented, this society appointing a person or persons to go out and send in an estimate to headquarters. Then let the society force the railroad companies to prepare to handle the crop which we will give them. If we have a big crop, the transportation should be prepared beforehand to take care of it. Suppose it is necessary to pay a man for his services; it will be worth much more to the orange grower to have information he can rely upon. If it is rumored that we have a larger crop than we really have, it has a depressing influence upon the price and we lose a great deal more money than these statistics will cost us.

Mr. Hart—I would say that this could

easily be done if we had an appropriation from the state, or some income more than we have at present; but we have had to economize in every direction.

Mr. Longley—As far as my experience is concerned, I believe that all of the orange growers here and elsewhere would be willing to pay a bonus for just such information. The information is sent out all over the country that we will have an enormous crop of fruit by parties bent on depressing the price of our fruit. I have no doubt but that every orange grower has lost hundreds of dollars every year. If we assess every member five dollars it would pay big to get just that information.

Mr. McLane—This is a very important question, and I move that the president appoint a committee of five gentlemen whose duty it shall be to formulate a plan to present to this body tomorrow by which statistics can be secured. I think that everybody will agree that it is a matter of vital importance; not only the men who produce the fruit, but the men who buy it should have some intelligent idea. We know that every other crop produced in the United States is estimated. I make that motion and hope somebody will second it.

Motion seconded.

Mr. Painter—While on this subject I wish to state that I undertook last year to get up information just like what you are talking about now. I sent out over 12,000 letters, addressed to growers all over the state, asking them for the very information that you are seeking for. How many replies do you think I got out of that 12,000? Just 1,200. The trouble is to get the information from the grower. They seem to be afraid to give the in-

formation out, and seem to want to make you think they have a big crop, whether they have or not.

Mr. Phillips—I can readily appreciate that very few people will answer questions like those, and realize how very hard it is to get this information. My suggestion is to get conservative business men, pay them for their time and let them go over the counties and get this information from an unprejudiced standpoint. Not one man in a hundred would refuse to let him estimate his crop. Not to have this estimate costs the state of Florida hundreds of thousands of dollars.

Mr. McLain—The motion is already before the meeting that a committee of five be appointed to formulate and present to this body a plan whereby this information can be secured. I call for the question.

Motion put and carried.

Mr. Cribb—There is a doubt in my mind if this information would be worth anything to us. I never saw an orange grower who could estimate his crop within ten or fifteen per cent.

Prof. Rolfs—The following committee is appointed: P. Phillips, A. H. Brown and Wm. C. Richardson.

WEDNESDAY AFTERNOON SESSION.

Prof. Rolfs—The matter of citrus diseases being up for discussion, I wish to make a few remarks in connection with this subject. The most serious disease and the most peculiar one that we have had anything to do with recently is the one which causes withertip in citrus. The causative agent here is *colletorichum gloeosporioides*. This species of fungus is probably the same as the one that occurs on the mango and the avocado; a

fact which is of considerable interest to us, especially since the avocado and mango occur in the same region, and often in the same orchards, with the citrus. Mr. Neeld will remember that in 1893 the mango bloom blight occurred pretty severely on the sub-peninsula. Up to that time the trees had fruited heavily. In 1894 the bloom blight was so bad that only a small crop matured, and investigations were started at once with a view of establishing what caused the diseases. Some information was gotten as to the identity of the fungus, but in the winter of 1894-95 the trees froze to the ground, leaving us without an opportunity of carrying on the work already started. Since 1901 investigations on the same disease were begun in the mango orchards of Miami. The mango bloom, when attacked by this fungus, soon turns black and falls off.

During the period of bloom, various species of insects visit the mango blossoms for pollen and for honey. These crawl about over the blooms, passing from diseased blooms to healthy ones. As the insects pass over the diseased bloom, they come in contact with the spores of the fungus. These adhere to their body or to their appendages, and the spores are then carried to the healthy bloom. In addition to the insects, the winds also help in disseminating the fungus spores. It therefore seems almost impossible for a single bloom to pass through this trying ordeal without becoming infected. As a rule, a small quantity of fruit sets in spite of all these adverse conditions. As soon as the calyx and corolla have fallen away from the flower, the young fruit is not in immediate danger of being infected. The recently set fruit stands in a perpen-

dicular position, consequently the danger of fungus spores coming in contact with it is greatly reduced. When, however, the fruit has reached about the size of a pecan nut, the weight becomes too heavy and the fruit causes the peduncle to turn over and bend downward. This gives the fungus a chance again to attack it, since the spores from other portions of the tree may be carried, by moisture, down on to the fruit and infected. On some trees, where the fungus did not affect the bloom, or those which are not affected by bloom blight, the disease gets started sometimes on the young fruit. In such cases the young fruit falls from the trees literally by thousands. While the fruit is quite small it turns entirely black before falling off. As it advances in size to that of a hen's egg, this blackening becomes less apparent. After the fruit has arrived at about the size of a hen's egg the epidermis becomes too hard for ready infection. The fungus spores, however, are washed from the epidermis just as before. The fungus, however, in place of causing infection, merely causes irregular streaks over the fruit, or what might be called tear streaks.

TREATMENT.—As soon as bloom blight makes its appearance on the mango, it is necessary to begin a vigorous campaign of spraying, using the ordinary form of Bordeaux, going against all recommendations heretofore in regard to its application. Direct the spray here against the bloom and right into the open blossom. Spray every third day, and continue this until a crop of fruit is set that is vastly heavier than the tree can bear. As soon as a very heavy crop of fruit is set, spraying may be discontinued until a large proportion of the fruit has become large

enough to bend the peduncles over, and the fruit hanging in a pendant condition. Then spraying should be again resorted to. An application of once in two or three weeks will be sufficient at this time. After the fruit has arrived at the size of a hen's egg no further spraying need be done.

WITHERTIP OF CITRUS.

For the last six or seven years, work has been carried forward actively on the study of withertip of the citrus. As said before, this disease and the mango blight are caused probably by what is the same species, *Colletotrichum gloeosporioides*. Similar to the bloom blight of the mango we have a bloom blight of the citrus, including grapefruit and lemons. Citrus bloom, when attacked by this fungus, sheds off in great quantities, leaving scarcely any fruit set. As soon as the grove owner discovers a condition of this kind, he should give careful attention to the blooms. If withertip fungus is present in this stage of the citrus bloom, a considerable number of the petals in place of being pure white, as they should be, or withering a brown, will have turned a brownish red. By means of the hand lens, one will be able to learn to distinguish fungus infested petals from petals that are merely dropping and withering.

TREATMENT.—Here again, as in the case of the bloom blight of the mango, our recommendations are contrary to the usual practice of spraying, in that we advise spraying directly into the bloom, using Bordeaux mixture of the ordinary strength. While this operation will destroy a quantity of the bloom, it will be comparatively insignificant when compared with the amount that it saves. As new blooms open constantly, the spraying should be repeated at short intervals, prob-

ably not more than three or four days apart. This, of course, will depend upon the severity of the disease in the grove, and the possibility of doing the work with the spraying machine.

After the bloom has shed and a considerable quantity of the fruit has set, there is still considerable danger from withertip fungus. If a large quantity of young fruit is shed off free from the calyx, one should regard it as a very suspicious condition and make careful examination for the withertip fungus. If the fungus occurs, the young fruit should be sprayed as promptly and thoroughly as possible. From the time the fruit is set until it reaches about the size of a large hazel-nut it is very apt to be attacked by this fungus. After the fruit has reached the size of a large hazel nut there appears to be little danger of its being attacked by this fungus. From this time until the fruit reaches the coloring stage, it seems to enjoy comparative immunity.

During this period, when the fruit appears to enjoy immunity from fungus attack, the tree itself seems to be vulnerable to its injuries. For controlling the disease in the tree we would not advise spraying, but would advise pruning. Prune out all dead and diseased wood, and do it as thoroughly as your time and pocketbook will permit. This pruning out should be done preferably before the middle of July in the summer time, and before the middle of February in the winter time.

In the fall of the year, after the fruit has begun to color, it is again vulnerable to the attack of this fungus. The marking on the fruit, whether it is grapefruit or oranges, is rather characteristic in that it makes a large brown *sunken* area, beginning usually with small size spots and

increasing in size. In groves where one notices considerable dropping of fruit, this disease should be suspected at once and a careful examination made for it. If the fruit is dropping from this cause, spray with an ammonical solution copper carbonate (ammonical copper carbonate). In using this fungicide, the spray should be directed toward the fruit as much as possible, keeping it away from the leaves and branches of the tree. We know from experience that an application of fungicide is pretty certain to be followed by an attack of scale insects, since the fungicide kills off the fungus which attacks the scale insects, as well as the fungi which attacks the fruit.

Mr. Gibbs—Did I understand you to say that you threw a good, strong spray upwards right into the bloom?

Prof. Rolfs—Yes, we did. But the rains and dew carry the spores downward, and by spraying downward the fungicides follow the paths of the rain and dew drops.

Mr. Skinner—I want to ask a question, too. We are all interested in the buying of nursery stock. We don't want to get any more insects than we can possibly help; and I want to bring up a point that has been in my mind for some time. When the state inspector signs a certificate, saying that there is no white fly or other insects in a nursery, I think we ought to be able to place dependence on that certificate. I understand that last year some nurseries got certificates saying that they were free from white flies when I knew positively that they did have white flies, and I think we should insist that if certificates are given they should be honestly given. If the nursery that has white fly will clean their trees and promise to do

the best they can to get them out, they should have a certificate to that effect, but they should not have a certificate saying that they are *free* from white flies. I think the experiment station, or whoever gives the certificates, should give them honestly. I would like to make a motion that this society, as a body and as a society, shall request whoever is in authority to give these certificates that they give them strictly in accordance with the law, and not give certificates that are no good.

Dr. Berger—I wish to say that these certificates were given to the best of my knowledge, honestly and honorably. If there were any white flies I certainly did not know it. I know that so far as I am concerned I did not give a single certificate where I had any doubt that the certificates would not be telling the truth.

Mr. Skinner—How do your certificates read? Do they all read one way?

Dr. Berger—Yes, sir.

Mr. Skinner—That this nursery is *free* from white fly?

Dr. Berger—Yes, sir.

Mr. Skinner—I will not mention any names, but I know of certificates being given when it was a patent fact known to everybody that the certificates were given when they did have white flies. I think the growers should have some protection.

Mr. Bell—I move that a committee be appointed by the president to examine into this matter and report at some future meeting the course they think this society should take in relation to it.

Prof. Rolfs—in regard to the matter of giving these certificates that are given to the nurseries in Florida. The other states in the Union require that stock shall be certified before it can be shipped. The

state of Florida makes no provision for the inspection of nurseries; consequently our nurserymen are placed in the position of not being able to ship their nursery stock into another state. Is Mr. Skinner going to sit down on the nurserymen and say they cannot ship their stock out on account of having no inspection? The other states, as a kind of waiver on the delinquency of this state, have said, "We will allow the stock to come into our state upon the certificate of the entomologist of the experiment station." Dr. Berger, or one of his assistants, has made the inspection, has granted certificates, and if there were any white flies in there, they did not know it. You could do more about it if you had a state entomologist.

Mr. Skinner—Well, I know there are certain nurseries in this state that have the white fly, but still have a certificate saying they have not got the white fly. I think a certificate ought not to be given saying that it is free from white fly when it really has them.

Prof. Rolfs—The state has made no appropriation for a State Entomologist.

Dr. Richardson—There is a motion before the house, which, I think, covers the ground fully. I do not think that Mr. Skinner meant to insinuate that there is anything maliciously wrong; at the same time it is possible that there is an inspection that does not inspect, and if this is so, a very great wrong is being done. We do not want to send the white fly out of our state as the white cotton cushion scale was sent in. We have no means of inspecting except in the method that has been put before you, because there is no provision for it. Now, suppose a proper committee be appointed to look in-

to it and settle this matter at this point without any further discussion.

Question called; motion put and carried.

Mr. Bell—I move that the first vice-president be empowered to appoint this committee.

Motion seconded and carried.

Dr. Berger—I would like to have the floor for a few minutes. I would like to ask Mr. Skinner if he ever saw any nursery stock sent out from a nursery with my certificate, when it had white fly?

Mr. Skinner—No, sir.

Dr. Berger—I wish to state that all certificates were given in good faith to cover shipments out of Florida, as there is no law in the state of Florida compelling any inspection of stock not going out of the state. Inspection is made for other states, and whatever the state of Florida gets out of it, it gets under the inspection laws of those states.

Mr. Bell—It has been the practice of some nurserymen to defoliate everything, and I think we should require that. In shipping stuff through the states something may get on it. Some nurserymen make it a practice to defoliate everything; others do not defoliate at all.

Member—A short time ago, trees were sent out of a certain part of the state to another place, and it was understood that there were white flies in that section, and when they came they were defoliated; but when trees came from another part of the state where there was no white fly, the foliage was on.

Mr. Taber—The first vice-president has announced that the following committee is appointed to report on the question of certificates of inspection: W. C.

Richardson, chairman; H. B. Stevens and J. D. Bell.

Prof. Rolfs—We have with us the State Entomologist from Georgia, Prof. Smith. We would be glad if he will give us a short talk.

Mr. Taber—Can't you tell us about the operation of your law, etc.?

Prof. Smith—I am glad to tell you about the inspection law in Georgia. In the first place, we have there a State Board of Entomology, supported by the state appropriation, and their work is laid down in the law which created the department. One branch of the work is the inspection of the nurseries in the state. The State Entomologist, or duly authorized assistant, is required to visit every nursery in the state each year and make a careful inspection of the nursery and surrounding conditions, and if the nursery is found apparently free from the San Jose scale and other insects and diseases, the nurseryman is given a certificate under which he can ship stock to any part of the state, and that certificate is usually accepted by any entomologist in any other state where they require a certificate.

I have been in Georgia only four years, but know somewhat about the working of inspection in other states, and I think that perhaps we make a more thorough inspection than the majority of the states. I want you to notice this point, that the law requires us to inspect the nurseries, and if we can do so consistently, we give a certificate saying that the stock is apparently free from San Jose scale. There is no entomologist in the world who can say that a plant is absolutely free from San Jose scale. You cannot say that a nursery is absolutely free; but after it has been carefully inspected by a com-

petent inspector who has had considerable experience, he can tell you pretty well whether it is infected or not, and if he finds no sign of that pest, we feel safe in giving the certificate.

Mr. Skinner—You spoke of the San Jose scale. It seems to me a couple of years ago a lady-bird was imported from China. What has become of them?

Prof. Smith—Most of them have died out. Of all the colonies started in several states the one in Marshallville, Ga., was the most successful. In the summer of 1903 we found that they were destroying some of the scale, but not enough to make any appreciable decrease. Next spring it was impossible to find many there, probably on account of the spraying that had been given the previous winter. In the summer of 1905 I sent one of my assistants to every place in Georgia where a colony had been established, and also sent him to DeLand, Florida, where we had sent some of those lady-birds, and he found almost none whatever. The general concensus of opinion is that the lady-bird will probably never become acclimated in the United States.

I might state further, with regard to the nursery inspection, that there is a need, I think, in Georgia and other states of some change in the nursery inspection laws. It is getting to the point where it is almost impossible for all the nurseries in the state to be free from the San Jose scale, and I feel that the time is coming when the scale will get in such a great number of the nurseries that it will be necessary to issue a different kind of a certificate than what we have been issuing. If the nurserymen are prevented from selling their stock by reason of finding a little of the scale in a small block,

perhaps only in a little corner, of the nursery, it will be an unjust law.

Mr. Griffing—I understand there is a movement among the entomologists to get a uniform law about inspection.

Prof. Smith—Yes, sir; the entomologists of the United States at their last meeting advocated that, and the nurserymen have also taken it up and tried to get them to work together. They should work together, with the idea of getting some uniformity in the laws, or some one law that would be adopted by all the states.

Prof. Rolfs—Tell us how much is appropriated annually by the legislature for this entomological commission in Georgia.

Prof. Smith—\$10,000. Of course, only a portion of that has to be used for nursery inspection. If we did nothing but keep with the nurseries, we would not need that much. Our work covers a larger field now.

Mr. Waite—I would like to ask Mr. Rolfs in regard to this scab or scaly bark that I have noticed in a few groves in this section; that is, on the Gulf Coast, some time ago. I presume Prof. Rolfs can give you a better description of it than I can.

Prof. Rolfs—Last year, immediately upon the experiment station being separated from the university, Mr. Fawcett took charge of that work on the scaly bark and has been working upon it since that time.

Mr. Fawcett—I was in hopes that the subject of scaly bark would not come up, but I will try to tell you all I can about it. This disease became known to the experiment station only about two years ago, when a specimen was first sent in to

us from this vicinity for our examination. In investigating the distribution of this disease I found it was confined to a limited area including this peninsula from just above St. Petersburg to a few miles above Tarpon Springs.

The first infection covers only a small spot, and this enlarges until finally the whole limb becomes scaly and scabby and reminds one of the progress of leprosy. Almost nothing is known of a remedy for scaly bark, but we are beginning some investigations with a view toward preventing the spread of this disease.

Mr. Longley—Does it appear only on the orange tree, or does it also attack other citrus fruits?

Mr. Fawcett—It is confined almost entirely to the sweet seedlings variety. Grapefruit seems to be free. We have begun experiments with the Bordeaux mixture.

Mr. Skinner—I think it was from my grove that the specimen you speak of came. I have experimented a little with this disease myself and inoculated the trees and the roots with a little bit of sulphite of copper with beneficial results. The scaly bark is almost identical, I think, with the "brown spot" that occurs through this section and makes the fruit rot. (The specimen referred to was sent in by the Secretary and taken from Mr. Skinner's grove.)

Mr. Fawcett—I might say that along in the fall about August, the fruit becomes covered with these spots, and there is every indication that the fruit has become infected from these scabs. The disease is a serious one and needs to be looked into.

Mr. Waite—I would also like to ask if, in treating the disease called "Mela-

nose," blue stone under the trees would be beneficial.

Prof. Rolfs—In connection with this subject I would like to say it is what some people call physiological disease. That does not express anything, but it is due to malnutrition. It is very closely related to dieback. You can cure a tree by spraying it with Bordeaux mixture. Melanose and dieback do not usually occur on the same tree, although I have seen the two diseases on one tree. It is what you might call "citrus tree indigestion."

In the case of the dieback we made very careful experiments to see whether an application of blue stone to the soil would be of advantage. We found no advantage in treating the dieback in this manner. We also applied it to the leaves and found it of no advantage. We tried the lime on the leaves of the dieback tree and saw no advantage. In these experiments we had untreated plots that we used as checks. In three plots that were treated with Bordeaux mixture they at once responded and showed beneficial results. Now, I will say that, not having made the experiment of applying blue stone to the soil, we are a little inclined to doubt if it would be advantageous in treating this disease.

Mr. Waite—In one section of our grove last year we had a good deal of fruit affected by melanose, and a gentleman living up the river who had quite a large grove, told me it was so badly infested that nearly all the fruit dropped off before it was matured, and he said he used about one or two pounds of blue stone around the trees, and the next year very little fruit was affected, and the second year there was none at all. I applied

some, but did not know whether it was the right thing to do or not.

Mr. Hoard—I have used blue stone as a remedy for dieback for several years, and always with good results. Have cured small trees that were almost dead and put them in fine condition. Have also used it on large seedling trees which were so badly affected with dieback that nearly all of the fruit would split and drop off early in the fall. I commenced using it on these large trees the year before last, with the result that the fruit was much improved last year; so I gave them another dose last year and am using it again this year. In using it on small trees, care must be taken not to use too much, as an overdose would be fatal. Large seedling trees will stand from three to five pounds twice a year, broadcast.

Member—What else do you do besides that?

Mr. Hoard—Nothing at all. Whenever I see a tree with symptoms of dieback I get some pulverized blue stone and apply it just as I would fertilizer. I have used it in the liquid form and have also put small pieces under the bark, but have come to the conclusion that it makes very little difference how it is applied so the tree gets it, and have adopted the easier method of throwing it broadcast.

Mr. Penny—I use blue stone under the trees. I put it on the crown roots and cover it over. I have thought possibly that is where they get the most benefit from the Bordeaux.

Prof. Rolfs—Where we applied it to the soil there was no benefit from the Bordeaux.

Mr. Donovan—I tried the same experiment last summer with blue stone in spreading in a circle around the tree to

the outer edge of the branches. It seems to do my trees good. They are dieback stock, and the trees this year do not seem to show any dieback. I didn't do any thing else, so I think it must be due to that treatment. I have also sprayed with Bordeaux and killed the dieback.

Mr. Waite—Prof. Rolfs, did I understand you to say that lime applied to the soil would not correct the conditions there?

Prof. Rolfs—In our experiments we wanted to find out what element in the Bordeaux corrected the disease, so we applied slaked lime to the soil in the plot, and in another plot we used lime on the leaves to find out whether the application to the leaves was necessary, or whether it was necessary to put it on the ground where it would be taken up by the roots. In the place where we used the lime on the leaves or on the ground, it gave us negative results; in other words, were no better than our checks. But in those cases where we used Bordeaux mixture on the leaves we got decidedly better results. We had the lots laid off with about thirty trees in the plot and went through one set and then took another set. Our conclusion was that, from the test we made, Bordeaux mixture must be applied to the leaves to be of advantage in curing the dieback. Mr. Waite has spoken more of the melanose than of the dieback, but it is very analogous to it in its behavior.

Mr. Waite—I have suggested that you use lime. I applied lime to the amount of 1,000 pounds to the acre and only this past winter, and I thought of applying it again this summer.

Prof. Rolfs—There are a good many things that may cause this dieback, and you want to make sure just what is caus-

ing it when it makes its appearance. Top pruning may cause it; carbonate in the soil may cause it; or if there is too much acid in the soil—humic acid—that may cause it. If it is the latter, lime would correct the conditions.

Member—Is blue stone an antidote for humic acid?

Prof. Rolfs—I think not. I think it would have no effect.

Mr. Waite—I would like to know if anyone has cured by inserting blue stone under the bark and kept check, so that he could tell if it had any effect.

Mr. Cooper—I had some trees on our place that had the dieback, and I tried the experiment. I took every other tree down the row and put blue stone under the bark, and it set up a terrible "spew," but it straightened them right out. Last year I applied it just as you would fertilizer.

Member—What quantity?

Mr. Cooper—A piece about the size of a grain of wheat.

Member—How large were your trees?

Mr. Cooper—We tried it on trees six inches through. I had one tree on a little five-acre place that certainly was a forlorn object, and it was astonishing how it picked up. Last year we tried some by casting it broadcast and with as good results. I mean to keep the experiment up.

Mr. Hampton—I had some experience with this blue stone inoculation and find where it is used carefully it is very satisfactory. I have taken trees and inoculated them in three different places, but I never used more than a piece the size of a small grain of wheat. Where you use more it splits the tree until it looks as though it had been frozen.

Member—Does this add to the growth of the tree?

Mr. Hampton—The tree shows a big, thrifty green leaf, and I never found any bad effects if used carefully.

Member—What is the chemical action of the blue stone that causes the beneficial action?

Prof. Rolfs—I don't believe that has ever been worked by the chemist. I do not think that we know just what the chemical reaction is.

Mr. Hampton—For the past two or three seasons I find that the kumquat, where budded on the rough lemon, especially, has the sap oozing out right at the connection of the bud and the stock. I would like to know the cause.

Prof. Rolfs—We have not succeeded in getting any cure or any definite information as to the cause.

Mr. Skinner—Isn't that identical with the same disease that is in Cuba?

Prof. Rolfs—I think not. As near as I can tell from observation without investigation, it is not a genuine disease. It almost invariably occurs where it is budded on the rough lemon.

Mr. Hampton—I am of the opinion that the stock of the rough lemon outgrows the bud, and I think it throws out too much sap for the bud to absorb, and it throws it out in the form of gum.

Mr. Griffing—Regarding the fungus asked about. Prof. Rolfs discovered this red fungus (*Sphaerostible coccophila*) about ten years ago. We have had it in mind since that time, but we didn't have the courage to try it. In the meantime it cost us anywhere from a few hundred up to about four thousand dollars a year to keep the scale under control. That does not mean that the orchard was badly

infested; you probably wouldn't find one tree in a hundred that had any scale on it. We used the spray as a preventive to keep it down. At the Horticultural meeting last spring, in Jacksonville, F. P. Henderson reported that owing to his inability to spray he got this fungus into his orchard and it practically cleaned up the scale. We went to Mr. Henderson's orchard and found the conditions exactly as he had reported them. You could see that ninety per cent. of the trees had been infested and the wood was pitted with the marks of the scale, but you could not find a live scale in the orchard. We immediately went to work to introduce the fungus in our 650 acres of peach orchards. Although it was the last of July, we tried to inoculate all the infested trees by taking a piece of limb infested with either the red fungus (*Sphaerostible Coccophila*) or the black fungus (*Myrangium durii*), and binding on the limbs of the infested peach trees. Last fall we thought that the fungus was not going to do the work, but, much to our surprise, this spring the orchard is coming out with practically no live scale showing. It took a lot of nerve to do it, but I believed that if you have got the nerve to keep your spraying machines out and encourage the natural enemy, it will help you out.

Prof. Rolfs—Mr. Griffing left off the most important part, and that is the cost of applying the fungus.

Mr. Griffing—We didn't know where to find a supply of the fungi, so arranged with Mr. Henderson to furnish the limbs infested with the fungus and carry it to the orchard in sufficient quantity for five hundred acres for \$200.00. I do not suppose it cost us to put it on the trees

over \$250.00 or \$300.00. Since then we find that we could get quantities of the fungus by hunting up live oak trees that were infested with obscure scale. You can find it almost anywhere if you look carefully. You will find where the oaks are infested with the scale, the fungus will be growing out over the scale. I think the one that has done the best work is the black one, which seems to work equally well during either the wet or the dry weather. I don't think the cost of applying the fungus will be over \$1.00 per acre. Mr. Berger, please tell them what per cent. of the scale you found had been killed.

Prof. Berger—We estimated something like 99 per cent.

Mr. Griffing—Prof. Smith from Georgia has just been in the orchard. He came to see what the results were, and he might tell you.

Prof. Smith—I came from Georgia principally for the purpose of investigating the red fungus on the scale, because if it will do the work in Georgia, it is of great importance to our fruit growers. I visited that orchard last Monday and found that the scale was practically dead, as has been reported. In fact, a larger per cent. was dead than Mr. Berger has reported in the majority of the orchard. We could not find much red fungus, either, at this season of the year. Of course, I am not well enough acquainted with the work of this fungus to explain the condition, but certainly something has killed the scale in that orchard, and if not the fungus it is something equally valuable. In my own personal opinion, I think, there is very little doubt but that the fungus is doing the work.

Mr. Griffing—I want to say right here,

too, that when we visited the Henderson orchard last June we didn't find any fungus. We simply found that the scale was dead.

Mr. Rowe—Would it not be possible to dissect some of those insects and find out what was working on the inside?

Prof. Rolfs—That is exactly what I did ten years ago and presented the results of my work to this society at the Orlando meeting, and before I got through reading my paper I had the house entirely to myself. I never tried it again.

The red-headed fungus has several stages in its life history, some of which are invisible to the unaided eye. The life history of this fungus being unknown, it proved a serious obstacle in its practical use as an insecticide. We found that the scale was dying off without any apparent cause. After learning the life history of the fungus all of this difficulty disappeared. In my studies I found no difficulty in getting pure cultures of this fungus from insects that showed no signs of disease to the unaided eye. (For a full discussion of this fungus see Bulletin No. 41 of the Florida Agricultural Experiment Station.)

After we have discovered this peculiarity of the fungus we then found that by taking some of the diseased insects we could readily get cultures of this fungus from them, proving quite conclusively that it was the cause of the death of those particular insects. Since that time, however, we have made considerable progress, and have added the black fungus as an ally in killing off the San Jose scale. The red-headed fungus likes a moderately dry season, while the black fungus wants, or prefers, an extremely rainy one, such as we had last year. Con-

sequently, the black fungus flourished better last year than the red-headed. I think it is a good plan to have both of these friends in our peach orchard.

In this connection, I might say that the long scale of the citrus is also severely attacked by these two fungi. In addition to these we have the white-headed fungus which Mr. White has been using for several years with the greatest satisfaction to him and those people who are watching the operation.

Mr. Hudson—Will someone please tell us how much time is required for applying the fungus before the scale is dead?

Mr. Griffing—Until last January or February we were afraid that the experiment was going to be a failure, but when the scale came out this spring it soon disappeared.

Mr. Hart—I have talked so much on this subject that I am a little modest about saying more. It does do me so much good to hear Mr. Griffing get up and talk about the nerve it takes to try the experiment he has been trying and found successful. That very nerve I have been preaching and urging on all my friends for the past twenty years. I am pleased beyond measure to know that so many are adopting the natural and rational method of controlling injurious insect pests, and when Prof. Gossard stated at the Miami meeting that over 50 per cent. had adopted these methods I felt like resting the case and letting it go on. I believe you are on the right track, and will do all I can to encourage it.

Mr. Skinner—How about the natural enemy of the rust mite? Has it got any?

Mr. Hart—I have found quite a number of these and have been careful not to drive them away by spraying. I never

sprayed for the rust mite. I am not thick-headed enough to say that I would never spray under any conditions, for that would be foolish; but I would not spray until I had tried almost everything else, even should dire disaster threaten in some new form.

Mr. Hampton—Let me tell you how I treat my trees for the rust mite. I powder the dry Bordeaux on the trees, and it keeps my fruit nice and bright. I have not given up spraying altogether, but find it injurious in many respects. I had much rather put the dry powder on than to spray it. I have also used the dry sulphur.

Mr. Hart—in my crop this year there was but a small part of one per cent. of rusty fruit. In fact, I did not pack a single box during the season.

Mr. Hampton—As I understand, your grove is in a hammock or in dark hammock soil. I have found that on light, clay soil the oranges will be more inclined to be rusty than on the dark, clear soil. Now, I would like to know how that holds good with the balance of your experience.

Mr. Hart—I think you are right in that. We all know that by covering the ground with mulch it will do away to a great extent with the rust. The rust mite does not like a direct, strong light or reflected light. If you can cover the ground in some way, you can do away with a good portion of the rust mite.

Mr. Hollingsworth—I never see results without looking back in an effort to locate the cause, and I have wondered if the climatic conditions have not had a great deal to do with the disappearance of the scale. I can think of nothing else to lay it to, and I think that the radical seasons

we have had did a great deal towards the destruction of the scale.

Mr. Griffing—Last year we had a very wet, rainy winter and spring and early summer. This year we have had identically the reverse, so I don't see how the dry weather can be accountable for the disappearance of the scale.

Mr. Hudson—I have noticed in setting out young trees, that the scale appears on the body of the tree within about ten months after it has been planted out. I have used a little coal oil and find that it works very well. The older trees can stand the scale better than the younger ones. I have also noticed that the scale takes more readily where there has been much vegetable matter in the way of beggar-weed, etc.

Mr. Waite—Is there any injurious effect to the orange trees by using sulphurous acid as a spray for foot rot?

Prof. Rolfs—There would be no injurious effects by using it in a diluted state. The dilution is about one to ten of sulphurous acid. The sulphurous acid is one of the first remedies recommended for foot rot, and you will find that it does no damage to the sound wood. *Sulphurous* acid is what was recommended first, and by mistake some people have used *sulphuric* acid. This latter will cure the foot rot all right—so will a red hot iron.

I would like to say in connection with the rust mite and the red spider, that in each of these cases I have found that diseases attacked them as well as higher insects. They do not exactly belong to the insects, but to the spider mites. They are attacked by diseases as well as higher life, but when you attempt to inoculate them with disease germs you will see that it is a very difficult thing. The practicability of the scheme falls down when you come to applying it. The difficulty is almost unsurmountable. Dry sulphur, or the sulphur and lime that Mr. Hampton has recommended, is a perfect remedy for it. On my own trees I used this calcium sulphide and had it applied merely to the fruit. I gave the colored man special instructions to apply it to the fruit only. By use of a hand lens, one can tell when the mites are migrating to the fruit and causing it to turn them to a rusty or golden rust. If they are present in sufficient numbers to cause it to turn to a golden rust, the spray should be applied.

Member—How can you spray the fruit without spraying the leaves at the same time?

Prof. Rolfs—The citrus fruits are nearly always on the end of the branch, and are away from the leaves. The fruit that is inside in the dark is not apt to be attacked by the rust mite.

Report of Committee on Diseases, Insects, and Method of Control.

By Ernest A. Bessey.

(Pathologist in Charge of Sub-Tropical Laboratory.)

Mr. President, Ladies and Gentlemen:

I regret that it is impossible for me to be present in person at your meeting in St. Petersburg, but my work compels me to be out of the State. My report, accordingly, will be read by the Secretary and will, naturally, be somewhat shorter than if I could be present to explain the various points. I have confined my observations to the Southern part of the State and have asked Professor Hume to include in his report something about the diseases occurring in the Northern part of the State and diseases of nursery stock.

Probably the greatest interest in the matter of diseases centers around the struggle with white fly. This has been gradually spreading but has not, so far as I am informed, made any very great jumps. According to a statement of Mr. C. B. Thornton of Orlando, the unprecedented drought the past winter and spring has been beneficial in one respect in that it reduced the injury from this pest. He states in a letter to me that "the red fungus stood the dry weather and is still active, while the yellow, while it spread very rapidly after its first appearance early last summer, has itself been attacked by a fungus enemy and is now virtually exterminated. My experience with the red fungus has been so satis-

factory that I will have no further use for my spray-pump."

On the other hand, the dry weather has been favorable to the spread of the purple and long scale, but Mr. Thornton is convinced that the fungi will keep it under control.

The exceedingly dry weather has had a more or less harmful effect on the Manatee snail which requires a certain amount of moisture for its favorable development. Especially disastrous have been the fires which have run through the hammocks in many of the groves in that vicinity, since these totally exterminated this beneficial mollusk in the region burned over.

The orange disease known as "blight," or in some parts of the State as "wilt", has slowly continued to spread through the State. It has now firmly taken hold in the lower end of Merritt's Island and is doing great damage to the groves there. There is nothing new in the method of treatment that can be reported at this time although I have started to take up the investigation of this disease again and hope, upon my return to the State this summer, to do a good deal of work upon it. In view of this, I would be very glad to get into communication with all orange growers who are troubled by this disease. In a few localities I have found the disease to attack severely not only the

orange, but pomelo and Tangerine, although the most serious injury is done to the orange.

This past season a peculiar disease has been noted in several parts of the State. It resembles in some respects foot-rot in that there is observable diseased tissue from which gum flows, but differing from that disease, it is found on all parts of the tree, in many cases being found both on the stock and cion if the bud is rather high, and in other cases being confined to the cion alone. Mr. Thornton reports that he has treated some trees with sulphuric acid solution, also boiling water, with apparently great improvement. I can at present say nothing regarding the cause of the disease for that is unknown to me. In some cases, however, it seems to be due possibly to unfavorable effect of the stock on the cion, for it is far more abundant in those trees where the cion is larger than the stock.

Mangos and avocados suffered severely last summer from the rotting and spotting of fruit due to the anthracnose fungus *Colletotrichum gloeosporioides* which has been shown by inoculations with pure cultures to be the same as the fungus causing the disease of the citrus known as "wither-tip". The past winter has been so dry that the disease was not nearly as abundant as the previous winter, but yet in many groves the blossoms were destroyed by this fungus so that but few fruits were set. This is especially true of the avocado. In general, however, the fungus is far less abundant than last year and as a result a far greater number of mangoes and avocados set than last season. It was noticed that those trees which were sprayed with Bordeaux mixture during blooming period set fruit far better than those which were not so treated. In

this connection a point of great interest was observed by me in the vicinity of Miami regarding the effect of improper fertilizing upon the injury from the fungus. A grove of budded avocados set out two years ago near the city of Miami was fertilized with a formula about as follows:

| | |
|-----------------------|------------------|
| Phosphoric acid | 15 per cent. |
| Ammonia | 3 to 4 per cent. |
| Potash | 3 to 4 per cent. |

As a result doubtless of the low amount of potash in the fertilizer and of the lack of potash in our soils, last year's growth did not harden up well; furthermore, probably as a result of the excess of phosphoric acid, the young trees blossomed very profusely, although they were far too small to do so properly. The fungus promptly attacked the blossoms (for the trees were not sprayed) and spread through the blossoms into the stocks of the inflorescence and into the twigs, the tissues not having been hardened up the fungus did not stop, however, as it usually does, but kept spreading down the trees, in many cases killing them to the ground; in others, girdling some of the larger limbs by running down short spurs. I think there is no reasonable doubt but that this excessive injury could have been prevented had the trees been properly fertilized. Of course the destruction of the blossoms by the fungus would require more than proper fertilization to prevent, viz: spraying with Bordeaux mixture.

Celery suffered quite considerably around Sanford this year, from two diseases; one, a leaf spot disease caused by the fungus *Cercospora apii*, and the other, black-heart, probably caused by bacteria.

Nematodes probably caused somewhat more than the usual amount of injury to

truck-growers on account of the drought, the affected plants showing the result of the injury much sooner on account of the limited water supply. Nothing further than was said last year can be stated now with reference to combating these pests. It seems probable, however, that where sub-irrigation can be used to soak

the soil full of water for a period of several days, the trouble from nematodes can be prevented, or very greatly reduced for some months or years to come. Possibly on this account, the trouble due to nematodes is less abundant around Sanford than at Orlando where this sub-irrigation cannot be successfully practiced.

Report of Committee on Control of White Fly. (Fumigation.)

By Dr. A. W. Morrill.

Mr. President, Ladies and Gentlemen:

The history of the use of hydrocyanic acid gas for insect pests covers a period of nearly twenty-one years. The process was discovered and brought to its present degree of perfection in California where it has steadily grown in favor until, at the present time, thousands of tons of potassium cyanide are used annually for controlling scale insect pests. This remedy has also become well established in the orange growing sections of New South Wales and in South Africa. Wherever it has been adopted, it has proven to be the cheapest and most effective of the direct remedies for citrus pests.

Several years ago, Prof. H. A. Gossard, well known as the former experiment station entomologist, undertook some experimental fumigation work in this State and was led to conclude that the efficiency of this treatment against

the white fly is such that if a fumigated grove were segregated from all others, one fumigation would render it so nearly clean that it would need no additional attention for two or three years. Prof. Gossard predicted that "a process that has been found so valuable in every other part of the world, is certain to eventually come into favor in Florida."

Having in charge the white fly investigation of the U. S. Department of Agriculture, the writer secured the assistance during the past winter of Mr. Stephen Strong, a horticultural commissioner of Los Angeles County, Cal., a man of wide experience in practical dealings with citrus pests and probably as well posted on the subject of fumigation as any other man in that State. Modern fumigation methods as adapted for use with trees of all sizes, were employed for the first time in this State during the past winter months

and considerable data has been obtained which shows the superiority of fumigation over even the most successful spraying, both in regard to cost and effectiveness.

It is the writer's object to give in this paper a concise statement regarding the methods involved in the fumigation of orange groves and the results obtained thus far by the experiments along this line, looking to the control of the white fly. Much more extensive experimental work will be conducted next winter with the object of testing improvements suggested by past experience, and of reducing the necessary cost to a minimum.

CONDITIONS CONSIDERED NECESSARY FOR GOOD RESULTS.

Isolation of an infested grove is the most favorable condition for successful control of the white fly by fumigation. Next in importance as a favorable condition is concerted action among the owners of adjoining groves, in the case of groves not sufficiently isolated for independent action. Whether or not this concerted action will be obtained in any particular instance rests with those interested in the success of the orange growing industry for the problem of how to accomplish this was solved many years ago in California. In Florida, Orange county has already made a beginning towards the adoption of a systematic campaign against the white fly, having organized a Horticultural Commission with powers equivalent to those of similar commissions in California. The officials having the matter in charge, however, have not felt justified in attempting active field work on

a large scale until careful experiments shall have determined what course can be followed with a certainty of uniform results.

The third condition which strongly favors, if it is not absolutely necessary for good results, is the absence of the white fly food plants other than citrus trees. Chinaberry trees including the variety called "umbrella" tree cause untold injury to orange growing interests. While all of these trees do not become infested each year owing to various circumstances which it is unnecessary to mention here, it is well known that in many localities, especially in central and northern Florida, adult white flies produced by them occur in myriads throughout the towns in midsummer. Chinaberry and umbrella trees favor the rapid dissemination of white flies from centers of infection, also their successful establishment in uninfested localities. They seriously interfere with the success of fumigation as well as of all other remedial measures by furnishing a favored breeding place where the white fly can regain its usual abundance in a much shorter time than would be the case if it were entirely dependent upon the citrus trees for its food supply. Of the other food plants of the white fly, cape jessamine and privets should, like the chinaberry and umbrella trees, be classed as public nuisances in all orange growing sections.

WHEN TO FUMIGATE.

Fumigation for the white fly should be done during December, January and February, beginning about two weeks after the adults of the last fall brood have disappeared, in order that

all of the eggs deposited by these adults may have time to hatch. It should be remembered that the presence of adults is practically a positive indication of the presence of unhatched eggs. It is impracticable to attempt to destroy the egg stage by fumigation or, as a rule, by any other direct means. The scale-like stages, technically known as the larval and pupal stages, are readily destroyed when the dosage is properly estimated.

Ordinarily, it would be undesirable to continue fumigation after the adults begin to emerge in considerable numbers in the spring. This time, of course, varies according to locality and weather conditions, but in general is between the middle of February and the first of March.

For some not well understood reason, fumigation with hydrocyanic acid gas in bright sunlight is liable to cause injury to the foliage even though in the absence of bright sunlight the same dosage might give entirely satisfactory results. On cloudy days, it is safe to fumigate during the middle of the day, but on clear days the work should not be started until between four and five o'clock in the afternoon. Fumigation should not be attempted in a strong breeze particularly if the tents have not been made gas tight or nearly so by one of the treatments which will be referred to hereafter. The presence of moisture on the leaves in the form of dew does not seem to have any deleterious effect upon the foliage although in California it is considered necessary to increase the dosage in such cases to ensure effectiveness of work against scale insects. The tents are more difficult to handle when wet,

and it has not yet been determined whether, everything considered, it is desirable to continue to fumigate when the foliage has become wet with a heavy dew.

EQUIPMENT.

Many different styles of fumigating outfits have been employed in orchard fumigation in California since the first discovery of the process. Ordinarily a person unfamiliar with the practices of recent years, pictures to himself some clumsy process of shifting bell or dome shaped tents from tree to tree by means of huge derricks, mounted on wheels and provided with gafts and an intricate system of ropes and pulleys. Such methods, however, have long since become a thing of the past and their use is remembered only as interesting incidents in the early history of the fumigating process.

Practically all modern tents for fumigating purposes are made in the form of regular flat octagons, and are generally made of six-ounce drill and eight-ounce duck. A tent of this pattern is called a "sheet tent" and its size is stated according to its diameter. In general a sheet tent is large enough for a tree that measures not over two-fifths of the given size. For trees up to 14 feet in height, bell or dome shaped tents, held open at the bottom by means of a gas pipe hoop are sometimes used. With small trees of uniform size, they are easy to handle and they require less material in their construction, but they are not as adaptable for general use as are sheet tents, and hence are not as extensively used.

It is the general custom in Califor-

nia at present to use untreated tents—that is, tents which have not been treated with any material either by dipping or painting for the purpose of making the canvas more nearly gas tight. This is not the result of such treatments having proven unnecessary, but seems rather to be due to the practice of fumigating by the contractor system, whereby the contractor for a certain price per tree furnishes the equipment and labor and the owner of the grove supplies the chemicals. The contractor naturally prefers to use a larger amount of the chemicals per tree rather than to be put to the expense of treating his tents so as to better confine the gas. A tanning solution obtained from tanneries and known as "oak ooze", and a decoction made from the prickly pear cactus, have been used extensively in California in years past for increasing the tightness of the tents. Linseed oil and flexible paints have also been used to some extent. The subject of the desirability of treating tents is one which needs further investigation.

Tents when not over 48 feet in diameter, are placed in position over trees to be fumigated by means of so called "changing poles." Larger tents are handled by means of uprights or derricks. The changing poles are light poles varying from 15 to 20 feet in length and attached to the tip of each, is a rope somewhat longer than the pole itself. Uprights or derricks are of simple construction, braced at the bottom to prevent them from falling sideways, and provided with pulley blocks and ropes for raising the tent. Cypress is a very desirable material to use in making uprights on account of its

lightness. Uprights are made from 25 to 32 feet in length according to the size of the trees to be covered. They need be only within two or three feet of the extreme height of the tree for the uppermost branches readily bend forward when the tent is being pulled into place.

The material used in the generation of hydrocyanic acid gas are Potassium cyanide (K C N), Sulphuric acid (H-2 S O-4) and water. It is essential that the potassium cyanide be 98 or 99 per cent. pure, and that the acid show a gravity test of 66 degrees. The proportions of these materials used in generating the gas are, one part of the cyanide, one part of acid (liquid measure) and from 3 to 4 parts of water.

The commissary consists of a movable table provided with balances for weighing the cyanide, a large stock pitcher for the acid, a measuring glass graded for fluid ounces, rubber gloves for the man who measures the acid, and a tin scoop and leather gloves for the man who weighs the cyanide. The generator tray is placed on top of the commissary table while "weighing up."

It is made with a removable upper rack for convenience. The upper rack contains two rows of tin cans for holding the cyanide. Directly below each can in the lower rack or body of the tray is a pitcher for holding the acid for the given tree. The gas is generated in earthenware jars of a capacity of from one and a half to three gallons according to the size of the tree. For large trees, two generator jars are frequently used.

PROCEDURE.

The systematic arrangement of details is of great importance in fumiga-

tion. First, the dosage should be carefully estimated and a so-called "schedule" prepared showing the location of each tree and the amount of cyanide which should be given in each case.

The work done by the agents of the Bureau of Entomology during the past season has not been completely summarized as yet, and it is therefore impossible at this time to present a table of required dosage for trees of different sizes. Before definite recommendations of this kind be made, it is desirable that further experiments be conducted with tents treated by different methods. A general idea of the amount of potassium cyanide required with an untreated tent of eight-ounce duck, can be obtained from the following table which includes only a few examples selected from the many records:

Example of results obtained with exposure of 45 minutes.

| Distance Over Top of Tent. | Circumference of Tent at Base. | Potassium cya- nide used (ounces) | Per Cent. of Lar- vae and Pupae White Fly Destroy |
|-------------------------------|-----------------------------------|--------------------------------------|---------------------------------------------------------|
| 45 | 50 | 20½ | 99.8 |
| 46½ | 60½ | 26 | 98.9 |
| 47 | 51½ | 22 | 99.5 |
| 36½ | 48 | 21 | 100 |
| 44½ | 58 | 27 | 100 |
| 50½ | 56 | 36 | 100 |

The measurements of a tent are easiest made by means of a tape measure attached to a reel. The measurement of the circumference is made within a few feet of the ground. To obtain the distance over, the end of the tape is held in one hand while the reel is thrown over the center of the tent and the measurement made from ground to ground. Tables will be prepared in due course which will show the proper dose for trees of various sizes, but with a little experience

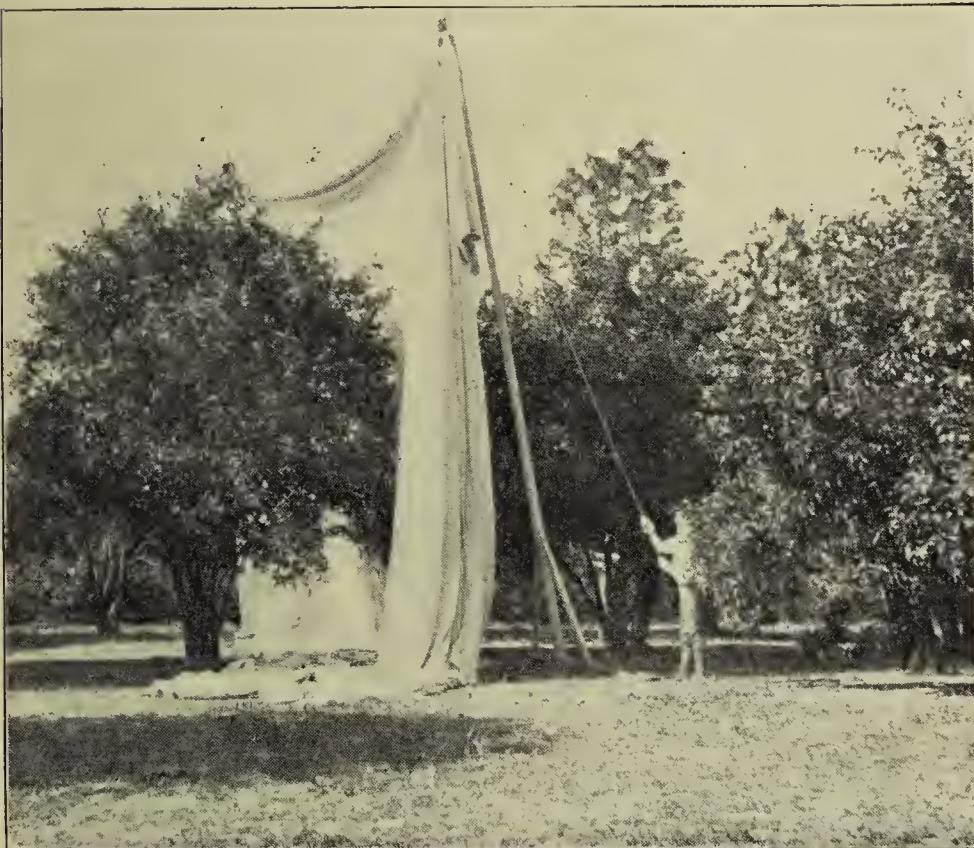
in calculating the dosage from actual measurement, a fumigator should be able to estimate the amount of potassium cyanide with sufficient accuracy.

In each outfit, from two to five men are employed according to the size of the trees. For medium sized trees up to 22 feet in height, four men can work to advantage. This crew can handle thirty tents every forty-five minutes, and can treat about 400 trees in a night's work of ten hours. For trees from 23 to 35 feet in height, derricks or uprights are used, and a crew of five men are needed to handle about 12 or 15 tents every forty-five minutes.

The changing of the bell or hoop tents from one tree to another is a simple procedure, requiring but a few seconds' time for two men. Sheet tents are placed in position over the trees up to about 22 feet in height by means of the changing poles described, and require from less than a minute up to a minute and a half for each tree. Trees from twenty-two to thirty-five feet in height can easily be covered by means of the derricks or uprights. The uprights being placed in position, the tent is raised by means of the pulley attachments, the uprights are then pulled forward by means of a rope attached to the top, and as they fall the tent is pulled over the tree. The covering of the largest trees can be accomplished in between one and two minutes. It is readily seen even from this brief description, that the mechanical difficulties involved in this process are insignificant when compared with the labor required for spraying and in addition, it lacks the many disagreeable features which always accompany the application of liquid insecticides.

With the schedule before them, the

PLATE I.



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I



3

Explanation of Plate I.

No. 1-3. Method of covering tree with sheet tent by means of derricks or uprights.

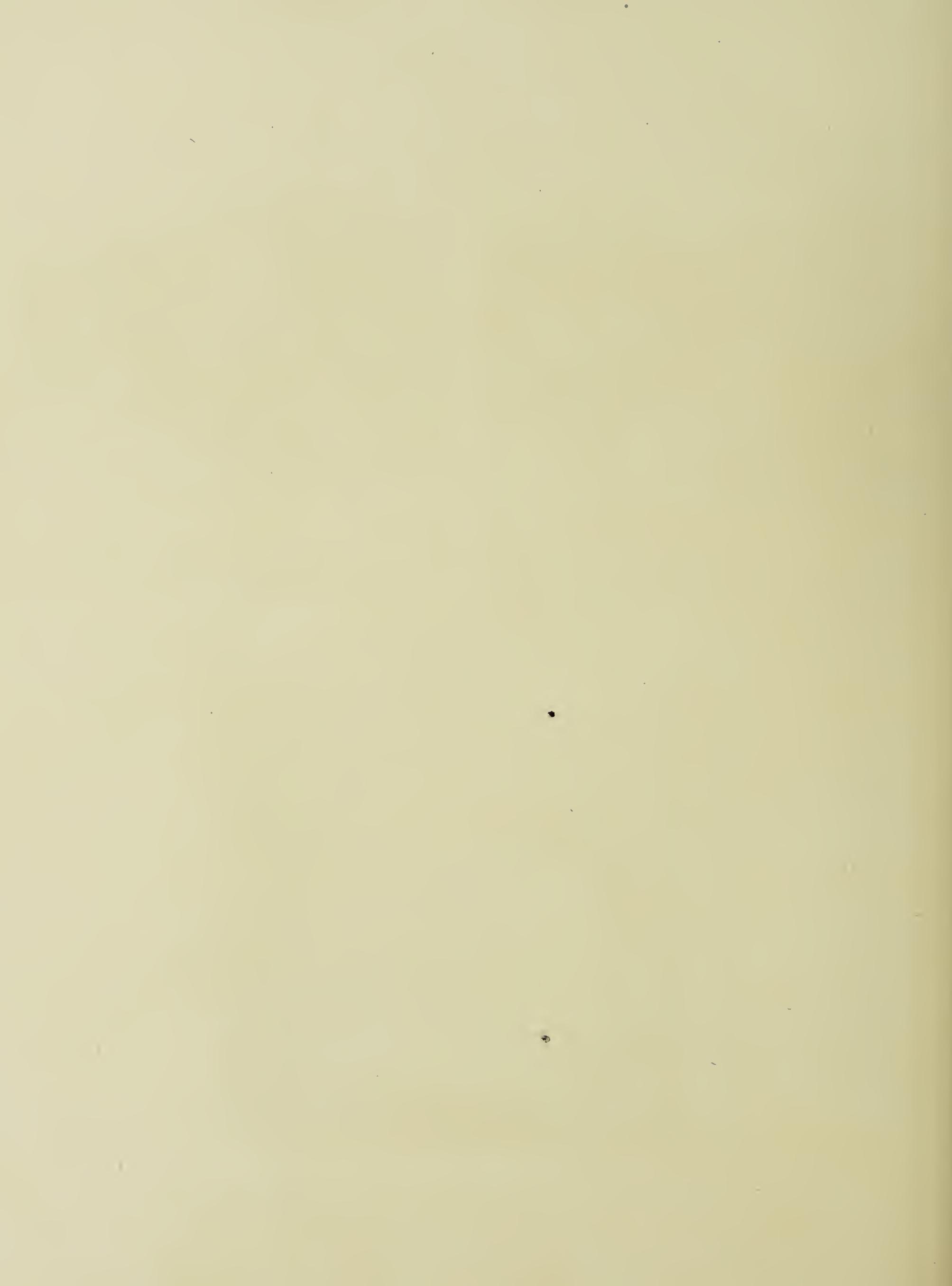


PLATE II.



4



5



6

Explanation of Plate II.

No. 4-6. Method of covering small tree with bell or hoop tent.

PLATE III.



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Explanation of Plate III.

No. 7-9. Method of covering tree with sheet tent by means of "changing poles."

PLATE. IV.

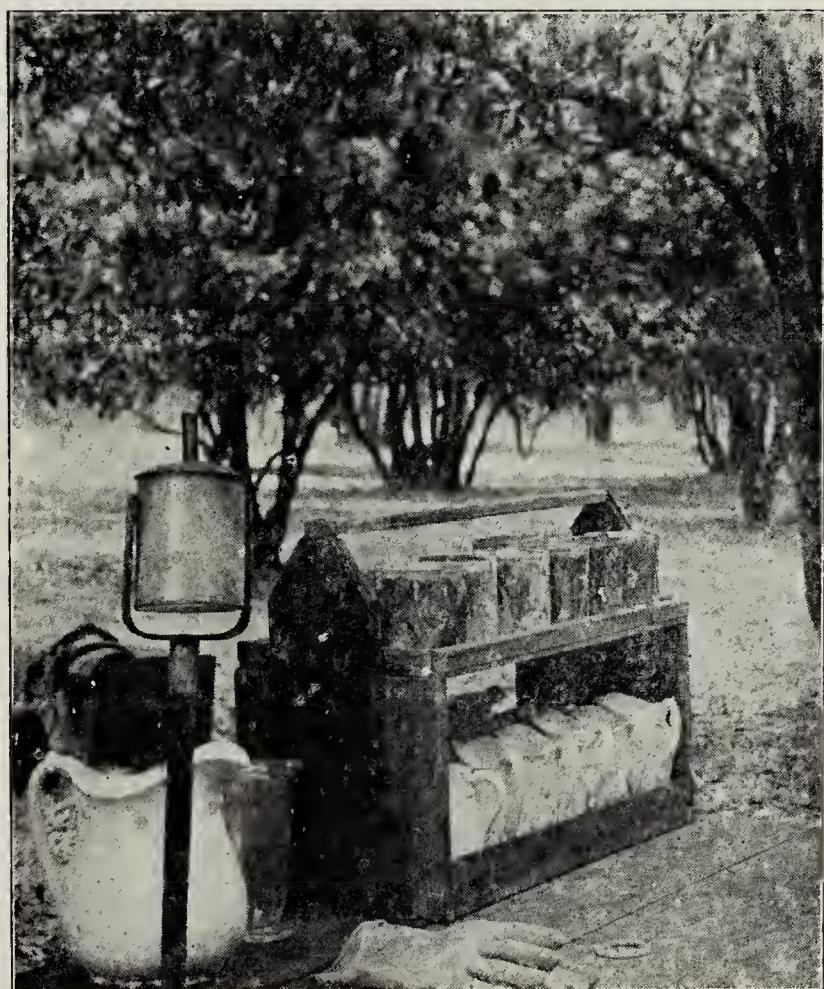


10

Explanation of Plate IV.

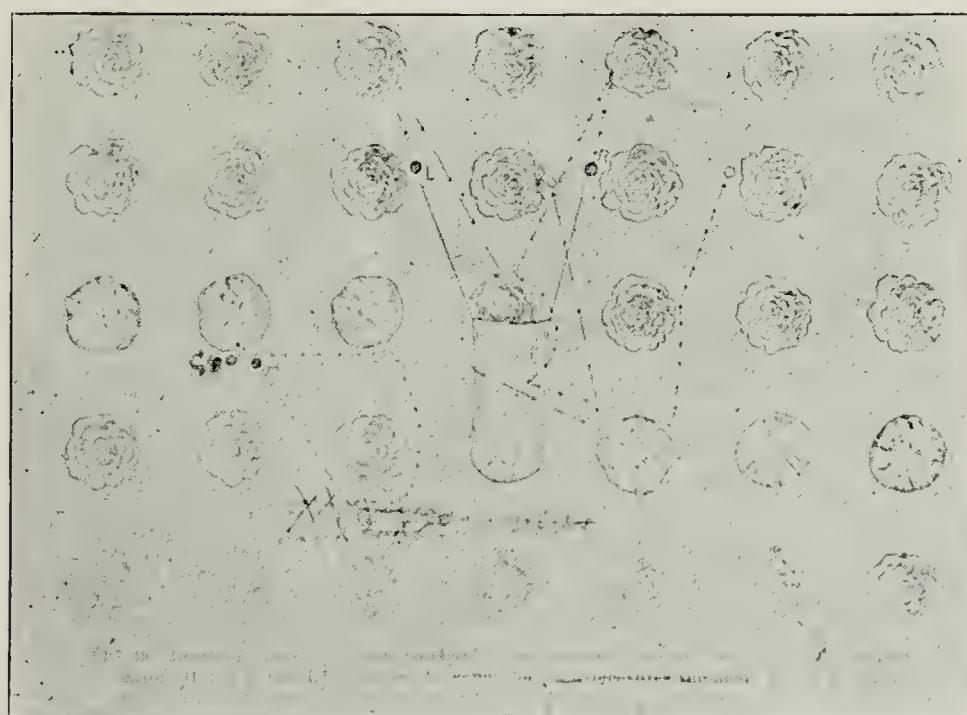
No. 10. "Weighing up" the chemicals at the "Commissary."

PLATE V.



II

No. II. Corner of commissary table showing the "generator tray."



12

Explanation of Plate V.

Birds-eye view of a young grove being fumigated under sheet tents showing one method of procedure. G, the "generator" or "fumigator"; R and L the "tent pullers". The arrow lines indicate the path traversed by each of these parties. (Diagram adapted from Woodworth.)

fumigators weigh the potassium cyanide and measure the acid, arranging the dosage for each tree in the racks of the tray, the cyanide in the upper rack directly above the pitcher of acid for any given tree. One man usually measures the acid and generates the gas and is known as the "generator." From two to three men look after the changing of the tents and are known as "tent pullers." Another man known as the "tent kicker" follows the tent pullers and pulls or kicks in the tent at the bottom and also raises the edge of the tent while the generator passes in with the can of potassium cyanide, pitcher of acid and the generating jar containing the required amount of water. The jar is placed near the base of the tree and the acid poured in followed by the cyanide, after which the generator passes out quickly and the edge of the tent is dropped into position. The commissary is usually located where it will be most conveniently situated for the entire night's work. After shifting the tents and generating the gas, all hands return to the commissary and the materials weighed up for the next change of tents. This procedure is varied somewhat according to the number of tents operated and the individual practices of the fumigators.

POISONOUS NATURE OF THE GAS.

The necessity of observing simple precautions in fumigating with hydrocyanic acid gas is so well known that, although this is one of the most dangerous poisons, there is no record of a fatal accident resulting from its use as an insecticide. After removing the tent the contents of the jar should be emptied between the rows of trees and

covered with earth. When emptied close to the trees the roots are likely to be injured, especially when the soil is very porous. Great care should be taken to avoid pulling the tents over any of this material even after it is supposed to be carefully buried.

EXPENSE OF FUMIGATION.

Wherever the surrounding conditions are such that a grove would receive full benefit from the almost complete extermination of the insects, the cost of fumigation would ordinarily be about the same as three sprayings, but its efficiency in checking the white fly would be equal to at least six sprayings at the rate of three per year. At the outside, the cost, making ample allowance for wear and tear of tents, should not exceed that of four sprayings. Even on this basis, the cost of fumigation in a period of two years would not exceed two thirds the cost of the best of spraying while the results obtained would be far more satisfactory and uniform. These estimates are based on the cost of fumigation with untreated canvas. With canvas made approximately gas tight, the cost would doubtless be reduced fully one-third.

Fumigating tents are expensive as a first outlay; those large enough to cover a thirty foot tree costing about \$90.00 and to cover a fifteen foot tree, about \$20.00. It is not advisable as a rule for an orange grower to invest several hundred dollars in fumigating tents for his exclusive use, although many with extensive groves would doubtless prefer to do this. In some citrus fruit growing countries where fumigation is practiced against scale insects, several growers form a

club and share the cost of the fumigating outfit, which is kept at the disposal of each of the members in turn. Such a plan might be followed in many cases in this State. A few orange growers with a crop worth annually \$10,000 or \$15,000 would not be put to an unreasonable expense in the joint ownership of an outfit costing \$1,000. Fumigation by the contractor system as it is now done to a great extent in California, may also come into use. The plan which can be most strongly recommended is for each orange growing county in the State, when the proper time arrives, to maintain an outfit large enough for the needs of the orange growers within its limits, and to provide for fumigation under the direction of a County Horticultural Commission.

The average annual loss due to the white fly in the infested groves in Florida may be conservatively estimated at 33 per cent. Taking into consideration the reduction in number and size of the fruit and the indirect loss through the necessity for washing the fruit and subsequent deterioration in its shipping quality, the total loss for the state is not less than three hundred thousand dollars per annum. According to the Eighth Biennial Report of the Florida Commissioner of Agriculture, there were in 1903, slightly over three million citrus trees in the State, more than one-half of which were non-bearing. The foregoing estimate of a loss of \$300,000 per annum is based upon these figures, placing the number of infested groves at one-eighth of the entire number. According to this estimate, there are at pres-

ent, omitting nursery stock, about four hundred thousand infested trees in the State of Florida. An average of fifty cents per tree would be an ample allowance for fumigating the infested citrus trees in the State. This would give us \$200,000 as the estimated expense of fumigating these trees. The work of Prof. Gossard and the work of the Bureau of Entomology during the past few months furnishes evidence that no further loss would be occasioned by the white fly for two or three years; hence the sum of \$200,000 invested by the citrus growers of Florida who suffer losses from the white fly, would result in the prevention of a loss of at least \$600,000. This point is made not as a practical recommendation, for the adoption of the practice of fumigation should be gradual, but simply to provide a basis for the estimation of the desirability of using this treatment in individual groves.

While it is generally considered that in Florida the natural enemies of the purple scale are so effective that any direct treatment is unnecessary or unprofitable, citrus groves are frequently met with where this scale is a serious pest, and where the losses prevented by fumigation would amount to several times its cost. In conclusion, the writer would express his conviction that in the case of the majority of the groves, the destruction of the purple scale and other true scale insects would represent an increase in profit which would, by itself, offset the actual cost of fumigation, leaving as clear gain the benefits derived from reducing the white fly to a negligible quantity.

Control of White Fly by Stamping Out.

By H. B. Stevens.

Mr. President, Ladies and Gentlemen:

The loss of fruit by thieving had become so great, that the growers at DeLand about decided to organize a fruit growers' society for self protection, and to help in other ways, that such an organization could; but like most such movements, it was only talk until the white fly was discovered on some trees in the very center of the town.

That called for prompt action and there was no trouble found in getting the growers together and organizing the "St. Johns River Fruit Growers' Association."

One of the first things they did, was to appoint a committee to devise means for combating the white fly; that committee first tried spraying with pure kerosine, with a result that they destroyed about 90 per cent. at one application, but the difficulty was to reach the other 10 per cent. Soon after, the cold of December come, and it took off so many leaves from many of the orange trees in the part, that the committee thought was the infected district, that they decided the best plan would be, to go into the matter thoroughly and defoliate all infected trees or shrubs. The matter was brought up before the society and they voted an assessment to meet the expense, and instructed the committee to go ahead.

The way they went about it was this, first, they examined the trees and shrubs that they thought might be infected, and if they found any of the larva or pupa of the fly, then they took a few of the infected leaves and with a glass showed them to

the owner, and asked his or her permission to remove the plants, or defoliate, as the case might be. If the party objected, then they let him alone, and went to the next place, knowing well, that after he had time to think the matter over, and to understand what an injury the pest would be, and how we were offering to remove it without any expense to him, he would consent later, and so it proved, in every case but one, and in that case the party had to be persuaded by other means than reason.

It was soon found, that wherever there were Cape Jessamine bushes there was apt to be white fly and in following up the fly they went over an area of four square miles, and defoliated every infected orange tree or Jessamine bush and also privet hedges.

Had we anticipated in the beginning, that we should have to go over anything like so great a territory, we might have shrunk from the task, but after we began we did not turn back.

After going over every place we found anything on, around DeLand, we turned our attention to near-by places, and soon found that the fly had gotten quite a strong hold at DeLeon.

We called the attention of Mr. McBride to what the flies were doing in his grove at DeLeon Springs, and he at once put a force at work defoliating a ten acre grove, and he says he got it done for \$135. Adjoining him, was a grove equally effected, that we could not prevail on the owner to do as Mr. McBride had

done, but they consented to our doing it for them.

Now any grower who has ever sprayed for white fly, knows that he has got off easy, if he has not spent more than \$135 on ten acres, and still he knows that he has not killed them all and that enough are left to keep him working the next season. If he could only be sure that he had stamped them out, he would not mind that expense.

We have not found a live fly, so far, this spring, in or around DeLand, and all it cost us, was \$158.80 to do the work.

We consider it a good investment, even if the flies get in next year, for all our groves are free this year anyway.

From the experience we have had I feel sure the fly can be stamped out of almost any section of the State, if the growers will only go at it in earnest, and be willing to lose all the leaves, wherever there are any signs of the fly found.

By doing this work as late as possible, in the spring before the fly begins its general hatch, or the trees to bloom, the work can be done with the least expense, and it need not diminish the crop any more than the fly itself would do, if as much.

I wish to say right here that our committee was greatly helped by two visits from Prof. Rolfs, he encouraged us to believe that we could make a success of it, and he helped to make the skeptical growers willing to allow us to take the leaves from their trees.

Our society was also greatly helped by a talk he gave us on insects, and diseases, and I am sure that if the growers in the different localities of the State, would organize as we have done, and then when a difficult problem comes up, invite Prof. Rolfs to pay them a visit, they would soon find that his talks would save them in the expense of working their groves, much more than the society would cost them. So far our society has cost none of its members more than seven dollars apiece.

One lesson we have learned at DeLand, that is if you fear the white fly watch your jessamine bushes as the fly will appear on the Cape Jessamine first and if you want to delay their coming destroy all such bushes in your neighborhood.

The fly will spread faster from one jessamine bush to another than from one orange tree to another.

In many cases we found larva on Jessamine bushes and no sign at all on orange trees near by, but if there were many of the larva on the jessamine bushes we defoliated the orange trees as a precaution.

To overcome thieving, we allow any member of the society who wishes to do so, to post a notice of \$25 reward offered by the society for evidence that will convict any one, other than a child, for stealing fruit, and the society does the prosecuting, which makes it easier to punish a thief than if an individual had it to do.

Control of the White Fly by Natural Means.

Dr. E. W. Berger.

Mr. President, Ladies and Gentlemen:

A study and discussion of the different phases of this subject are exceedingly interesting and important whether considered from a purely practical or from a purely scientific standpoint. When considered from a *purely practical standpoint* it involves mainly the knowledge necessary for successful insect control. This, however, includes a knowledge of the life history, habits, and conditions of existence of the insect pests to be controlled, of the fungus or insect parasites or other enemies that feed upon the pest, and the plants or animals that we desire to protect or rid of their injurious insects or other pests. And last but not least, a knowledge of the methods for propagating and distributing the natural enemies of the insect pest that we desire to control is absolutely necessary. Thus, to take the ease of the citrus whitefly as an illustration, I find that I cannot arrive at a rational understanding of this "whitefly problem" without a comprehensive understanding of the life history, habits and conditions of existence of the whitefly, of its fungus enemies and of the citrus tree itself. The methods for distributing, or propagating and distributing, the fungi must be solved in reference to the case at hand, guided, of course, by previous experience and the established principles of the subject.

When considered from a *purely scientific point of view* this subject involves phases of the mutual dependence and relationship of living things as a whole.

Aside from the many interesting facts of this relationship the question arises, how came this relationship about?—this destruction of one kind of living thing by another kind.

The truth of the matter is that nearly all animals are a "pest" in so far as some other animals or plants are concerned. Animals that live on decaying animal or vegetable matter are the only exceptions to this among animals. Plants are thus about the only living things that live without breaking the commandment, *Thou shalt not kill*, if you will allow me to temporarily extend this mandate to all living things. But even among higher plants we have those that kill other plants and animals or at least live upon their substance. Thus the dodder in part lives upon and finally kills other plants; the Indian pipe, beech drops and the green mistletoe feed upon the sap of other plants. A few of the higher plants are also carnivorous, feeding in part at least upon insects and the like, which they capture. Thus the drosera, or sundew, the Venus flytrap, the pitcher plant and bladderwort belong to this group. But the chief destroyers in the plant kingdom are the bacteria and fungi which attack both living plants and animals as well as dead ones, and many of these are to be feared as a scourge, only too frequently leaving complete desolation in their path. To this class belong the cholera germ, consumption, typhoid, diphtheria and others, of which there are varieties attacking animals as well as man. Among such pests

of plants can be mentioned the several blights of vegetables and fruit trees and some root diseases, all caused by bacteria or fungi. In fact, nearly all plant diseases not caused by insects or other animals belong to this class.

A printed list would be a long one. But, were plants and animals to vote on the greatest pest of all living things, no doubt man himself would receive a unanimous vote as the most wanton destroyer. And the object of all this so-called fighting of pests, in sum and substance, is but to make for man, that larger parasite, a little easier living, a little purer atmosphere to breathe, and perhaps add a span or two, to his human existence. Briefly stated, the present relative significance and abundance of each animal and plant group is the result of a struggle to make a living. In this struggle different groups began to prey upon other groups and the whole kingdom of living things (plants and animals) has become in a manner somewhat delicately balanced in regard to relative numbers.

NATURE BALANCED AND UNBALANCED.

But nature occasionally gets a little out of balance, so to speak. Either some plant or animal group gets out of its place and begins to feed upon some other plant or animal group not normally its food, or it increases abnormally either in proportion to its food or out of proportion with its natural enemies. In either case, it becomes a pest proper, in the sense that we ordinarily use the term. Our so-called fighting of pests consists also in nothing more than in an endeavor to restore the equilibrium in nature or in overbalancing the same in favor of the crop that we wish to harvest. To accomplish this we may use artificial means for combating the

pest, such as spraying, poisoning, fumigating, etc., or we may artificially spread, or propagate and spread, some known enemy of the pest that we desire to control, or in other words, propagate a pest of the pest.

As already stated, nature is generally quite balanced in the relative proportion of each kind of living thing. It is only when any one of these finds a great abundance of food, or some calamity keeps its enemies in check, or it is transplanted into some other country or district where its enemies have not followed, that it can increase abnormally. I refer, of course in particular, to plants and animals ordinarily known as pests. Thus if we plant an orange grove, we bring into existence an enormous amount of food for orange insects, with the result that the latter may increase enormously, much more rapidly, for a time at least, than their enemies. If left alone, the natural enemies of some of these would (in fact have done so), very likely at sometime strike a balance and control, if they did not exterminate, the same.

NATURAL ENEMIES OF SCALE INSECTS IN FLORIDA.

However, we do not ordinarily care to wait for nature to strike this balance, as it might necessitate replanting our grove for a life-time, and we either try to keep the insects off by some artificial means, or we try to discover their enemies and undertake to propagate them artificially, or in some manner encourage their increase. In the case of several of the scale insects of trees, in Florida, the fungus parasites of these have become very efficient whenever the same were not destroyed by extensive spraying, or whenever the grower

undertook to spread and encourage the same.

The several fungi parasitic upon scale insects in Florida are the Red-headed Scale Fungus (*Sphaerostilbe coccophila*), the Gray-headed Scale Fungus (*Ophiocentra coccicola*), and the Black Scale Fungus (*Myriangium durii*).

Several insect friends have also been active in keeping the scales of orange trees in check. Among these insect friends are several species of lady-bugs (beetles), the larvae of lace-winged flies (Chrysopidae), the larvae of the Hemerobians (Hemero-biidae), related to the lace-winged flies, and perhaps several fly-like parasites belonging to the Hymenoptera. The efficiency of all these fungoid and insect friends is so great that many citrus growers as well as some others have learned to depend upon them altogether.

FUNGOUS ENEMIES OF SAN JOSE SCALE IN FLORIDA.

The remarkable mortality among the San Jose Scale some ten years ago near DeFuniak was discovered by Professor P. H. Rolfs (Bull. 41), to be due to the red-headed scale fungus, already mentioned. About two years ago Mr. F. P. Henderson, of Arno, Florida, introduced some of this fungus into his peach orchard, and later discovered that the scale had been killed to such an extent as to amount to its control, if not its eradication. Based upon this extraordinary success in his own orchard, Mr. Henderson succeeded in convincing the Gainesville Orchard Company and the Griffing Bros. Company to introduce this fungus into the peach orchard of the former near Gainesville, and into the five-hundred-acre orchard of the latter at Komoko. Mr. Henderson collected

the fungus necessary for this work in great part from oak trees, upon which it frequently occurs in great abundance, growing upon the obscure scale (*Aspidiotus obscurus*). Judging from inspections made last February in these orchards by Prof. H. S. Fawcett and the writer, 95 per cent. to 99 per cent. of the scale was dead at the time of inspection. The black scale fungus (*Myriangium durii*) has also been instrumental in reducing the amount of scale in these orchards, and Mr. Henderson has stated, if I recall rightly, that he finds more of this black fungus in his orchard at Arno than of the red. Which one of the two fungi in question has been the most effective in these orchards we have not at present been able to decide.

OTHER ATTEMPTS AT CONTROL BY NATURAL ENEMIES.

Not a few successful and unsuccessful attempts have been made along this line with other insects. The most notable of these has been the attempt to control the increase of the chinchbug in several of the States by means of a fungus disease of this insect. The introduction of the Australian lady-bug to control the cottony cushion scale, originally introduced into California, is too well known to need anything more than mere mention. The former has not been a complete success, and I believe has been generally abandoned, while the latter appears to have been an unqualified success. The failure of the former is due to the general lack of favorable moisture conditions necessary for the rapid development of this fungus at the time when the chinchbug is most destructive. Whenever the conditions of moisture were favorable, the

fungus appears to have been abundantly successful in checking the chinch bug.

The fact that past efforts at obtaining an enemy from China of the imported San Jose Scale have not been successful does not indicate that this will not eventually be accomplished. Efforts are being made to find and import the natural enemies of the gypsy moth and the brown-tail moth into Massachusetts from Europe. Efforts are also at present being made to introduce the parasites of the purple scale of citrus into Italy where this scale appears to be on the increase. The officers of the Pasteur Institute are undertaking the introduction of an American robber fly into Algeria for the purpose of reducing the numbers of a certain tabanid (a member of the horsefly tribe) known to be instrumental in spreading a certain disease of the dromedary.

While Americans have not been idle in the matter of propagating fungus and insect parasites of insect pests, on the other hand some very interesting work goes to the credit of foreigners. I have already referred to the presence of the purple scale of citrus in Italy and the effort to obtain a parasite of the same from Florida. It is now nearly a year that I prepared (at the request of Dr. L. O. Howard) a box of citrus leaves and twigs heavily infested with this scale to be shipped to Dr. Berlese of Italy for this purpose. I have also previously referred to the efforts of the Pasteur Institute in behalf of the dromedary in Algeria. I shall next briefly review a few more instances of like nature and interest.

Experiments have been made by German and French investigators to destroy the grubs of cockchafers by means of a fungus frequently found parasitic upon these. An effort has been made in France

(but only partially successful) to control a certain turnip weevil by infecting the soil with a parasitic fungus in order to destroy the grubs. In South-west Africa grasshoppers have been in part controlled by means of a species of mucor (*Mucor locusticida*), a relative of the gray bread mold.

One of the most successful as well as important efforts in this line relates to the destruction of field mice in Thessaly by the use of the *Bacillus typhi murium*, or in plain English the bacillus of mouse typhoid. This germ is distributed (1903) on small pieces of bread or other culture media used for growing fungi and bacteria in the laboratory by several of the states of Germany and Austria. It is not known to be injurious to man or domestic animals. A disease-producing microbe of rats has also been discovered by a Frenchman.

In 1906 six disease-producing bacteria were cultivated and recommended by the state laboratories of Russia. These were recommended for the destruction of the following animals: House-mouse, rats, marmots, wood-mouse, field-mouse, earless-marmot, and the Norway rat.

THE WHITEFLY AND ITS FUNGUS ENEMIES.

With this fragmentary review before us, I desire next to take up in some detail the work done in Florida on methods of distributing the several fungi, parasitic upon the whitefly. The remarkable increase of the whitefly is perhaps best explained by the probable fact that this insect is a foreign importation with but a few of its natural enemies, the fungi, coming along with it. The great increase of this insect in newly infested sections of the state can also be explained in this way: The fungi do not at once follow the fly to these newly infested sec-

tions. The generally persistent presence of the fungi parasitic upon the whitefly in whitefly infested groves after they have once been introduced, and the thoroughness with which they do their work, when once well under headway, places these fungi among the most remarkably efficient of fungus parasites. These fungi came unbidden to begin their good work, and not a few growers have learned to spread them from tree to tree and from grove to grove, and are depending altogether upon them to keep the fly in check. The number of the fungi parasitic upon the whitefly is generally given as three, although a fourth one, the red headed scale fungus already mentioned, occasionally develops upon the whitefly larvae; but the number it destroys, so far as observed, is insignificant. These three fungi are the Red, the Yellow and the Brown. The red and the brown are pretty generally distributed throughout the whitefly infested groves of western Florida from Fort Myers to Lake City, and as far east as Orlando. The red fungus has been known for about fifteen years, and the brown for about eleven. I desire to emphasize that this red fungus of the whitefly is not the same as the red-headed scale fungus already mentioned several times. The yellow fungus was first recognized as such by Prof. P. H. Rolfs last September on specimens sent in from Winter Park, Florida. At this writing the yellow fungus appears to be limited to Eastern Florida, and is found in the groves at Orlando, Winter Park, Oviedo, and Mims. The scientific name of the red fungus is *Aschersonia aleyrodes*, Web., of the yellow *Aschersonia flavo-citrina*, P. Henn. The fruiting stage of the brown not being known, this fungus has received no definite name. It is this so-called

Brown fungus, furthermore, for which some evidence exists that it represents two fungi. Professor H. S. Fawcett, of the Florida Agricultural Experiment Station has several times observed a form of this fungus that he thought might be the fruiting stage and even succeeded in getting artificial cultures from which he again succeeded in infecting whitefly larvae. This fungus, however, appeared to be a species of *Verticillium* and somewhat different in appearance from that of the Brown as it ordinarily appears. Recently a similar condition, but not fruiting, was observed by him on some specimens sent in by the writer from Palmetto, Fla. These latter specimens presented two forms of Brown on the same leaf, thus indicating very strongly the presence of two fungi, each working on the larvae of the whitefly. Further observations must determine whether these different appearing fungi are different forms of the same fungus or distinct species and also their relative efficiency.

A UNIQUE PHENOMENON.

The phenomenon of these several fungi parasitic upon the larvae and pupae of the whitefly in Florida is unique in several ways: (1.) The fact that there are at least three of the fungi practically limited to a single food supply (the larvae and pupae of the whitefly) is surely remarkable; (2.) The abundance of infecting material generally at hand in infected groves practically ready to be used for starting the fungi in other groves, together with (3.) The relative ease with which this can be applied in infecting other whitefly-infested groves are facts of great importance to the man in charge of the grove; (4.) The favorable climatic

conditions generally existing during a good part of the year in Florida is not the least of these.

In the majority of instances where natural enemies of an insect pest were employed for its control the material either had to be imported or cultivated at some laboratory and distributed from there. Again, since it could not well be foretold when an outbreak of the pest would occur, it became necessary to keep a supply continually under cultivation. In the instance of the whitefly the grower need not fear any sudden outbreak of the pest. He knows beforehand just about what he may expect and what the situation is. Neither does he have to depend upon the Station for a supply of fungus. I shall add, however, that we do expect to cultivate these fungi at the Experiment Station, and we expect to leave no stone unturned until we are able to do so. That our Professor H. S. Fawcett has made some progress along this line will be evident from some of the lantern slides which I will show later in the evening. I must frankly add, however, that our first effort along this line on a large scale was not a success. But, unless some unforeseen and unsurmountable difficulties are encountered we hope to succeed.

DIFFICULTIES.

I have one regret, namely, that the freeze of last December, together with the prolonged drought of the past six or seven months, has so reduced the amount of the fungi that it will be difficult to obtain any large quantities for some time this season. I hope, however, that by the middle of this summer a new crop will have started. The frost reduced the amount of the fungi by causing the leaves

to drop from the trees, while the drought has caused it, as well as the leaves, to curl and large quantities have been loosened from the leaves and dropped to the ground.

Another factor which may possibly interfere somewhat with the efficiency of the Yellow Fungus is the discovery of a fungus (a species of *Cladosporium*) that lives upon the yellow. This has been observed by Dr. A. W. Morrill at Orlando and by myself at Mims (near Titusville) and Winter Park. When I first observed it at Mims last December it was on some trees that had been sprayed and I then lightly passed it over, thinking that the yellow fungus having been injured or killed by the spray this other fungus came on as a saprophyte. Dr. Morrill observed it more carefully at Orlando and considers it a parasite of the yellow fungus. My observations lead me to believe that this second fungus comes onto the pustules of the yellow fungus later in the season after the pustules of the latter have matured and have perhaps undergone some degenerative changes. Again, from the fact that this second fungus occurs in three of the strongholds of the yellow fungus, already mentioned, I cannot help but feel that its presence is of no great significance so far as the efficiency of the Yellow Aschersonia is concerned. If it were a serious pest of the yellow fungus I believe that the latter would have been seriously retarded in one or the other of the four places mentioned where the yellow fungus has been very effective. Besides, I do not believe it probable that this second fungus could have infested the yellow fungus in all four of the localities mentioned at one time and I therefore infer that the same has been present for perhaps several years without seriously re-

tarding the usefulness of the yellow fungus. Dr. Morrill observes (circular to the Press) that the Red Aschersonia is rarely attacked by the Cladosporium.

Dr. Morrill has recently called my attention to another fungus in the Manatee country which he believes may be a super-parasite of the brown. This fungus which occasionally overruns the brown much resembles a certain stage of the black scale fungus, *Myrangium duryii*, but a comparative examination of these two by Professor Fawcett has so far failed to verify the possibility of their identity. Personally, I believe in regard to this fungus as I do in regard to the Cladosporium overrunning the yellow fungus previously considered, that it attacks the brown fungus only after the latter has become weakened from old age or other causes such as drought, etc. To sum up, it appears that we have in these two possible super-parasites a new issue for investigation.

CONDITIONS FAVORABLE FOR THE FUNGI.

Nearly all fungi thrive best in the presence of an abundance of moisture, especially in a moist atmosphere. The past year has given me abundant evidence that the fungi parasitic on the larvae and pupae of the whitefly spread and increase but little during cool or dry weather. This fact limits the time for their introduction into whitefly infested trees and groves to the rainy season of the year or to the months of June, July, August and parts of May and September. These are the months during which success is most assured, but other periods of rain and warmth will be favorable. The moisture conditions may also be favorably supplemented by permitting plenty of vegetation in the nature of cover crops, wind-breaks, etc., to grow at the proper season.

Irrigation or sprinkling, where the outfit is at hand, will help in creating and conserving a moist atmosphere in a grove.

INTRODUCING THE RED AND THE YELLOW ASCHERSONIAS.

The chief drawback to introducing the fungi has been the supposed difficulty of starting ("planting") them in whitefly-infested trees. The matter appears to be much more simple than was heretofore supposed. At Lake City the writer succeeded (June 20 and August 8th, 1906) in introducing the Red Aschersonia into four out of five trees by pinning leaves, with an abundance of fungus pustules upon them, to the leaves of the trees. In two instances the fungus started in another part of the tree some distance from the pinned leaves, but as no other infected trees could be found within one-half mile of these, it is considered safe to assume that the fungus started from the infected leaves placed there. In two of the successful instances the leaves with the fungus pustules upon them were dry and had been picked about a month before being pinned into the trees, showing that the spores of the fungus retained their vitality for at least a month and no doubt longer. It was also found that the fungus had started in three different trees at Leesburg, into which Judge J. B. Gains had pinned some leaves. No Red Aschersonia had hitherto been observed at Leesburg. Since writing the first part of this paragraph, the writer has found the fungus started in each of thirty-seven trees into which he had pinned leaves of the Red Aschersonia six weeks previously (August 15th) at Leesburg. In all, forty-two trees had been treated in this manner, but five of them were not examined for lack of

time. In many of these trees the fungus had made good headway, and in one instance Judge Gaines reported that it had started at the end of two weeks from the time of infection. W. H. Maxwell of Titusville, also reports that he has observed the Yellow Aschersonia to start in two weeks after "planting" (pinning leaves) the same in trees infested with whitefly.

The writer has also succeeded in starting the Red Aschersonia by spraying a mixture of spores and water on the under surfaces of the leaves in trees infested with whitefly. This method of application was successful in starting an infection in two out of three citrus trees, sprayed at Lake City (July 10, 1906). In each case (leaves pinned or spores sprayed) the fungus was observed to have started in three to four weeks from the time of application of the spores or leaves. Eight trees were also sprayed at Leesburg at the same time (August 15th) that the fungus was started there by pinning on leaves, and examination six weeks later, showed that the fungus had started in each tree.

These experiments are a *complete demonstration* that this fungus can readily be started either by pinning on leaves or by spraying on spores, there being only one failure in fifty-two trials made during the months of June, July and August, 1906.

Hitherto, planting into a grove small trees with fungus-infested whitefly larvae upon them has been considered the only sure way of introducing it. This method is good and sure, where the trees can be kept from dropping their leaves, but is rather impracticable on a large scale. The infected trees should be planted so that their branches and leaves extend among

the leaves of the tree to be infected. If necessary, the infected trees may be planted in tubs and raised on platforms or otherwise elevated.

One serious objection is raised in regard to the efficacy of the fungus, namely, that when it has practically killed off the whitefly and the fly starts to infest the grove anew, it takes the fungus so long to start that the fly has done considerable damage before the fungus gets it under control. The situation appears to be about as follows. During one year the fungus cleans up the fly; the second year the grove is generally clean, also the fruit; the third year the fly reinfests the grove, and the trees and fruit are again black with sooty mold; then the fungus does its work again; etc. Now, in view of the fact, that the fungus can be introduced by pinning on leaves or by spraying on spores, *the fungus should be started at the same time that the whitefly larvae are first observed*, and while the progress and injury of the fly may not be wholly offset, yet I believe a great deal can be done in this way to lessen the injury. It is purely a question of helping nature (the fungus) along by guiding her at the critical moment. *This is an important point.* A grower should not wait for the fungus to start of its own accord but should start it himself as soon as he discovers the presence of the whitefly and this should be done whether the fungus has previously been present or not. The fungus should be introduced and handled with the same rational consideration with which spraying or fumigation is carried on. Because the fungus is a natural remedy and will of itself (generally) spread and reduce the whitefly is no reason why *rational means for artificially spreading the same should not be used*.

BY SPRAYING ON SPORES OF THE FUNGUS.

If it is decided to introduce the fungus by means of spraying on spores, care should be taken to spray against the under surface of the leaves. Future experiments may show that this precaution is not necessary but we are not likely to go very far astray by adopting it for the present. Forty well developed pustules having the bright red spots upon them are sufficient for a pint of water. Two well infected leaves may be taken as representing the forty pustules but one leaf will frequently have the required number and often more. A pint of the solution, I believe, should be sufficient for a tree of ordinary size where a very fine spray is used. From this it will be seen that spraying is the most economical in so far as infecting material required is concerned. Three thousand leaves will about fill a bushel measure. Two leaves per tree to make the spray, gives us fifteen hundred trees that can be treated with this number of leaves. Where an abundance of leaves are available the spraying solution may be made stronger; it cannot be made too strong. After having poured the water over the leaves and stirred the same about for a few minutes, fifteen to thirty minutes should be allowed for the spores to become dissolved out of the red spots on the pustules of the fungus. Then the mass should be stirred again, thoroughly, in order to wash out all the spores possible. Do not permit the solution to settle but strain the liquid at once through a piece of cheesecloth or fine wire sieve. An atomizer spray is to be preferred because it does not require so much liquid to spray the tree. At all events, a nozzle that produces a very fine spray should be used. The above estimate of one pint of liquid per tree was

based upon an atomizer spray. If on the other hand, no atomizer is available, a spraying machine may be employed. The spraying solution should under no conditions be permitted to stand in a copper or brass tank, for the amount of copper that would go into the solution might be fatal to the spores, as these are very sensitive to copper. If a spraying machine made wholly or in part of copper or brass, must be used, the same should be thoroughly cleaned before using, and then the work should be done as expeditiously as possible. If it is necessary to use the copper or brass reservoir connected with the spray pump or spraying machine this should be partially filled with the solution, enough only being put in, to spray three or four trees. Spray the solution on the under surface of all the infested leaves giving special attention to the heavily infested new growth. If it happens that only a limited amount of the spraying solution is available it may be diluted with water. Thoroughly spraying all the trees with a weaker solution is considered preferable to spraying half the trees, or only part of each tree, with a stronger solution.

It goes without saying, that it would be futile to introduce fungus into a tree not infested with whitefly. The fungi in question, so far as known, can thrive only upon the whitefly, so that there would be nothing for them to live upon in a non-infested tree. It will also be well to wait before introducing fungus into a tree until the whitefly larvae can be abundantly found under a considerable number of leaves. To spray every tree in a grove regardless of the individual requirements of each tree would frequently lead to waste of material and labor. The writer's plan of campaign would be as follows: Start the fungus in all the trees in which

the whitefly larvae can be readily found. Later, say in three or four weeks, inspect the grove and spray all the trees not previously sprayed and which now show the presence of whitefly. In another three or four weeks inspect again and spray. Each tree should be considered individually and treated accordingly. Any trees not showing a good start of fungus in three to six weeks should be sprayed again, wholly or in part. This kind of procedure should be continued from year to year, and the prediction is made that in a comparatively few years, when the citrus growing sections of the State have in this manner been thoroughly saturated with the fungi, there will be no whitefly problem.

I have stated above that the fungi in question can thrive only upon the whitefly larvae and pupae and this is probably true in nature. In the laboratory, however, Professor H. S. Fawcett has been successful in growing the Yellow and Red Aschersonias, and to produce spores, upon several of the media generally used for such work. There is but little doubt that the Brown Fungus can be cultivated on the same media. This opens up the possibility of producing spores of the fungi in the laboratory for use upon trees. But as an abundance can generally be obtained from infected groves it is not likely that we shall very soon be compelled to depend upon artificial means for a supply. The fact, however, that a fungus can be cultivated artificially gives the scientific investigator greater opportunity for careful and varied experiments and observations that may eventually lead to broad scientific principles of practical value.

I wish to state again that if the first attempt at introducing the fungus fails to produce a good start in a grove, or in individual trees of a grove, a second at-

tempt should be made and a third one if necessary. This kind of spraying is much cheaper (and I believe spraying on the spores is preferable to pinning on the leaves; but both methods can be used) than spraying with insecticides, and is perfectly harmless to the trees. This point, furthermore, should not be lost sight of, that the increase of the fungus in a tree (other things being equal) is in the same proportion that we succeed in starting it in that tree. Thus, if we succeed in starting 100 pustules of fungus in one tree and 300 in another, it will be evident that the spread of the fungus in the last tree will be three times as rapid as in the first one, and hence the importance of making as good a start of fungus as possible by repeated sprayings.

Attention should also be directed to the fact, that for subsequent sprayings, fungus from the trees previously treated may be used, provided it is sufficiently developed. This will be evident as the pustules increase in size and become a bright scarlet red in the Red Aschersonia or a bright yellow in the Yellow Aschersonia.

BY PINNING ON LEAVES.

To introduce the fungus by pinning on leaves I would suggest that from one to a dozen or more well infected leaves be pinned to a tree. The number will be determined by the amount available. At Leesburg 12 leaves per tree were used. Each infected leaf should be pinned to the under surface of the leaf on the tree, with its under surface down, that having been its position before it was removed from the tree and is in closest keeping with nature. The infected leaves might be pinned with the infected (or under) side against the under side of the leaves on the tree, and I have obtained good results in this way,

but for the sake of keeping close to nature I advise the other way for the present.

Each infested leaf should be pinned as high up in the tree as is convenient, that is, at least as high as a man can reach. To pin it higher is desirable. It should, furthermore, be so placed that the drip from it, when it rains, will drop onto a cluster, or several clusters, of leaves beneath it. Use two pins for each leaf. I have observed that the fungus sometimes starts on the leaves beneath the pinned leaf rather than at the leaf to which the infected leaf was pinned. It is well to pin a small piece of paper on the upper surface of the leaves to which the infected leaves are pinned as a mark. This will greatly facilitate later inspections.

THE BROWN FUNGUS.

What has been said for the Aschersonias applies (with one probable exception) also to the Brown Fungus. The spores of the Brown Fungus have not been discovered, and this fact makes it uncertain whether it can be successfully introduced by spraying. This leaves two methods available for introducing the Brown Fungus: (1) to pin leaves having whitefly larvae infected with the fungus upon them onto the leaves of the tree into which it is to be introduced; (2) to plant small trees, having the fungus upon them, into the grove as previously explained for the Aschersonias. (See also Bull. 88, by the writer, Florida Agricultural Experiment Station).

CONCLUDING STATEMENT.

So much on the subject of the fungi. I should be extravagant were I to herald the same as an absolute panacea. They are, however, a very valuable adjunct to a whitefly-infested grove and with a

thorough knowledge of how to best introduce the fungi, together with a little extra fertilizer for each tree, the grower will be able to continue the growing of citrus fruits profitably, other things being equal. I should not hesitate, however, to recommend judicious spraying in isolated groves (i. e., isolated by sufficient distance or forest barriers from other groves) or on small trees where the work can be done thoroughly. By judicious spraying I mean that the man knows the proper time to spray and to spray thoroughly. And then, I should recommend spraying only in the nature of a makeshift to tide over a certain period pending either the introduction of the fungi or fumigation. Following Dr. Morrill's careful experiments and observations on fumigation for the whitefly during the past year, I anticipate that many growers will take up this method of controlling the whitefly, and that rightly so. And, as more experience along this line becomes available it appears not at all improbable but that many growers will prefer to control the whitefly as well as other insects by fumigation. This will be especially true for growers or districts so isolated as to be comparatively safe from becoming immediately reinfested from nonfumigated districts.

In regard to the subject of insect control by means of their natural enemies in general, many efforts along this line have been only partially successful or complete failures while perhaps only a few can be accorded complete success. But the fact that there are failures does not indicate that any particular effort along this line will be a failure, since each case must be worked out on its own merit. This brings us to another important fact which may be of much value in guiding our efforts to control insect pests by means of their

insect or fungoid and bacterial enemies. We may roughly divide insect pests into (1), those which are always with us, such as scale insects and the whitefly, and (2) those whose appearance in sufficient numbers to be destructive is uncertain. Among such may be mentioned the several leaf-hoppers, destructive to corn, beans, etc., grasshoppers, chinch-bug, and others. The fact that these latter can generally be found only in small numbers, or practically disappear altogether, except during periodic and sporadic periods of increase, this results in a natural decrease of their enemies to a minimum. It being practically almost impossible to cultivate a supply of their insect enemies on artificial foods or other insects, and generally difficult enough to artificially cultivate their fungoid or bacterial enemies, it follows that the enemies of these pests are generally not at hand in sufficient abundance to meet the requirements when an outbreak of such a pest occurs. All this, together with the possibility of unfavorable weath-

er conditions, in case the enemy supplied is a fungus, makes the proposition a difficult one.

When considering the proposition of controlling the first (1) class by means of their natural enemies we have this great advantage, namely, that the insect is generally with us in abundance at all times and hence also its enemies; and our work is simplified to this extent, that about all we have to do is to devise methods of spreading its enemies to keep them abreast of the pest and to protect them by creating conditions favorable for their increase.

If we desire to supplement their natural increase by cultivating them in the laboratory, it will be mainly for the purpose of observing them at closer range and under peculiarly favorable conditions otherwise unobtainable. It is under the favorable conditions accompanying this first (1) class of insects that we are laboring in our effort to control the whitefly and scale insects of Florida.

PLATE VI.

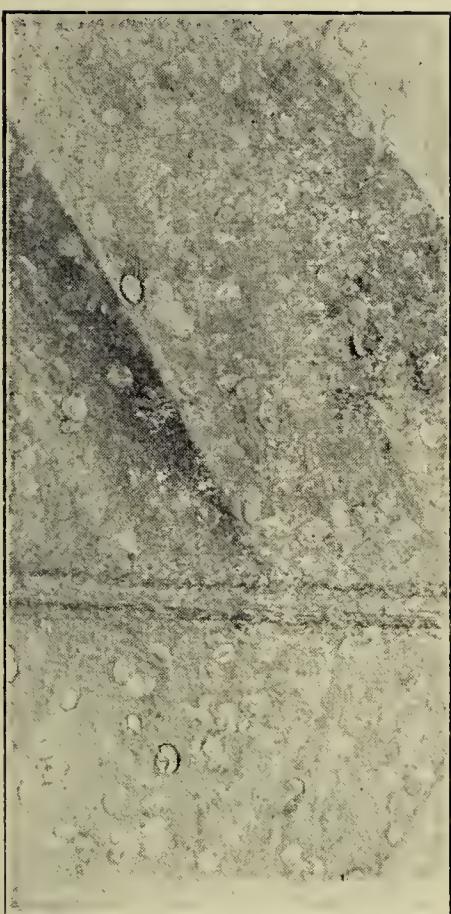


Fig. 1.

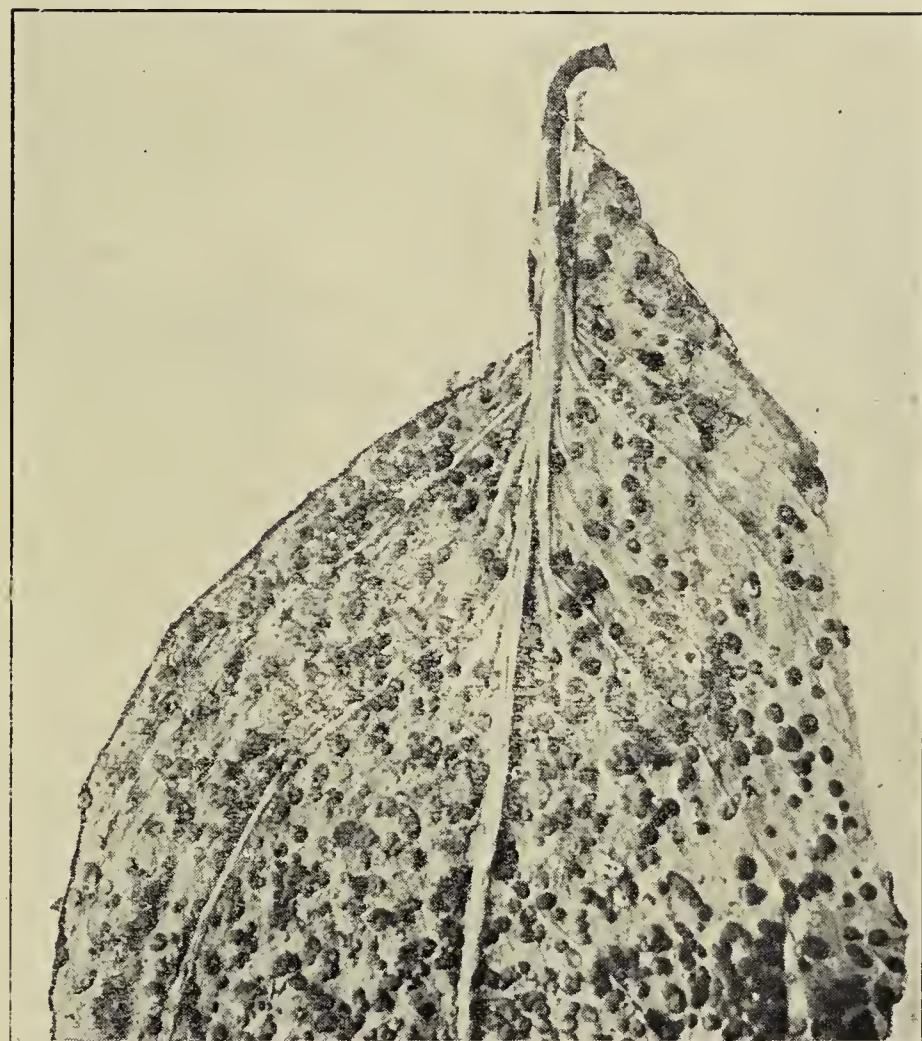


Fig. 3.

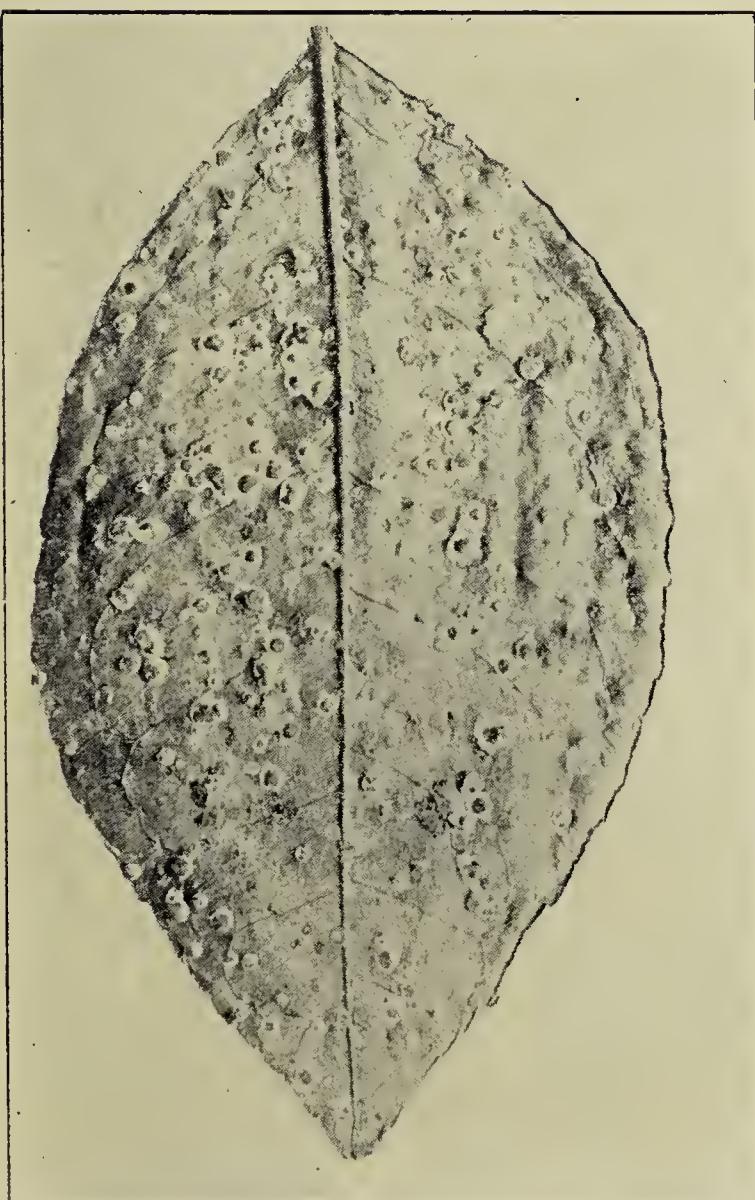


Fig. 2.



Fig. 4.

EXPLANATION OF PLATE VI.

This Plate is the same as plate III of Bulletin 67, by H. A. Gossard.

From Photographs.

Fig. 1.—Larvae and Pupa of White fly on Orange.

**Fig. 2.*—Red Fungus, *Aschersonia Aleyrodes*, Webber.

Fig. 3.—Brown Fungus on Orange.

Fig. 4.—Adult Flies and Eggs on Orange.

*This figure may represent the Yellow Fungus, *Aschersonia flavo-citrina*, P. Henn.

E. W. B.

The Influence of Packing Methods on the Carrying Qualities of Citrus Fruits.

By Lloyd S. Tenny.

(Assistant Pomologist.)

Mr. President, Ladies and Gentlemen:

The agricultural interests of the world have made immense progress in recent years, especially true is this in this country. In a single generation there have been developed our modern system of State Experimental Stations and the National Department of Agriculture. It was only recently that the primary object of these institutions and frequently the only real one, was the studying of plant diseases. This in turn gradually led into the work of plant breeding in all its phases, the securing of varieties resistant to certain diseases, those especially adapted to one soil or one climatic condition, and thus the work has broadened, not only along this line but along every line, until now we find the Department of Agriculture and many of the State stations undertaking a careful scientific research along a multitude of lines connected with the farming interests. No phase of the subject is considered too small or too unimportant to be left out.

One of the subjects into which this study has led us at the Department of Agriculture is the transportation side of fruit handling. The wonderful extension of our railroads and the great headway that has been made in the methods of transporting perishable produce, has made it possible for every section of the country to produce those fruits and vegetables best

suited to its soil and other conditions. And so the vineyards and orchards of California, the gardens of Texas, and the semi-tropic fruits and vegetables of Florida have come to be well known things over the country. But the one thing which has made all this practicable and has enabled the man of New York or Denver to have Florida fruits upon his table is the development of the transportation side of agriculture. The study of these transportation subjects and the methods of harvesting and packing fruits intended for distant markets is a study worthy of real investigation. What commercial advantage would it be to Florida to produce a delicious orange if you growers and shippers were unable to put this on the market at a profit.

Uniformly almost during recent years has good fruit demanded excellent prices. Methods of orchard management have been improved, so that the yield is nearly certain and the quality of the fruit high, the various fungous and insect diseases are watched and methods of preventing their spread sought, and so along every line we find the conditions such as to justify us in expecting an industry at a very high point of development, and such do we find to a great measure. The fact remains, nevertheless, that while we are producing something like a 4,000,000 box

crop in this State, worth some ten millions of dollars, that the profits to the ordinary shipper are comparatively small. I realize at the same time that doubtless most of the orange men here today are conducting their business on a liberal margin of profit; at the same time you will admit that there are those in your immediate neighborhood who are not so fortunate. These conditions exist in a measure at least from the great losses there are in transit from decayed or wasty fruit.

THE EXTENT OF THE LOSS FROM DECAY.

It is difficult to estimate the extent of this loss, since no accurate and detailed inspection reports are made, but not one of you will deny that there are heavy losses. As we have come into closer touch with the shippers throughout the State, we continue to get more of the inside information regarding this sort of loss. It is not uncommon to hear of cars arriving at destination with 20 or more per cent. decay; even in some exceptionally bad cases it runs as high as 50 per cent. From personal conversation with many of the large Florida commission men in New York City, a 15 per cent. loss seems a conservative estimate. One of the very large houses and one that favors Florida fruits, expresses their opinion as follows:

"The past season has been an exceptionally good one, and 10 per cent. would cover the losses in most of the cars, but in former years a 20 per cent. or 25 per cent. decay was not uncommon. We should think that a 15 per cent. waste would be a fair average for several years."

But for our purpose let us be even more conservative in our estimate of the loss from decay in transit and place it at 10 per cent., which means but 7 or 8 rotten oranges in each half bix of 150s. With

this moderate loss, it means on a crop of three million and a half boxes, the loss of three hundred and fifty thousand boxes, or over one thousand cars of fruit. If the cost of picking, packing and shipping amounts to one dollar and a quarter a box, then you are paying out over \$400,000 to harvest rotten oranges. If you are a shipper and buy your fruit at a dollar a box, that means another loss of over \$300,000, or to put the figures into one sum, you orange men of Florida are losing each year close to one million dollars from this one cause alone. The purpose of the Department of Agriculture in opening this line of experimental work is to determine whether this loss is a necessary one, and, if not, what are the causes and how far are the present packing methods to blame for the present condition of affairs. The subject is one that cannot be covered in an investigation extending over one season alone, nor over two, but it is one that must be followed for a series of years, or long enough to determine experimentally the effects of different methods of picking, hauling, packing and shipping, season after season. So let me say now that any statements made today or any results given, are only preliminary and subject to change as the work develops. The work was begun this past season, and, at the best, only a preliminary survey could be made the first year. Had it not been that the results obtained so far were so uniform and so suggestive, we would not feel justified in bringing before you even this preliminary report. I should like to say further that we are beginning this work with no set idea as to the influence of the packing methods on this subject, and so have no pet theory to advance. The work will be wholly experimental in nature, and our aim will be to devise methods of handling

the citrus crop with the least amount of loss in transit.

THE CAUSE OF DECAY.

The decay which causes practically all the wasty arrivals is produced by the growth of a common blue mold fungus, a low form of plant life. The spores which form the blue covering on the surface of a rotten orange act as the seed for the reproduction of this plant. These are ever present, the dust of the air is laden with them, and each orange doubtless has many of them on its surface. Before decay takes place, three things seem to be necessary, as they are necessary for the growth of any plant, a soil in which to grow, heat and moisture.

One of the characteristics of the blue mold fungus is that it seldom if ever lives on living tissue. A perfectly healthy uninjured orange on the tree is seldom seen decaying. When the fruit is picked the life of the orange does not stop immediately, the cells continue active for some time after. It should, therefore, be impossible for the fruit to decay soon after harvesting, and from experiments we see that a perfectly sound orange may be covered with these spores and held in a warm, moist room and yet no decay takes place. But once bruise the fruit or injure its skin, thus killing some of the cells, and one of the conditions for the growth of this decay fungus has been supplied; it has proper soil conditions. If you place this injured orange on your desk in a very dry place, or put in a very cold room, it probably will not rot, but pack it in a box, wrapped in paper, so that any moisture there may be retained, and then place the box in a warm, moist spot and the decay will be very rapid.

With this understanding of the nature and cause of the common decay, it becomes easier to see how the harvesting methods might have an important bearing on the keeping quality of the fruit. If the methods are such as to injure it by bruising or cutting the skin, then we would look for decay, and in turn careful methods should give sound fruit.

THORN PUNCTURING.

Starting our investigations with the fruit as it hangs upon the tree, some injury has been done already by thorn puncturing and branch injury. In seedling orchards this damage at times may run quite high, and after a period of warm, moist weather, decaying fruit may be found on the tree. Close inspection of some of these in the early stage of the rot will generally show that the decay is beginning around some sort of a mechanical injury, although it may be so small that it is scarcely seen without the aid of a hand lens. This class of injury is increased by the method of picking, namely in the setting the ladder, by the picker pulling the branches about, and by his hitting the fruit against the thorns. In examining fruit from the same tree, picked by different men, it is common to find in one box five or six fresh thorn bruises, while in another not one is seen. A small number of counts made so far indicate that about 6.6 per cent. were thorn or tree injured. This varies from one to 22 per cent. Lots with 5 per cent., 3.9 per cent., 6.6 per cent. and 6.8 per cent. were found.

CLIPPER CUTTING.

Enormous damage may be done by puncturing the fruit with the clippers in the act of picking. On the other hand, it

is not necessary to do any damage. Three years ago when Mr. G. Harold Powell, of the Department of Agriculture, began his work with the California citrus fruits, he found as high as 15 or 20 per cent. of the crop made subject to decay from this thing alone. He and his associates made records on hundreds of boxes, with the result that at that time a 5 per cent. injury was as low as could often be found; frequently the per cent. ran to 25, not infrequently to 40 or even 50, and with some individual pickers even to a higher amount. The shape of the Navel orange as grown in California, with a sunken area around the stem, favors this injury with the clipper. In attempting to cut the stem as close as possible, the shears punctured the skin. To a much less extent, this damage is found in Florida. The round orange is more easily clipped with a short stem, and there is much less danger of its being cut. A count of a considerable number of boxes show 5.9 per cent. clipper cut. In many cases no injury was done at all, and in a few the percentage ran high.

Mr. Powell has demonstrated by many shipping tests, and it is accepted as a fact among California shippers, that an orange with a broken skin is liable to decay in transit. Boxes of that class of fruit have reached New York City this past season with as many as 105 rotten oranges in a box of 126s. When injured fruit is shipped under ice or during cold weather, the decay upon arrival is often small. This same fruit shows a rapid breaking down, however, when it is held a few days upon the market.

The following chart will indicate the amount of decay in injured fruit as compared with sound lots:

CHART I.

| | |
|---------------------------------------------|--------------------|
| Apparently free from mechanical injury..... | 2 per cent decay. |
| Mechanically injured..... | 48 per cent decay. |

The average for the sound fruit is 2.9 per cent. decay, while the injured fruit ran as high as 48.7 per cent. rotten. These figures are the results of the work done in Florida, and while the tests have been few in number, yet they only confirm the results obtained in California with series extending over a long period of time.

LONG STEM PUNCTURES.

Another type of injury is the puncturing done by long stems. Some pickers leave a considerable number of stems sufficiently long to pucture other fruit. This damage may be done as the fruit is dropped into the picking bag, from the movement of the oranges in the bag, in the hauling, or somewhere in the packing house.

INJURY FROM DROPPING.

It was a question, however, whether all the decay which develops in a car of oranges in transit from Florida could be attributed to the above causes. With 3 or 4 per cent. thorn punctured fruit, 8 or 10 per cent. clipper cuts, and some additional stem punctured oranges, it is difficult to explain a 40 or 50 per cent. decay. These high percentages seem to indicate that at times at least nearly or all of the fruit was made susceptible to decay. To a fruit man, unaccustomed to your methods of hervesting and packing, the most probable explanation of this condition would be in the amount of rough handling and dropping to which the fruit is subjected. The picker in his hurry lets the fruit fall into

his basket or bag and generally takes pains to give each orange an extra shove with his shears as he aims the fruit toward the basket. He often holds the branch with one hand and allows the oranges to drop the 18 inches or 2 feet into the basket. In an ordinary gang, a drop of 12 inches seems about the minimum which any orange receives in the picking; two feet is not uncommon. In pouring into the field crate, which is 13 inches high itself, the mouth of the bag is held 6 inches above the box, and here is another drop of 18 inches onto the bottom. Not counting the rough handling in loading and in hauling, sometimes over very rough roads, there is another very dangerous drop into the hopper. This is often large and the fruit rolls down a steep gravity run and hits again. With another tumble into the bins the oranges are ready to pack. The question then is, does dropping make the oranges susceptible to decay? The only way to settle such a question is by experimenting. Pick carefully some boxes of oranges, pack half the lot as they are, drop the other half a certain known distance—we selected 18 inches—then pack them and hold along with the first lot for 10 days or two weeks. Do this, not once, nor twice, but a hundred times, and you will begin to know whether an 18 inch drop will cause any decay. Here are some of the results of our first year's work.

These experiments were done in your own packing houses, through the courtesy and excellent co-operation of the owners and foremen. At the same time that the experimental lots were packed, several boxes from the regular house pack of the same fruit were set aside. These were picked, hauled, and packed in the usual manner and by the regular workmen. In preparing the series of dropped fruit, un-

usual care was taken to have the oranges picked carefully and not dropped into the bag and box. All mechanically injured fruit was removed and there were no long stems. Just before packing each orange was held 18 inches above the floor or bottom of the box and dropped separately this distance.

CHART II.

Carefully handled... 1.9 per cent. decay.
Dropped 18 inches... 32.0 per cent. decay.
Regular house pack... 42.0 per cent. decay.

CHART III.

Carefully handled... 2.8 per cent. decay.
Dropped 18 inches... 13.0 per cent. decay.
Regular house pack... 21.5 per cent. decay.

CHART IV.

Carefully handled... 0.0 per cent. decay.
Dropped 18 inches... 21.8 per cent. decay.
Regular house pack... 18.7 per cent. decay.

CHART V.

Carefully handled... 10.0 per cent. decay.
Dropped 18 inches... 77.0 per cent. decay.
Regular house pack... 61.0 per cent. decay.
Mechanically injured... 98.0 per cent. decay.

CHART VI. SUMMARY.

Carefully handled... 2.9 per cent. decay.
Dropped 18 inches... 20.1 per cent. decay.
Regular house pack... 22.9 per cent. decay.

Charts II to V give the results of some of the individual experiments. Many more were made and chart VI summarizes the results of them all. The only difference between the fruit which showed 2.9 per cent. decay and that which con-

tained 20.1 per cent. was in the drop of 18 inches. How much of the 22.9 per cent. waste in the house pack may be attributed to a similar cause, we will leave to you to judge, who know something about the amount of rough handling a box of fruit ordinarily receives.

SUMMARY.

It does not seem best at the present time to make any very definite recommendations. I should like to present, however, the following questions for your consideration.

Is there not an immense amount of rough handling in your orange groves and packing houses?

Is it not reasonable to expect, and do the experiments not indicate, that the injured and dropped fruit has been made susceptible to decay?

Other conditions, such as the amount of moisture and heat at the time of packing, the length of delay in shipping, the time in transit and the character of the weather encountered, all have their bearing. But as a preliminary consideration, is it not more than probable that the packing methods have much to do with the keeping quality of citrus fruits?

DISCUSSION.

Member.—What is the character of the land? High pine land fruit?

Mr. Tenney—All kinds. This is one of the things of which more definite notice will be taken another year. We did not find a great deal of difference in the results where the experiments were made with high pine land or hammock land fruit. There were, however, striking differences in individual lots of fruit.

Mr. Hart.—A question I have in mind is whether, if that fruit was kept

a little while and cured and softened up, it would not have gone through with less percentage of rot. When an orange is just off the tree and rigid, the drop would injure it considerably more than after it had been off the tree for 24 or 36 hours, and that brings up the matter of whether curing is desirable or not before shipping.

Mr. Tenny.—Oranges that have been picked some time will probably not be injured as much by dropping as those that are freshly picked. The difficulty, however, lies in the fact that a large proportion of the damage is done in the picking, hence curing some time after picking will not remedy the trouble. Under your present harvesting system, the trouble is in getting your fruit into the packing house. There is little doubt that an orange that is cured will stand a drop better than one that is just picked and consequently hard.

Mr. Hart.—Then another important point is that where fruit is shipped in small quantities, it is loaded largely by the freight handlers, and it is not unusual for them to shoulder the box and give it a shove and let it go. Now, if we had cured the fruit, I think it would have been injured less than when packed immediately from the tree and crowded into boxes.

Mr. Tenny—The matter of delaying the shipment will be taken up before our work is finished. I could give you some of the results from the California end, but do not feel justified in doing that, because the same conditions might not hold good here in Florida.

Mr. Hart—In putting on the covers of the boxes considerable injury might be done, while, if partly cured,

it might get into market in better shape.

Dr. Richardson—There has lately come into use a different kind of pack. We used to put the oranges in and press the top down and nail it. Now, the market seems to like a loose pack. The ends of the top are nailed down and the center at the partition, is not nailed down, and it bellies out. Was the pack you used the loose or the firm pack? I think the loose pack permits the fruit to be bruised.

Mr. Tenny—We use the firm pack. In any case, there was no damage in our experimental lots after the fruit was packed. Any injury that appeared on this fruit was made before the box was nailed up. The boxes were set in the packing houses very carefully and no injury was done by the dropping or the rough handling of the boxes.

Mr. Skinner—In my opinion, this is one of the most important sessions. Now, about the picking of the fruit; at the start I want to say that I don't see what we are going to do. I had one man six feet and over picking for me, and found him with his arms extended full length and dropping them down to the basket. I don't know how in the world we are going to get rid of the trouble. Last year, I provided my men with a bag to tie around them that had a kind of a proboscis. I also agree that there is a great deal of trouble in the packing, but how to overcome it is a question. Naturally, this brings up the labor question. I shipped this past season about 60,000 boxes, and every time I saw a fellow dropping an orange, it touched me right on a tender nerve. You can im-

agine that by the end of the season I was a nervous wreck. There seems to be seasons when everything carries well, and then another season when everything rots. Mr. Sampson shipped a carload of oranges to Augusta, Ga. and they were not over three or four days in transit, but when they arrived there, they were entirely worthless. I do not know how to meet these conditions. I expect to try a blower to see if I cannot dry my fruit. The atmosphere in this country is saturated to the full point with moisture, and sometimes the oranges are dripping wet with moisture from the atmosphere. I would like to know your opinion as to whether it would be practicable to use a blast of that kind to keep the fruit dry.

Mr. Tenny—This is a question considerably discussed in California. I am not willing to venture an opinion on it. The point in question is this: If the climatic conditions are such so that the atmosphere contains 90 per cent. or so of moisture, and this moist air is blown over the fruit, it may apparently dry them off, but in reality the air which is around the fruit after it is packed is still very moist. As the oranges continue to give off moisture after being packed, it seems probable that if the weather is moist, there would still be sufficient moisture to allow decay to take place. Regarding the question as to why one lot of fruit will decay while another packed apparently under similar conditions arrives in a sound condition, is possibly because the atmospheric conditions at the time of the two shipments were entirely different. One shipment may have been injured by the pickers, and

at the time of packing the weather was dry, while in a short time the conditions may be entirely different, and a lot of fruit injured in a similar manner to the first lot may show a heavy decay. The relation between the climatic conditions here at the time of harvesting and the decay conditions upon arrival on the market is something we want to investigate further. How much good may be accomplished by blowing air over the fruit, I do not know.

Dr. Phillips—I would like to ask what the gentleman thinks about using the brush.

Mr. Tenny—if your fruit is not dirty, do not brush it. Do not handle your oranges any more than is absolutely necessary. If they do not need washing or brushing, don't do it. They may be washed or brushed probably without serious damage, but make a practice of handling your fruit just as little as is possible. I know of no wash yet discovered that will kill the spores of the decay fungus and at the same time not injure the fruit. This fungus is the same that causes the blue mold on bread and other things, so the spores are ever present. It is not a parasite, it is a saprophyte; that is, it lives on dead tissues. It will not live on a live, healthy orange.

Mr. Gibbs—What class of labor do you depend on in California for picking oranges?

Mr. Tenny—They have the Japanese, Chinese, Mexican and hoboes. I realize that you have hard labor conditions here in Florida, but we had this same thing to meet in California. But let me ask you this. If all your orange trees were transformed in a night to peach trees,

wouldn't you gather the entire peach crop without punching them or dropping them? Wouldn't you?

Mr. Hart—This seems to be an experience meeting. Mr. Skinner was speaking about the question whether we could overcome the careless picking or not, and I would offer one suggestion which I got from Mr. Stevens in regard to that matter that has been of great help to me. That is, to have all your field pickers have a piece of chalk and put their numbers on the boxes. When it comes into the packing house, if there is any injury to the fruit that has been picked, you can identify the picker who did that work; then, of course, you can speak to your foreman and have him see that the trouble is corrected or the picker discharged. Where you have careless pickers (and they will get careless if not closely watched) they think that their fruit goes in with all the rest so you cannot identify it, and consequently they take little pains.

The next point is about the current of air in the packing house. I can take an orange and with my thumb nail cut through the cuticle clear around the orange and put it up on a beam and it will dry up and the wound will become air-tight. It can go into the market, if the conditions are fairly good, after it has left my packing house, in good shape. I believe a current of air is very important in a packing house, and if you can sweep a dry current of air through, it will heal those wounds.

Now, about the moisture in the atmosphere. If the fruit gets cold during the night, and the morning comes up bright and warm, the orange does not warm up as quickly, and the warm air deposits

its moisture on the oranges and makes them wet. I have my packing house so built and arranged that I can close it up entirely. If the night has been cold and the days are warm I close it up early in the day and keep my oranges dry until packed. If I open a window or a door, even for a few minutes, the oranges are wet.

As to the picking boxes, to avoid too deep a drop, I would have my field boxes shallow. I would not have them as deep as some do. For the picking receptacle I would not use a bag. There may be less danger of injury from dropping, but you can tell your men to put them into any receptacle without a drop. When they put them into a bag they are climbing over the tree. It is a thorny tree, and they cannot help but get the bag against the thorns and branches of the tree, or thumping it against the ladder. There is a gentleman here, I think, who invented a metal receptacle, so that you can stoop down and allow the oranges to slide through the lower end without any drop. I believe we can pick into these picking baskets safely. They are the best of any kind that I have found, when of the correct shape. The baskets are made by the Wakefield Rattan Company in East Boston. I have paid all the way from \$1.00 to \$2.50 for them.

Member—What size of basket is most desirable?

Mr. Hart—I think those that hold about half a box, fairly deep, but not wide from the body outward. The outside should be higher than that next to the picker.

Now, about brushing and washing. I do not believe you can put your fruit in really first-class shape with a brush,

unless you have water connected with it somehow. I wash mine particularly on account of the fly-specked fungus which gives the fruit a little cloudiness. Fruit shipped without has not such a tempting appearance, but that which has been washed meets more the demands of the very best trade and looks like pure gold. If you run a brusher over a rotten orange, you are apt to inoculate every bristle. I do not think that you can get satisfactory results without using water. To put the fruit on the market in the best possible condition, I think it must be washed. I think more and more will come to that conclusion and adopt the washer, and there is at least one washer on the market that will do it in fine shape and without injury if properly handled.

Out of my grove this year we lost simply one box of oranges from the whole packing. The lot in which that was, was shipped under extremely severe conditions after it left my hands. This year I shipped until the middle of March. I speak of this to show you that washing does not injure the fruit; if anything, it is of benefit. I have taken fruit picked by the same man, put half of them through the washer and the other not, and stored them away in the packing house and left them there for six or eight weeks, and in each test the unwashed fruit gave away first.

Mr. Tenny—I would like to ask Mr. Hart if his orange crop was a peach crop, if there would be any bruises on it when it was shipped.

Mr. Hart—Not if I could help it; nor are there any on any oranges if I could help it. I am especially particular about that, and not only have my pickers to be careful, but when the fruit goes into the

washer there is not an orange goes through, but that there has been a finger, thumb or eye on the calyx, and no long stem goes in. If there is a puncture in that fruit, that fruit is laid aside, every orange is examined again by the grader, and all found injured in any way are discarded.

Mr. Gibbs—Do you use any mechanical agency, such as potash?

Mr. Hart—Up to this year I used soap, but this year I have not used any at all and found the results equally as good. I prefer soft water, though I use some pump water. I prefer soft water, and think the oranges can be washed without soap successfully.

Mr. Julian—Could you put up five cars of fruit and do this?

Mr. Hart—Well, yes, sir ; I would

wash every orange. Of course, it is pretty nearly impossible for the very large shipper to give the careful handling to the fruit that a smaller shipper can, but I would do it just as nearly as I could, anyway, or sell off a part of the grove and get the same or a little better income by giving more care to the balance.

From the drying rack they go into the drying crates. These in my packing house, are made five by six feet and set on a bearing that allows of tipping to run the fruit to either end. The oranges are never two deep when curing. I do not intend to ship in less than forty-eight hours after my fruit is picked; a little longer is just as good. By that time injured fruit shows up and is culled out more easily and surely.

Report of the Committee on Fertilizer and Irrigation.

By E. S. Hubbard, Chairman.

Mr. President, Ladies and Gentlemen:

In considering the question of fertilizers I shall pass by the question of sources and percentages of the necessary elements, and devote my time to some of the problems of application and effects. An immense amount of valuable and often contradictory facts can be gathered on these questions, and it seems almost impossible to draw any exact conclusion on the subject, except that each individual user of fertilizers should strive to use the formula or mixture that will give

the best average results under the varying climatic conditions his crop and soil are subject to. It is needless to say that the past winter has been the driest in the memory of the oldest inhabitants, and I will use the Irish potato crop grown in my vicinity for a few illustrations.

It has been demonstrated that the grasses transpire through their foliage between 500 and 600 times their dry weight of water in making their growth, and I estimate that Irish potatoes use

between two and three inches in perfecting the crop.

As the evaporation in a season of average warmth and sunshine is doubtless fully as much more a minimum rainfall of between five and six inches must be registered, provided it is well distributed over the growing period, and no fall is so great as to run off in the drainage ditches.

Measured by the Weather Bureau rain gauge, the rainfall the past winter was as follows: November, .06 inches; December .44; January .47; February 1.07; March .96. The total during the growing months of January, February and March being just two and one-half inches, mostly in small showers that wet in very little, the greatest fall being just one inch on February 5th. The soil was already dry from the only one-half inch combined rainfall of November and December, and the evaporation owing to the unusual number of warm, sunshiny days was greater than the average. The rainfall, therefore, was less than half what was necessary for an average crop, while the crop averaged about two-thirds; the deficiency of rainfall having been somewhat made up by the subsoil water rising by capillarity towards the surface.

I noted exceptions, however, that were interesting. New Year's eve one man had over two acres of seed dropped by hand in ridges split by a bull tongue, so that the fertilizer mixed in the soil was practically exposed. That night there was a shower of .05 inches, and the man woke in fear and trembling lest his seed should freeze before morning. He covered it early next day with a disc ridger and harvested 45 barrels per acre, the average annual yield being about 40

barrels. This .05 inches of rain, therefore, by dissolving his fertilizer and surrounding his seed with wet soil nearly doubled his yield over an adjoining field planted two days earlier.

Another man had his fertilizer in the opened ridges exposed to two showers, December 20th and 21st, aggregating .29 inches, and harvested 35 barrels per acre. Another man irrigated with an artesian well running the water in ditches between his lands which are some forty feet wide, and harvested fifty barrels per acre. Later planted potatoes are usually more prolific, and some irrigated fields at Hastings are reported as yielding 80 barrels per acre, while newly broken, unirrigated fields were not worth digging.

This illustrates the advantages of dissolving fertilizers and irrigation in dry seasons; but, on the other hand, the problem of very wet seasons is equally serious. The previous winter the rainfall was 1.42 inches in November, 3.54 in December, 3.72 in January, 3.51 in February, and 2.25 for March; the total for the three latter months being 9.48. There was much cool, cloudy weather with small evaporation, and the rainfall was twice what the potato crop needed. This season, nitrate or soda applied to the mixture before planting was undoubtedly nearly all lost, and similarly to other seasons, the crop was so slow growing and maturing, I judged large percentages of the potash and phosphoric acid leached also. I therefore sent a sample of soil to Prof. Blair for test tube experiments of leaching. The soil was about one foot deep in the test tube, and the first application of four inches of water leached 37.8 per cent. of the soluble phosphoric acid. The second application of

three inches of water leached 15.8 per cent., and the third application of three inches leached 6.9 per cent.; a total for ten inches of water of 60.5 per cent. of the small amount of soluble phosphoric acid mixed with the test soil. The experiment with sulphate of potash was even more striking. The first four inch application of water leached 67.3 per cent., or over two-thirds of the potash; the second of three inches 17.3 per cent., and the third of three inches, 6 per cent.; a total for the ten inches of water of 90.6 per cent. of the sulphate of potash mixed in the test tube soil. Now, the condition of fertilizers covered in a ridge of soil is not half so favorable to leaching as these test tube experiments, and when these soluble salts are diffused through the soil, the humus must hold more of the attenuated solution, yet, at the same time, when the soil is fully saturated with rain and the water table gradually sinks below the surface, a large percentage of the soluble fertilizers must be carried with it.

If we lose half as much fertilizer as was leached in the experiments, it is a most serious loss and drawback to harvesting good crops. If we only knew when a wet season was coming, we would apply our fertilizers on the installment plan, or when a dry season was coming we would apply soluble fertilizers in advance; but undoubtedly the safest plan from lack of this knowledge is to apply the less soluble fertilizers and have in reserve an irrigation plant with which to meet the emergency of drought.

In this, however, the individual must work out the problem according to his peculiar needs, or average the good seasons with the bad to determine profit or loss.

In fruit tree fertilizing, especially if the sod method is used part of the year, soluble chemical fertilizers are a necessity, as they will dissolve without evaporation or loss. Nitrate of soda is of extreme solubility, and sulphate of ammonia probably leaches about as fast as phosphoric acid. Broadcast applications to orange trees, for instance, which have a healthy and unlacerated system of fibrous roots, may be depended upon unless rainfall is excessive, to be practically all available for plant growth.

DISCUSSION.

Mr. Wakelin—Let us hear from the gentleman who has Mr. Chase's property in charge.

Mr. Hoard—The pump we are using at Chase & Company's grove is of simple construction and great capacity and is entirely different from any I have ever seen used in this state. It consists of a wooden box two feet square inside and eighteen feet high, with a steel shaft running through the center from top to bottom. This shaft has a water wheel at the bottom end and another wheel of the same kind in the middle and an eight inch pulley on the top end which is connected with the engine by an eight inch belt. The box stands on end in the edge of the lake where the water is about three feet deep. The lower water wheel is so constructed that when revolving rapidly it raises the water to a height of seven and one-half feet where the upper wheel catches it and carries it out at the top of the box. This gives us an elevation of fifteen feet above the lake and six feet above the highest point in the grove and considerable pressure. From the top of the pump the water runs through a ten inch

terra cotta pipe across the grove from east to west. This pipe is cemented together and buried under ground and has a five inch outlet every 90 feet, which may be opened or closed as desired. From these five inch openings the water is conducted through five inch galvanized iron pipes to all parts of the grove. This five inch pipe is in ten foot lengths and is connected in the same manner as stove pipe. We can run four lines of this five inch pipe at once, or if we are short of piping, we use three lines and run the fourth opening into open furrows. We can run five of these furrows from one opening, or if we used the furrow system alone we could run twenty furrows at one time. These furrows are about eight inches wide and two to three inches deep and 500 to 600 feet long. This will give you an idea as to the capacity of the pump: We commenced using this irrigation plant about March 1st, and kept it going every day for over two months. As a result, we will have twice as many oranges as we had last year, and in all probability three times as many as we would have had this year without irrigation. In other words, an increase of at least 5000 boxes over last year.

Member—What kind of land is it?

Mr. Hoard—Hammock land; very porous and thirsty.

Mr. Griffing—How many gallons per minute do you get?

Mr. Hoard—I have never figured that out, but a man from California estimated

it at 120 miner's inches as they measure water out there. He says this irrigation plant in California would be worth \$100,000.

Member—What is the cost of that plant?

Mr. Hoard—I cannot give the exact cost, but it is a much cheaper system than those of like capacity in general use in this state. I believe I would be safe in saying that the whole cost did not exceed \$1500.00. The pump alone cost about \$150.00 in New Orleans.

Mr. Griffing—He speaks about irrigation in open ditches. We have always had the idea that we had to pipe the water to get it over Florida sand, therefore considered irrigation too expensive for practical purposes. The past season, we started pumping water in open ditches or furrows and find that all it is necessary to do is to get the water to the highest point from which we have no trouble in running it from 500 to 700 feet. The cost is so low that almost any planter can do it. A pipe line sufficiently large to deliver 60 to 70 gallons per minute, 1600 to 1800 feet long ought not to cost over \$700.00 or \$800.00. This is exclusive of pumping plant. This line in this climate can be simply strung out on top of the ground and moved as occasion demands, thus being able to irrigate a large area with it from one source of supply. A gridiron of pipe lines in the field or grove is not necessary for practical, efficient and economical irrigation.

Lime as a Remedy for Acid Soils.

By A. W. Blair.

(Florida Experiment Station.)

Mr. President, Ladies and Gentlemen:

Before taking up directly the relation of lime to acid soils, it may be well first, to refer to the amount of lime in different soils, the ease with which it is washed out, etc., and discuss very briefly the functions of lime in agriculture.

Calcium, which is one of the elements of lime, is found in the ashes of all plants, and some lime is found in practically all soils. As naturally found in soils, lime exists in combination with other groups of elements; for example as calcium phosphate (phosphate of lime), calcium carbonate (limestone), calcium silicate, etc.; and from these compounds it is dissolved by soil waters and taken up by plants.

THE AMOUNT OF LIME IN SOILS.

According to analyses made by the Florida Experiment Station, the average amount of lime in a number of samples of soil taken on the Florida East Coast, between Lemon City and Eldred, is .012 per cent., and taking the weight of an acre foot (the soil on one acre to the depth of one foot), to be 4,000,000 pounds this would give us 496 pounds of lime, or approximately 1-4 ton to the acre-foot. The average amount of lime in samples of soil representing Orange, Hillsboro, and DeSoto counties is .028 per cent., which is equivalent to 1,120 pounds, or a little over 1-2 ton to the acre-foot. Many soils in the humid regions of the United

States contain from .2 per cent. to .4 per cent. of lime and if we take the average of these, .3 per cent., and the weight of an acre-foot of these soils as 3,500,000 pounds, we find that they contain 5 1-4 tons of lime to the acre-foot, which is twenty-one times the amount in the East Coast soils. Snyder gives the average amount of lime in 200 fertile soils as 2.16 per cent., equivalent to 37 4-5 tons per acre-foot, which is approximately 150 times the amount in the East Coast soils, and 67 1-2 times the amount in the samples representing Orange, Hillsboro and DeSoto counties.

It is evident from the foregoing that many of the Florida soils contain comparatively small quantities of lime. The same is true, in a measure, of other bases, as magnesium, potassium, iron, etc. This is to be expected where a soil is composed so largely of sand.

LIME EASILY WASHED OUT OF THE SOIL.

Undoubtedly there was a time when these same soils contained much more lime than at present, but through years of cultivation and leaching it has been lost. The amount removed by crops each year, though small in most cases, must not be lost sight of, especially where no part of the crop is returned to the soil. In addition to this loss there is a constant leaching going on which depletes the soil of its lime. From an examination of the composition of drain-waters from unmanured land, it has been

shown that in all such waters lime is the ingredient most abundantly leached out, and the same has been shown to be true of the waters of some of the world's largest rivers. Reade, in his treatise on Chemical Denudation in Relation to Geological Time, calculates that 143 1-2 tons of lime carbonate are annually removed by solution from each square mile of land in England and Wales, and the average amount removed annually from each square mile of the earth's surface is about 50 tons.

SOILS OF LIMESTONE ORIGIN MAY BE DEFICIENT IN LIME.

It is commonly believed that soils of limestone origin are rich in lime, but this is not necessarily the case. The relative ease with which limestone dissolves in carbonated waters partly accounts for this fact. An instance has been cited where two soils were thought, by the owner, to be rich in lime, derived from lime-stone rock, but while the parent rock in one case contained 92.6 per cent carbonate of lime, and in the other 91.3 per cent., the soils contained only 3.28 per cent. and .40 per cent., respectively. In another instance, the parent rock contained 30 per cent. carbonate of lime, and the resulting soil .14 per cent.

THE FUNCTIONS OF LIME IN AGRICULTURE.

Although all plants require lime, it is not usually regarded as a fertilizer in the sense that phosphoric acid, potash, and nitrogen are, since it usually exists in the soil in quantities far in excess of the actual food requirements of the plant. (Among the other elements which are required by plants, but which exist in the soil in quantities quite suffi-

cient for their requirements, may be mentioned iron, sulphur, magnesium, and sodium). However, there may be rare instances where the soil has been so thoroughly exhausted of its lime that an application of this material would be of value from the standpoint of a fertilizer. As we have just seen, lime has a part to play in building up the plant. This is shown by the fact that calcium, one of the elements of lime, is found in all plant ashes. This may be termed its physiological function.

Physically, lime improves the condition of the soil; if it be a clay soil it becomes more mellow, and is more easily drained and cultivated; if it be a sandy soil the lime acts as a cementing material, binding the grains together, thus lessening the loss of water and plant food by percolation.

Chemically, lime aids in rendering more available, elements of plant food which are locked up in the soil and are unavailable to the plant; especially, is this true of potash.

In the processes of the nitrification of organic compounds, nitrates are formed, and if no base is present to unite with these, they are easily lost by leaching; however, if lime be present, they will unite with the calcium of the lime, and in this form, calcium nitrate, they are readily available as plant food. Lime hastens the decomposition of organic matter, and aids in the formation of ammonia and other nitrogen compounds from this organic matter.

A function of lime which we have been slow to recognize, but which nevertheless is an important one, is its power to correct acidity, or sourness, in soils, due partly at least to the presence of organic acids. Such soils are

now known to be quite general, even where the land is high and well drained. These soils are unfavorable to the growth and development of nitrifying organisms, and as a consequence the processes of nitrification would tend to cease. Further, the tendency of these organic acids would be to attack such bases as are present in the soil, and if iron be one of these bases, salts of this metal would be formed, and these salts would prove injurious to micro-organisms, and possibly also to the tender rootlets of the plant.

It is believed by some that lime aids in the production of root hairs, and that by this means the absorption of potash is encouraged.

IS THIS CONDITION OF SOIL ACIDITY A GENERAL ONE?

If then there is a tendency under some conditions, to the formation, in the soil, of organic acids, the questions which will naturally present themselves to those interested in agriculture and horticulture are: To what extent are the soils with which I am concerned thus affected, how may I recognize such a condition, and has lime proved an efficient remedy? Perhaps the most exhaustive work along this line has been done by Wheeler and his associates, of the Rhode Island Experiment Station. For something like twelve years they have been working on this problem, and they have shown beyond a doubt, that the sandy soils of Rhode Island do very generally give an acid reaction; and they have further shown, as will be pointed out more fully later, that lime is an efficient remedy. Hilgard has noted a similar condition in the sandy upland soils of Mississippi and other

southern states, and earlier, Ruffin called attention to extensive tracts of that character in Virginia. French investigators have mentioned large areas of sandy soil in Brittany, Limousin, and other sections of France, as distinctly acid; and in German writings reference to sandy, sour soils is not wanting. Hilgard in speaking of sour soils writes as follows: "The acid reaction characterizing the ulmic substances, is also characteristic of many woodlands, notably in the United States of the soils of the long-leaf pine region of the Cotton States, both upland and lowland, as well as of many deciduous forests in northern climates. Hence, liming, whether artificial or natural, effects a most notable improvement together with a marked change of vegetation in these lands." Previous to the work of Wheeler, Hartwell, and others, it was generally considered, in America at least, that only low wet lands, or those that were largely made up of muck, were subject to the sour or acid conditions; but we now know, beyond a doubt, that in many places, upland and well drained soils do show a decidedly acid reaction. The question as to how we shall recognize this condition is not always the simplest. It may sometimes be recognized by the character of the vegetation, or the crops grown on it, but the surest way is a test of some kind. The one most generally used is the litmus paper test, though this is not always satisfactory, since it gives us no very definite idea of the degree of acidity, and undoubtedly fails in some instances, to indicate an acid condition which really does exist. And here it may be said that our knowledge of methods of determining soil acidity is

very general. Even the best soil chemists are not agreed upon a uniform method, although a number of methods have been proposed and are being tried in various laboratories. When such methods are perfected, as they ultimately will be, we can determine the exact acidity of any soil and then calculate to a nicety the amount of lime required to neutralize this acidity. Until such methods are perfected, investigators and agriculturists will have to content themselves with using tentative methods and with field trials, using different quantities until the right amount is found for the different classes of soils. One thing, however, seems definitely settled, and that is that we must recognize the fact that an acid condition in the soil is more generally prevalent than has heretofore been believed to be the case.

WHAT CAUSES THIS ACIDITY?

In wet locations where large quantities of organic matter undergo decay, enormous amounts of humus accumulate as a result of the decomposition. Such humus is said to be usually, though not always, in an acid state. The acidity is naturally dependent upon the lack of bases with which the organic acids may combine. Until comparatively recently little reference has been made to an injurious degree of acidity from such causes, in upland or well drained soils. That a dangerous degree of acidity may and often does exist in such soils is now well recognized. We have, however, been slow to recognize this fact, and on this account, no doubt, we have often attributed the failure of crops to cold, poor germination of seeds, drought, excessive rains, attacks

of insects or fungi, which should have been attributed to soil acidity.

The formation of organic acids by the decomposition of organic materials in soils deficient in bases, would then seem to be a reasonable explanation, in part at least, for the existence of acid soils.

WHAT ARE THE EFFECTS OF AN ACID CONDITION IN THE SOIL?

We cannot answer this question in full; we do not know. As the subject is further studied we shall know more. If I should say that it causes the wilt of the orange, I might be very wide of the mark, but on the other hand, no one can say absolutely that it does not cause this disease. We do, however, know some of the effects. We do know that it interferes with the processes of nitrification, and thus prevents the plant from getting certain food elements that it should have. We do know that in many instances clover, alfalfa, and other legumes, have failed almost entirely on acid soils, but have done well when the acid of these same soils has been neutralized with lime.

IS LIME A SATISFACTORY CORRECTIVE?

Volumes could be written showing the beneficial results obtained by the use of lime on acid soils, but here it will only be necessary to make brief reference to a few instances. The experiments conducted by the Rhode Island Experiment Station have shown that something like thirty-one plants, including vegetables, grasses, fruit trees, etc., are benefited by the use of lime, while nine are indifferent to its use, and four are injured by it. The Maryland Experiment Station reports that most of the crops grown in that state are benefited by the application of lime, and includes one—Indian Corn—in the

list of those benefited, that is placed by the Rhode Island Experiment Station in the list of those that are indifferent. Veitch, of the Department of Agriculture, reports a very decided increase in the weight of clover, cowpeas, and alfalfa, on soils that were limed over those that were not limed. In fact, in the case of the alfalfa, no crop was secured on the unlimed plot; and he further shows that in no case does the yield on the plots where the acid was only partially neutralized by lime, equal the yield on those where it was completely neutralized. At the Ohio Experiment Station they have found it difficult to get a good stand of clover on acid soils, the clover dying out in patches, and being supplanted by a growth of sorrel. In one case this unfavorable condition was aggravated by the use of fertilizers compounded with acid. With a ton of lime to the acre they secured a luxuriant growth of clover. The report suggests that a smaller quantity might have sufficed. Others have noted the decided improvement brought about by the use of lime on clover, alfalfa, and cowpeas, where the soil was acid, where before these crops had been a partial or total failure. The beggarweed also is a legume, and may it not be true that the difficulty which so many have had in getting a good stand of this crop is due to an acid condition in our soils? In this connection it is of interest to note the following statement taken from the Rhode Island Experiment Station report for 1893; "The application of lime on our soils has enabled us to secure a good catch of clover where it was before impossible."

ARE FLORIDA SOILS GENERALLY ACID?

No systematic study has been made of the soils of this State with reference to

this particular point, but judging by tests which I have made of soils representing rather widely separated portions of the State, and by the statements of others, I feel justified in drawing the conclusion, that our upland soils are more generally acid than we have heretofore supposed them to be. That our muck soils are decidedly acid I think no one will question. Many of the muck soils are quite rich in nitrogen, and in addition contain some phosphoric acid and potash, and should prove quite valuable as a fertilizer, but in many places they are under the ban, because they have been accused of ruining groves and pineapple plantations. It is very probable however, that it was the organic acids in the muck that were responsible for the damage, and if those who have thus basely slandered muck will try a liberal application of lime, and by liberal I mean enough to make a fair sample of the mixture show an alkaline and not an acid reaction, there is good reason to believe that their slander will be turned into praise.

WHAT IS THE CAUSE OF THIS ACIDITY IN FLORIDA SOILS?

As was pointed out in the early part of this paper Florida soils are generally very deficient in lime, and likewise in a number of other bases, and this in itself may explain, in part at least, why our soils have a tendency toward acidity. There being a scarcity of bases to neutralize the organic acids formed by decaying organic matter, the acid tendency prevails. Moreover, the large quantities of commercial fertilizers that we are constantly using undoubtedly tends to aggravate this condition. There are present in most soils hydrated silicates, and non-acid organic compounds which have a strong affinity for sodium, potassium, calcium, and mag-

nesium. When these bases are dissolved by the soil waters, or when they are added in alkaline compounds, they immediately combine with these neutral constituents—silicates and non-acid organic compounds—and thus the soil is prevented from becoming alkaline until the above mentioned affinity is satisfied. This condition, while harmful to sensitive plants, is probably not so harmful as the presence of free acids or acid salts. Further than this, there is good evidence going to show that the reaction which takes place between certain of these soil constituents and added chlorides and sulphates, produces positively acid salts. There can be but little doubt that it is due, partly at least, to the acidity thus produced, that the injury arising from the use of chlorides and the sulphate of ammonia on neutral or acid soils is to be ascribed. It was found in experiments at the Rhode Island Experiment Station with different forms of nitrogen on acid soils, that sulphate of ammonia was positively poisonous to plants when it was not used in connection with lime. When the acidity of the soil was corrected by applications of air-slaked lime, the sulphate of ammonia was beneficial. This beneficial effect is attributed to the fact that the lime restored the alkaline condition of the soil necessary to the transformation (by nitrification) of the sulphate of ammonia into nitrates, so necessary to most crops. I would not therefore, recommend a reduction in the amount of fertilizers to be used, but would remedy the evil by a liberal application of lime once in two or three years, or oftener if found necessary.

The causes above mentioned are general; there may also be local causes which are responsible for this acid tendency. In some parts of the State sulphur water (wa-

ter containing hydrogen sulphide, $H_2 S$) is used for irrigating purposes. Now when hydrogen sulphide gas comes in contact with air, the hydrogen unites with oxygen to form water; but it is also true that some of the sulphur may be oxidized to sulphuric acid, and where this system of irrigation is carried on for years at a time, keeping the ground wet during a good part of the year, the accumulations of sulphuric acid and sulphates may reach considerable proportions. Under such conditions injury to crops may eventually be expected, unless lime is used in liberal quantities. A statement made to me recently by a celery grower of Sanford would seem to bear out this theory. He said that a few years ago only a few barrels of lime were used in Sanford, but that now the market could scarcely supply enough. No doubt this increased demand is partly due to the increased acreage, but it is no doubt also due in part, to the fact that the growers are learning that without it they cannot get good results. This same grower said that he used about a ton to the acre. Notwithstanding this fact, a test of several soils at this point, his among others, showed an acid reaction. Examples of the oxidation of sulphides, with the formation of sulphuric acid, are to be found in the vicinity of coal mines. Whole tracts of land have become practically sterile from having been saturated with water containing free acid and ferrous sulphate formed by the oxidation of iron pyrites.

WILL THE CONDITION OF FLORIDA SOILS BE IMPROVED BY THE USE OF LIME?

On this point also there has been no systematic investigation, but if the sandy, sour soils of Rhode Island and Massachusetts, of France, England, and Germany,

and of Virginia and Mississippi, have responded well to the use of lime, then there seems good reason to believe that the same will be true of Florida soils. Detached instances might be given showing the value of lime on Florida soils. I have noted Bermuda grass growing luxuriantly where a mortar bed had formerly been located, and where plaster had been thrown out and ashes scattered, when only a few feet away where the soil had not been thus treated, it was difficult to get the grass to grow. As already noted, the celery growers of Sanford are using large quantities of lime and say they cannot produce crops without it. Perhaps almost every one has noted the more luxuriant growth of vegetation on spots where piles of logs and brush have been burnt, and while this is perhaps due in part to the potash contained in the organic matter, it is no doubt due also to the fact that the lime in the ashes has neutralized the acidity of the soil.

LIME SOMETIMES INJURIOUS.

Excessive amounts of lime may have an injurious effect on almost any crop, while any excess of lime whatever seems injurious to a few plants. Under some conditions, too, lime seems to favor the production of the potato scab. For these reasons it is important that judgment be used in the application of lime to the soil.

If lime is used directly with sulphate of ammonia, ammonia gas will be set free and lost. It may, however, be used directly with nitrate of soda and organic fertilizers.

FORMS OF LIME TO USE.

Where the neutralization of acidity is the only object to be sought, caustic or quick lime will probably be more economi-

cal, since fewer pounds are required. However, quick lime, slaked or hydrated lime, and air slaked lime, or carbonate of lime, are probably equally effective pound for pound of actual lime.

Marl is a form of carbonate of lime and contains from 5 to 95 pounds of carbonate of lime per hundred pounds of the material. A good quality of marl would prove quite effective in correcting soil acidity, its effectiveness depending on the fineness of the material.

Phosphate of lime, that is phosphate rock, when finely ground has also been found effective on acid soils. This is valuable not only on account of its neutralizing effects on acid, but also on account of the phosphoric acid which it contains, the phosphoric acid gradually becoming available after having been in the soil for some time.

THE LITMUS TEST.

This must be made with considerable care, else erroneous results may be secured. The following method if carefully carried out will give satisfactory results.

Having secured from a drug store strips of both blue and red litmus paper, take one or two ounces of the soil to be tested, moisten in a clean glass or cup with pure water (water that will change the color of either paper must not be used), bringing the mass to about the consistency of thick paste. After allowing this to stand about fifteen minutes, part the soil in two places with a clean knife blade and insert a strip of each kind of paper, carefully pressing the soil against the paper with the point of the knife. Allow to stand for about five minutes then remove and wash off adhering particles of soil with the pure water. If the blue paper has become red, or shows

red spots, the soil is acid; if the red has been turned blue, the soil is alkaline, and if neither has been changed the soil *may be* neutral. Do not put the fingers or hand upon the end of the paper that is to be placed in the soil.

DEFINITE EXPERIMENTS.

The Experiment Station is beginning

some systematic work with reference to the effect of lime on acid soils, and we hope at no distant day to be able to report some definite results.

We shall be glad of the co-operation of any of the members of this society who are interested in the subject.

Principles in Tree Pruning.

By H. Harold Hume.

Mr. President, Ladies and Gentlemen:

To understand the underlying principles of pruning, we should know something of the structure of the trunk of the tree, and its branches. If we examine a cross section of the wood of an old tree, we note in the centre, the pitch surrounded by the heart wood. Around this is a band of sap wood and outside of all a protecting cover, the bark. Just between the bark and sap-wood lies the cambium layer in which all growth takes place. From it, wood is formed on one side and bark on the other.

WHERE A BRANCH STARTS.

Branches always develop from buds and, where produced normally, the branch is formed from a bud developed the year previous. In consequence the base of the branch is generally one year younger than the part of the tree on which it grows. We commonly refer to the portion of the branch extending into the wood as a knot. This knot has its origin at the pith. If we examine a section cut through the

branch and the trunk on which it grows, we will note that the grain of the knot runs to the center of the tree.

From this we learn the lesson, that if for any reason the branch should die and rotting should commence, that the rot will extend along the knot into the center of the tree and there continue its work in the trunk.

THE HEALING OF THE WOUND.

With the removal of the branch all inner portions of the tree are exposed by the wound made. The bark being removed, the wood is laid bare and decay has an opportunity to begin its work.

Every tree in healthy, active growth makes an effort to cover over the wound. The healing does not take place over the whole surface. A tiny ring, or cushion of woody tissue protected by bark, is thrown out from the cambium layer all around the wound. This is called the *callus*. This callus gradually shoves out, increases in size and ring after ring of growth is

added until the wound is covered. If the wound is small this may be done in a single season, but if large it will take several years.

THE STUB.

If a branch is cut off a few inches from the tree the cut end of the stub does not generally heal over. There is no life in it, it dies back and acts as a foreign body. In ninety-nine per cent of cases, the tree makes an effort to heal over the wound at the base of the stub. It is impossible however for it to succeed as the tree cannot exert sufficient pressure to cut it off and the callus frequently forms a mound about its base.

The stub usually disappears in time by rotting off and the result is a knot hole. The first principle in pruning is to leave no stubs.

KNOT HOLES.

When the stub rots away, leaving a knot hole, the rain enters, sand and dirt are blown into it. Sufficient soil is frequently formed for plants to grow in it. Everything favors the extension of the rotting process. The heartwood in the trunk and branches sometimes even down into the roots is destroyed. A strong wind blows the tree over, and we wonder why it fell.

The rotting of the wood is not due to chemical or atmospheric action. It is due to minute plants—fungi and bacteria. These live and grow in the wood and bring about its destruction. The fruiting parts of some of the fungi are quite large, those of the shelf fungi for instance.

WHERE TO CUT.

We have learned that the stub is objec-

tionable and injurious to the trees in that it prevents the healing process. Leave no stubs. Make the cut as close as possible to the part that is to remain and in making the cut hold the saw parallel to the branch or trunk from which the branch is removed.

The cut should be as smooth as it is possible to make it. It heals better.

TO PREVENT SPLITTING.

If the branch is large and heavy, an accident often occurs in close cutting. When the branch is half cut off, its weight causes it to split and frequently the injury extends down along the trunk of the tree. This may be prevented by making a cut on the underside of the branch half way through it a foot or two out from the trunk. Then on the upper side three or four inches farther out another cut should be made half way through. The branch will drop off. The resulting stub can then be cut off where it should be.

WOUND PROTECTION.

A wound has been made and the inner portion of the tree is exposed, how can rotting be prevented? By covering the cut surface with something which will prevent the entrance of decay. The most desirable substance is one which will stick well, wear well and at the same time not interfere with the healing process. As a dressing for tree wounds many different materials have been used, such as shellac, grafting wax, tar and paint.

Ordinary grafting wax is not good, it curls up around the edges and peels off. A formula used by Mr. W. S. Hart is excellent: One pound of resin and two ounces of tallow; melt these and mix thoroughly. Remove from the fire and

after cooling slightly, add slowly six ounces of alcohol and one ounce spirits of turpentine.

Shellac likewise cracks and drops off; tar is likely to prevent the healing process. Of all the substances which have been used from time to time no material so nearly fills all the requirements of a wound dressing as pure lead paint made up with good oil. Sufficient coloring should be added to make the paint about the color of the bark.

Paint the wound as soon as it is made for no amount of paint will keep the wound sound if rotting has already begun.

TIME TO PRUNE.

It is not advisable to prune trees during the time when the sap is in active motion. At this time it is well nigh impossible to properly protect the wound; the necessary coat of paint will not stick to a surface wet with sap, which has bled from the tree. The best time to prune is during winter and early spring before growth starts. If it cannot be done then, the trees should be pruned in spring just after they are well out in the leaf.

PRUNING TOOLS.

Some people like to use an ax, but in the hands of the average individual it is a poor tool to use. About one man in five hundred knows how to handle it. It should be banished from the orchard and the street. In the writer's opinion the only time that the ax should be used either on a fruit or shade tree is when it is vigorously applied just above the roots, when it is deemed advisable to remove a diseased or worthless specimen. The ax

is synonymous with hacks, cuts, stubs, knotholes, rotten trunks, decayed trees and general neglect. It is opposed to good treatment, intelligent care and a true appreciation of the needs and nature of a tree. Banish it!

Get a good pair of pruning shears, a pruning saw and knife. The dearest in price are the cheapest. Keep them sharp and with these the right sort of work can be done.

DISCUSSION.

Mr. Neeld—I think the best time to prune a tree is after the sap has fallen and the leaves have fallen. I would like to have your idea. In connection with this subject, I would like to say that our trees lost their leaves in the freeze, and when the leaves came forth again they were little bits of leaves—they never developed. That was largely because there was no moisture in the soil. There were a great many water sprouts, and they put on large leaves.

Prof. Hume—In reply to the first question as to the best time of pruning: an old German adage says, "Prune apple trees while in the bloom." One of the best seasons is after the tree comes out in full leaf, speaking of trees that drop their leaves in autumn. I do not believe in pruning when the sap is moving in the trees, when the wound is likely to bleed freely. If we prune it at that time, we cannot get our covering to stick. Wait until the tree comes out in full leaf. Either then or prune when the tree is entirely dormant. One of the things that makes spring pruning the best, particularly if you are desirous of removing dead wood, is that dead wood is much more easily found.

About those water sprouts you speak of; I have seen a good many cases where a tree had been severely injured, and these water sprouts had come out with vigorous leaves on them. I think it is a good plan to leave them there. I don't know that I would take them off at all.

Mr. Hart—It seems to me there are a few more points that we might touch upon. Now, "water sprouts." I would say by all means let them grow and make leaves just as quickly as you can. They furnish lungs to the trees. If it is an orange tree that has been cut back by a freeze, and those sprouts are sour, let them go until they get a good top on the tree, then bud and lop the tops down but don't cut them off. The sap will flow to the highest buds and these sour sprouts will, while bent to the ground, maintain the large root system and growth until we have a good sweet top there. When the buds get well started, bend them out and spread them out, making a wide tree. They may be long and slim and apparently of very little use, but bend them out and do not cut them off. The result is that you check the flow of sap near the trunk. Where the sap is checked it will push out a new growth and in a little while you get plenty of fruit, the limbs become strong, other limbs surround these and you get a symmetrical tree. The orange tree will become a symmetrical tree in a few years if given a chance and do it without pruning to any great extent. There are a few cases where it will be well to nip in and in rare cases to cut a limb, but I think it far better to force limbs in place than to cut them off.

Now, in regard to stubs. There are a few cases, perhaps, where it may be well

to leave a stub for awhile. For instance, if we have a nursery tree of pretty good size and lop the top down from above the bud, when that bud is grown large enough so that you can remove that old top, it sometimes is best, I think, to cut the old wood off leaving quite a little stub, and wait until the bud has gotten large enough and has strength so that by cutting the stub off close just before the spring or summer growth, it will be covered up quickly and no serious wounds or rotten wood remain in the tree. I find it practicable to do this in many cases where trees have been injured in some way and heavy pruning of partly dead wood has to be done before renewed growth is strong enough to cover wounds promptly.

Mr. Sheppard—I have found a pretty good wound covering in coal tar. It keeps out all the water, is flexible and the wounds will heal right up.

Mr. Hume—in my opinion, it is a very unsafe thing to use. I have seen injury done to the trees by it, and the healing of wounds prevented by its use.

Mr. Sheppard—I have seen where it has been beneficial.

Mr. Hume—Some people still recommend the use of gas tar, and the practice is still prevalent in Europe, but has never been followed to any extent in this country. I have used it on oak trees and it works very nicely. On peaches and cherries as well as some other fruits, I would not use it.

Mr. Sheppard—It works pretty well on orange trees.

Prof. Hume—Some men I know had the experience of killing some three hundred trees with tar. You cannot convince them that tar is all right.

HORSE INJURIES.



The Work of a Horse.
Many Meals.



A Horse Made a
Scanty Meal off
This Tree.

WOUND PROTECTION.

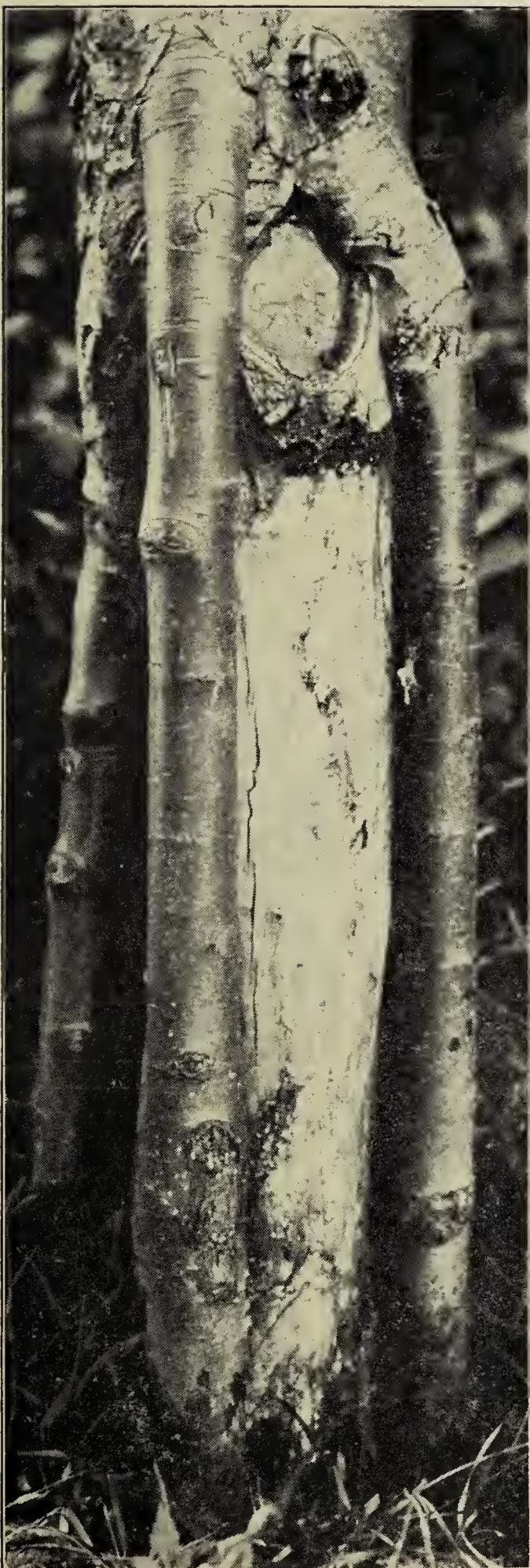


Grafting Wax Used to Cover a Wound. See
How It Has Curled Around the Edges.



Painting the Fresh Wound. Every Wound
Must be Painted.

SUN SCALD AND HOW TO TREAT IT.



Bridging a Wound.



Sun Scald on Maple.

THE STUB AND ITS WORK.



The Stub Rotted and a knot Hole is Left in Remembrance.



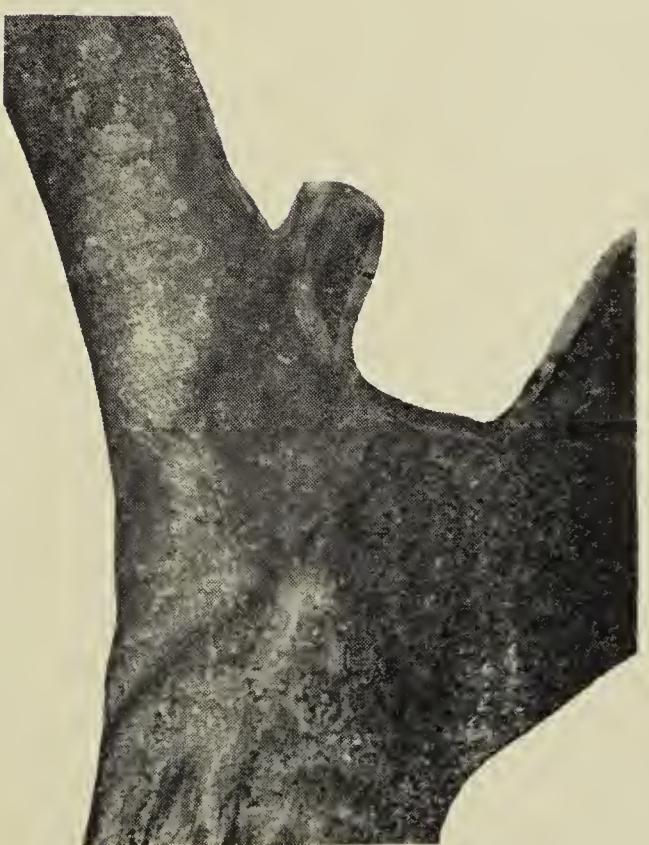
Sycamore With Dead Stub Just Below Where the Branches Fork.



Healing Prevented by a Dead Branch.



The Dead Stub and the Rot (Black) It Caused.



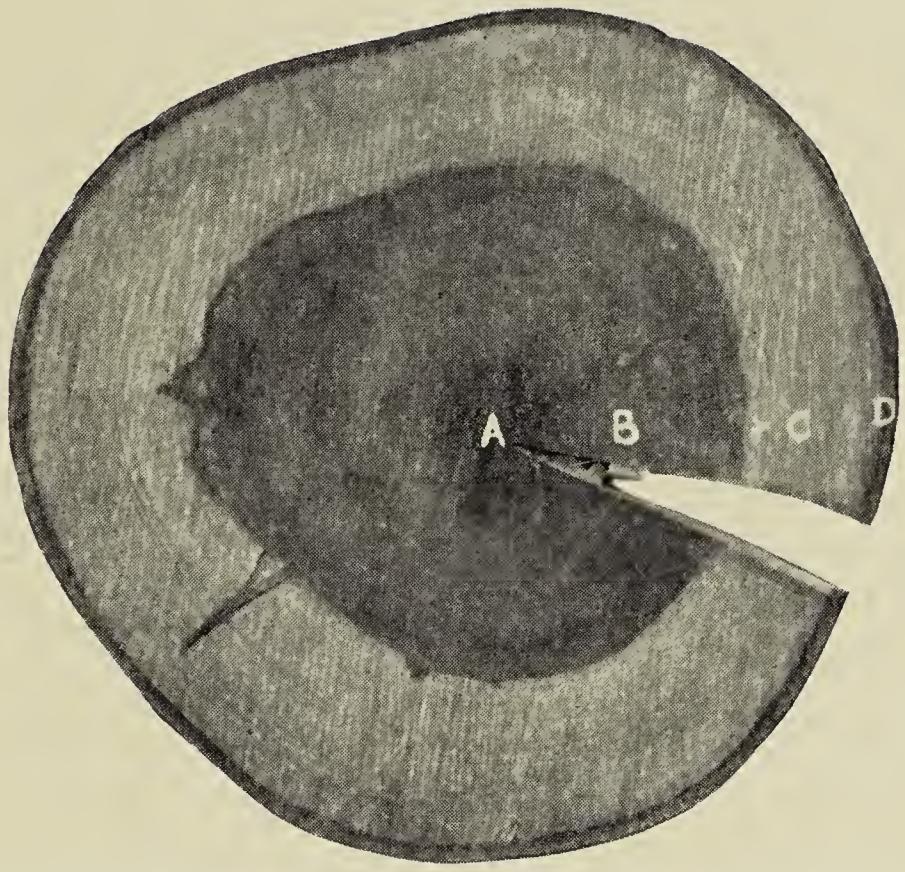
A Noble Effort at Healing. Look at the Pile of Callus Beside the Stub.



TREE STRUCTURE.

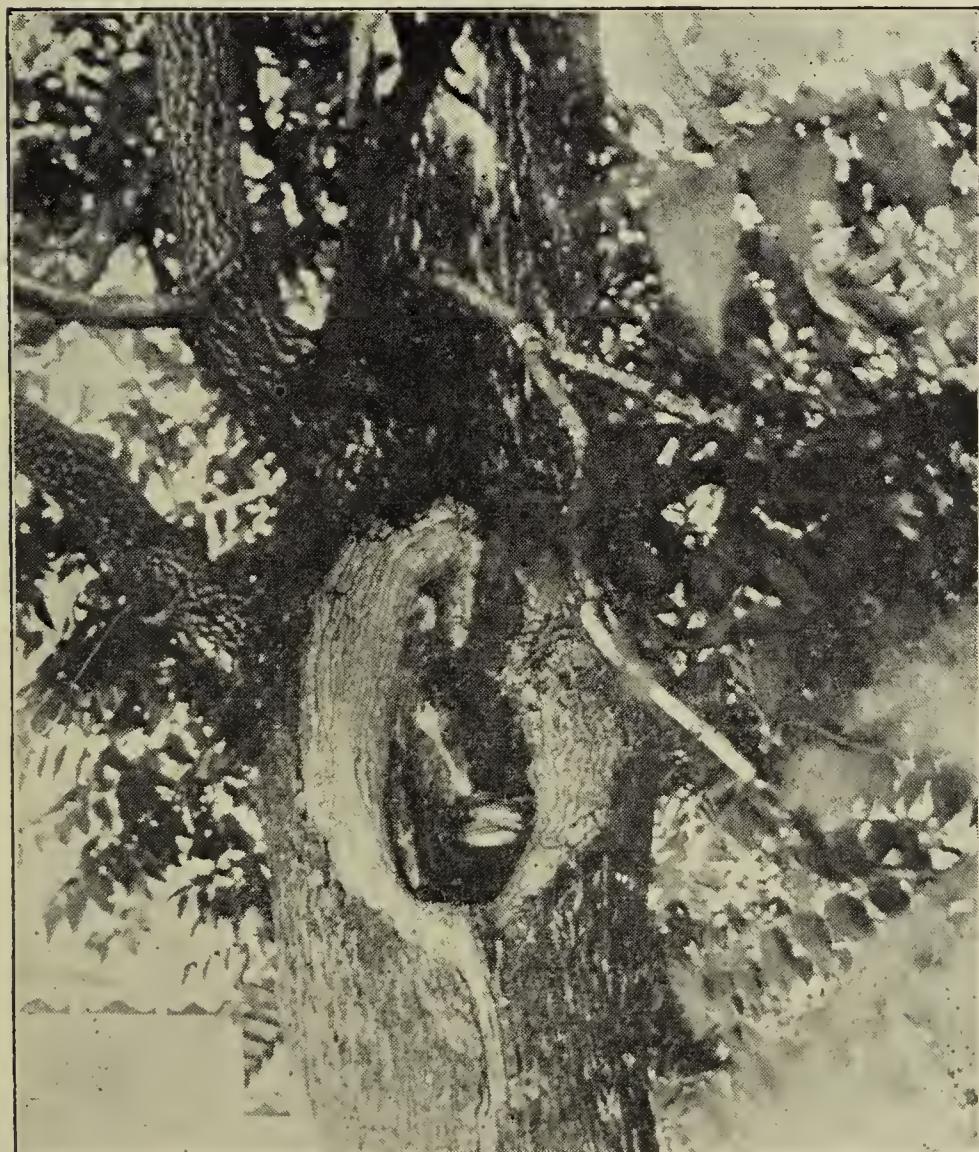


Knot and Half a Tree Trunk.
The Knot Extends to the Center
of the Tree. 1 Pith, 2 Wood,
3 Bark.



Cross Section of a Tree. (1) Pith, (2) Heart Wood,
(3) Sap Wood, (4) Bark.

WOOD FUNGI.

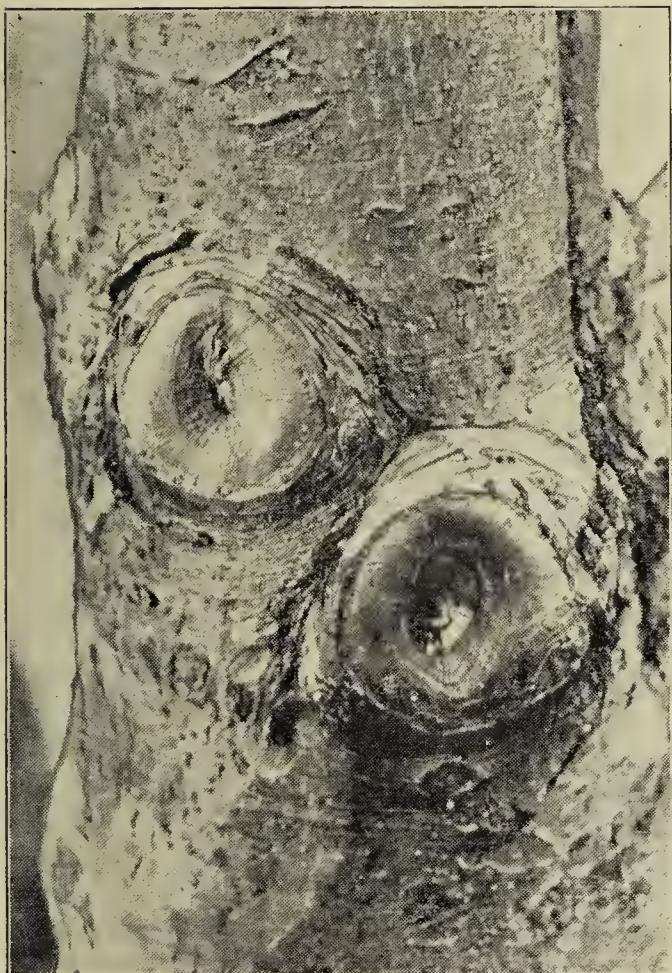


Branch Split Off. Fungus Growing in the Wound.



Shelf Fungus on a Maple. N. Blount Street.

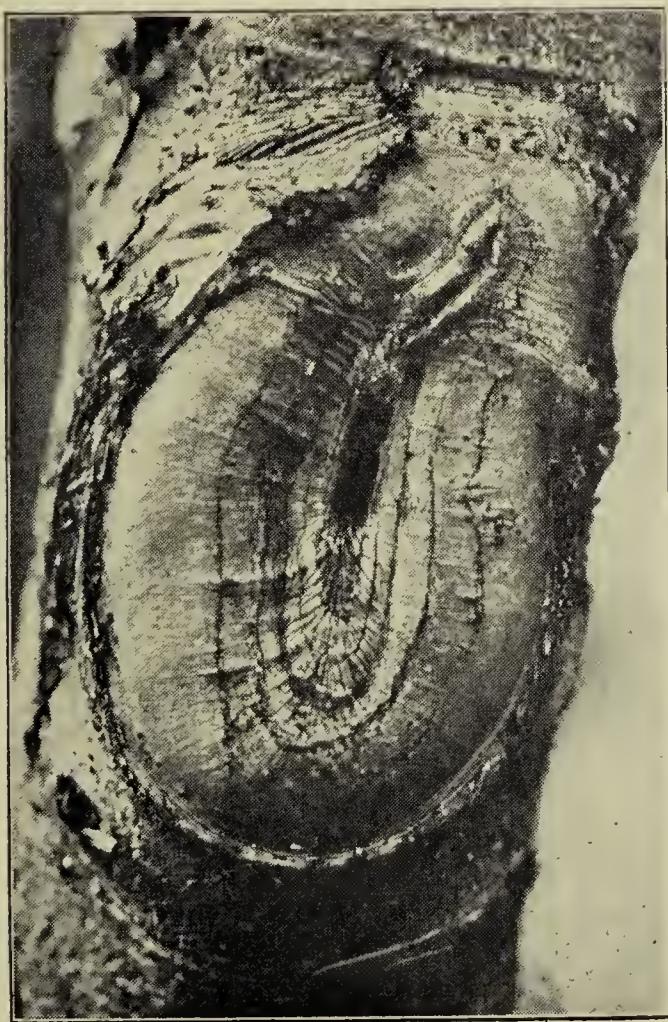
THE HEALING OF A WOUND.



Well Made Wounds Completely Healed.



Unpainted Wound, Partly Healed. Look at the Checks.

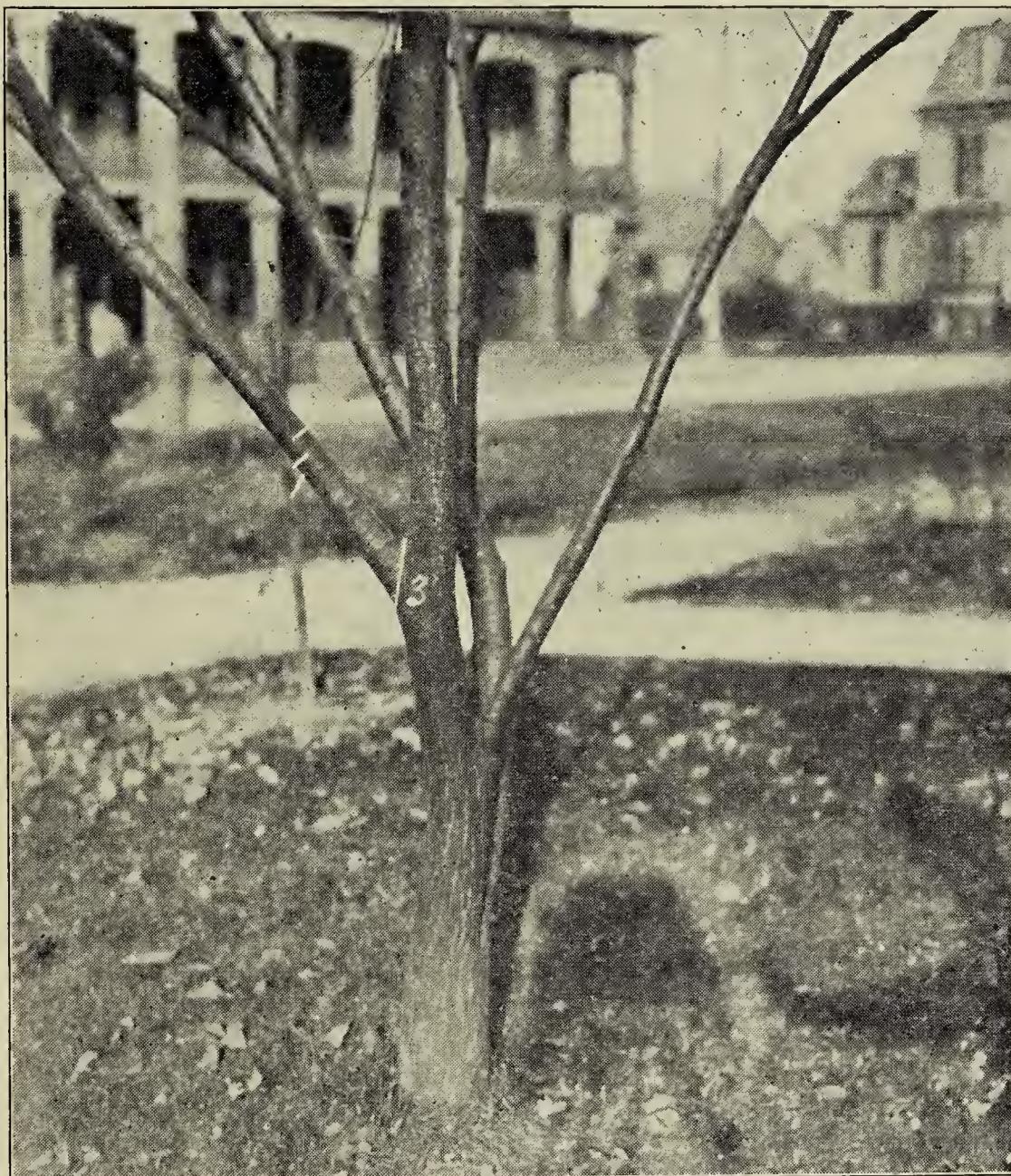


The Healing of a Wound. Six Rings —Six Years.



Well Made Wound. Front View.

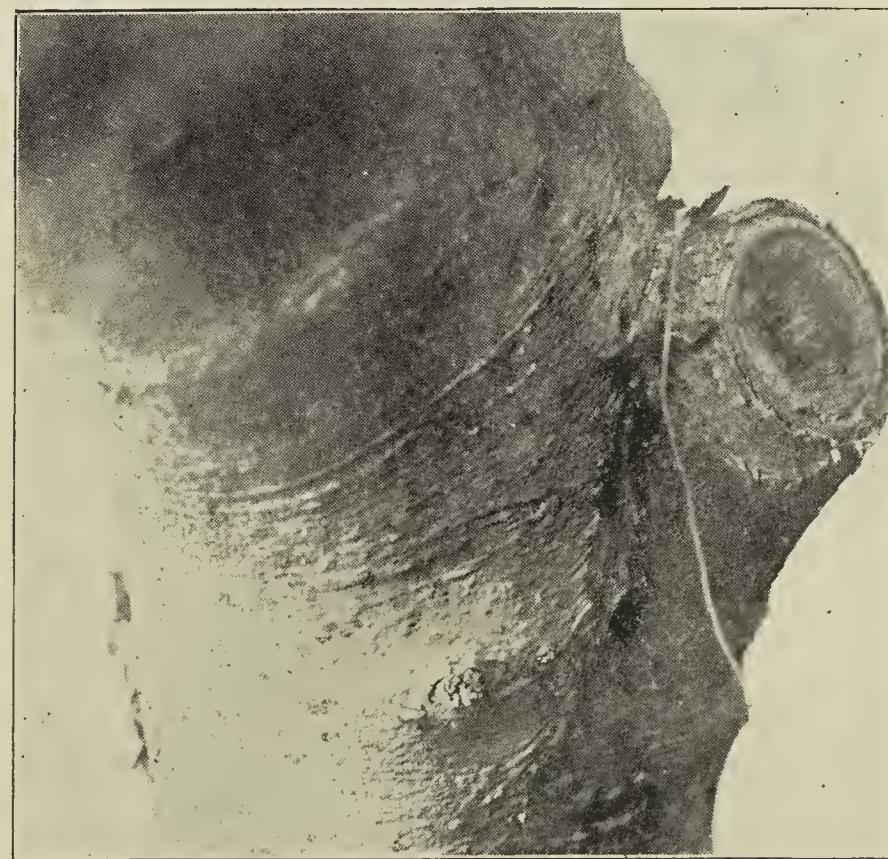
WHERE THE WOUND SHOULD BE MADE.



How and Where to Remove a Large Branch. Cut in Order of Numbers.

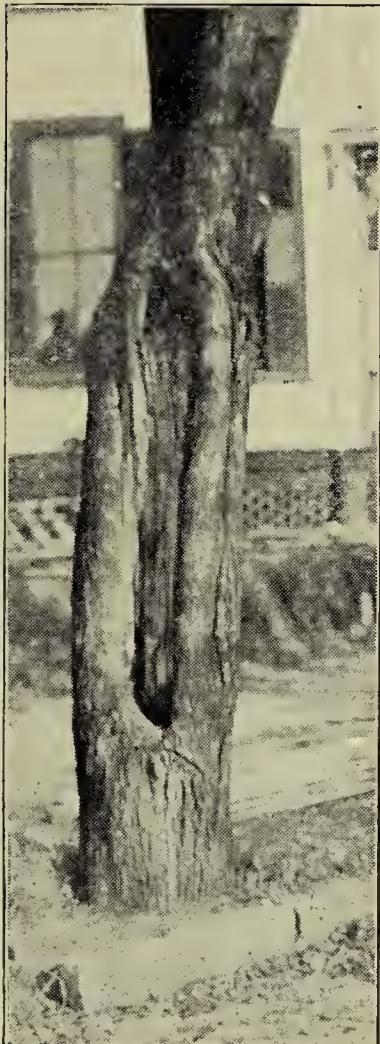


One Danger in Close Pruning.



Branch Cut Off Leaving a Small Stub. Note the Ring of Callus.

CROTCHED TREES AND THE RESULTS.



Result of Crotch Formation.



Result of a Crotch
See the Fungi



2
Crotched Tree With
an Iron Bolt.

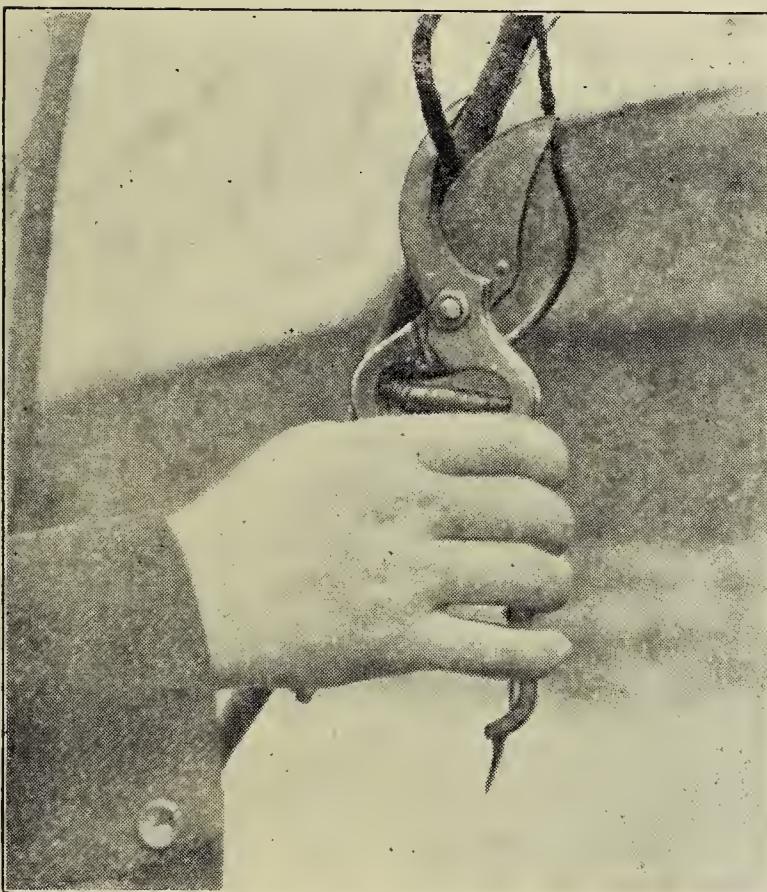


Examples of Crotched Trees. Elms in This Case.



Crotch Splitting. This
Tree Should be Bolted
at the Line.

TOOLS AND HOW TO USE THEM.



How to Hold the Shears in Pruning.



Using Water's Tree
Pruners.

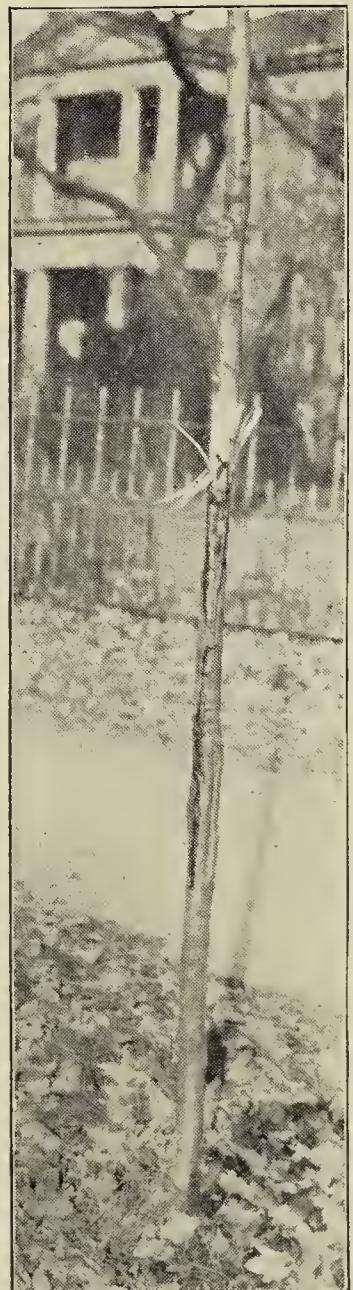
MISCELLANEOUS INJURIES. WIRE—FENCE—BOY.



Wire Injuries.



This Cedar Did Duty as a Fence-
Post.



A Boy's Knife Did This.

Mr. Griffing—Have you used shellac?

Mr. Hume—Yes, and it is very good while it lasts, but it soon flakes off.

Mr. Hollingsworth—I agree with Mr. Hume on every point he has made, except in the use of utensils. I pruned two or three years with a saw and used the long clippers and the hand pruner. I think I have used every outfit that any pruner ever did use, and I must say I like an axe the

best. You can take a pruning axe and grind it down very thin, and then after you have had practice enough you can cut exactly in the right place. Always strike from the under side of the limb. I am heartily in favor of the axe system over any saw. A saw wound will hold more water than an axe wound. It is the water in the wound that causes the rot. It is very much quicker also.

Report of Committee on Ornamentals.

By Mrs. E. S. Hubbard.

Mr. President, Ladies and Gentlemen:

Let us imagine that we have chosen our new home. Our house and buildings are finished and our grounds are leveled and ready for planting.

We have selected a spot in middle Florida where the temperature occasionally touches the frost mark, and where in extreme seasons, ice is formed.

We, therefore, must use plants and shrubs that will thrive in our peculiar situation. The first consideration is our lawn. St. Augustine grass will prove most satisfactory, for it resists cold weather. When frequently clipped, it forms a mat of bright green, and after a severe freeze, it soon regains its freshness. It is planted by slips and roots and is easily destroyed when desired. Bermuda grass thrives best on dry soil, but is browned by frost in winter and is hard to eradicate.

Our piazzas are furnished with supports

for vines. Strips of poultry netting three feet wide, are, at intervals, set upright two or three feet from the ground, extending to the eaves. With this arrangement, the beloved vines can be enjoyed to the utmost, without injuring buildings or interfering with the painter in his work.

First in our list is Rhyncospermum jasminoides. Its dark, ever green foliage forms a thick screen during the winter. In April, its profusion of dainty white blossoms, transforms it into a drapery of lacework. If allowed to do so, it will reach the highest chimney with its trail of graceful fragrance. Akebia quinata, its characteristic foliage and its clusters of ruddy purple blossoms lasting from early March until May, must not be forgotten.

Chinese Wistaria, if kept in subjection by persistent pruning, will give a wealth of great, fragrant, purple pendants.

The English honeysuckle must not be mistaken for the paler and rampant variety which will not be satisfied with its own space in the border, but which will not be content unless it overruns everything within reach and even usurps the grass plot and ruins the lawn. The English honeysuckle, on the contrary, seldom suckers and needs only occasional pruning. It will reward the grower with bloom and delicious perfume throughout the year. The bark is red and the foliage dark green. The buds are deeply roseate without, and the flowers are pure white within, turning to cream color and finally to a dull orange. In the early, dewy morning, when the perfume of this honeysuckle mingled with that of the *Rhynchospermum* and *Magnolia* float through the open windows, the combination is exquisite beyond description.

We must not tarry too long with the vines, but mention in brief succession, *Bignonia venusta*, that glorious vine with its masses of flame colored trumpet-flowers; another variety with wax-like flowers of white and canary, and still another rightly named the *Gloria*, with large throated blossoms of delicate lavender, veined with purple. These vines are hardy, enduring any cold which visits this section, and also thriving during the heat of the long summer.

Many tropical vines can be successfully grown here. We must expect them to be cut back, sometimes, by cold weather. They spring up again as if by magic, and seem even benefited by the disaster. Among these are *Clerodendron Balfouri*, *Antigonon leptopus*, the showy *Rosa de Montana* from Mexico, the climbing *Allamanda* with great golden flowers, so very

noticeable at Miami; *Thunbergia fragrans* with snowy blossoms and graceful twining stems, and *Bougainvillea*, *Thunbergia grandiflora*, a very elegant climber, has large, white-throated, sky blue flowers and handsome foliage. Lastly, I will recommend *Cobea Scandens* and its large purple bells always in bloom. Its method of climbing is unique, for it attaches itself to supports by clinging tendrils growing at the ends of its compound leaves.

Our list of shade and ornamental trees begins with the evergreen oaks which need neither praise nor description. Following the oaks are *Magnolia grandiflora*, loblolly and sweet bay, umbrella tree, sycamore, one of our grandest native trees; *Vitex* or chaste tree, with purple spikes and whose palmate leaves smell of lavender; the starry leaved sweet gum, *Ilex* or American holly; scarlet maple whose brilliant red seed pods appear in midwinter; and lastly the *Liriodendron tulipifera*, whose oddly cut leaves and large, showy, tulip-shaped flowers have given it its name of tulip-tree.

Cornus canadensis, or white flowered dogwood is most charming with its level masses of foliage and bloom. It savors of the picturesque having a marked individuality. In the same class will be found *Camellia Japonica*, so prized for its large perfect flowers, and *Azalea Indica*, whose wondrous display of lovely blossoms of an infinite variety of shadings and colors is a marked feature of northern Eastertide. *Magnolia fuscata* and some varieties of *Magnolia* from China and Japan which are deciduous, and whose flowers are richly colored with rose and purple, are very desirable. *Olea fragrans* or sweet olive must be included, for the unctuous perfume of its small clustered

white bloom is unique and delicious, and it will group well with Judas tree or red bud and Gardenia fragrans both single and double.

The trees and shrubs which I have chosen are perfectly hardy and will give entire satisfaction.

Among some tropical shrubs which grow again after frosts, are Pleroma purpurea, Tabernamontana, night blooming jasmine and the charming group of Hibiscus.

We associate palms with the tropics. The following species, however, have been thoroughly tested and we can safely plant them; Cocos Australis, Sabal palmetto, our own cabbage palm, and also another handsome variety from Cuba, Chamoerops Excelsa, Chamoerops humilis, Phoenix Canariensis and Phoenix sylvestris. Latania Borbonica, and Phoenix dactylifera, our date of commerce, are sometimes nipped by severe freezing but we must risk something for their beauty and in the latter for its fruit. These palms will make trees; some of them growing to a height of 40 feet or more. They, with many others, are now growing in the grounds of the late E. H. Hart at Federal Point.

We must not overlook some very charming acaulescent palms and their kindred. Chamoerops hystrix or needle palm growing wild in many parts of Florida and also near Savannah, Ga., must be planted in the shade of tall palms, and it will then send out a host of glossy leaves with long slender stems, admirable for cutting. Cycas revoluta cannot be surpassed when well grown. Cycas circinalis, a more tender variety, is exquisitely beautiful.

Some fourteen years ago, in June, we

made a trip on the St. Johns river on the steamer "City of Jacksonville." As we went into the brilliant light from the outside darkness, we were dazzled by a vision of color and beauty. On a table in the center of the salon, where the light fell upon them from above, was placed a wonderfully beautiful arrangement of aquatics. In the center was a large bowl of great glowing blood red water lilies, wide open and in bud—*Nymphaea Zanzibarensis*, the large night blooming water lily from Zanzibar. On either side, and around, were bowls filled with smaller blossoms; pale blue, white, yellow and blush, all with foliage. A stand, near by, was devoted to a single specimen. It was floating in a large bowl. Its abundant, shining, dark green leaves and spikes of buds and open flowers, lilac shaded with purple and a dash of yellow, attracted universal attention.

Mr. Fuller, who was taking this charming collection from his home, Edgewater on the St. Johns, to his summer home in New York, told us that this interesting plant which he viewed with pride, was *Eichornia crassipes*, a new, rare aquatic, and that he had paid \$10.00 for a small plant some time before. It had, however, increased so enormously that he had thrown several cart loads of it into the St. Johns river, and he wondered if it would grow there. You doubtless recognize that plant, which so greatly admired by some, is heartily detested by others—the water hyacinth.

The most fascinating of all garden beds, our water lily pond, is made by digging out the earth to a depth of 2 or 3 feet and cementing the excavation. Put a layer of muck and sand at the bottom and fill with water.

Our rose garden, to which we turn when wishing to express regard or sympathy with others, by sprays, or a basket perhaps of fragrant roses, must be carefully planned. Mrs. McCarty has given us in her report for 1905, most complete and valuable directions for planting and caring for roses. My list will include Bride and Bridesmaid, American Belle, Richmond, Andre Schwartz, Kaiserin Augusta Victoria, Madam Lambard, Papa Gontier, Madam Cochet, La France both pink and white, Cecil Bruner, Duchess de Brabant and Magna Charta. Climbers Devonensis, Gloire de Dijon, Chrometela or cloth of gold, Reve d'or, Madam Peary or climbing Kaiserin, Adelia Praedel and climbing Meteor.

These roses are well adapted to our cli-

mate and conditions. Madam Lambard is unsurpassed as a general utility rose. During the entire year this rose with Cecil Bruner and Duchess de Brabant will continue to give us fine buds and flowers. Even the thrip, that inveterate rose pest, has little taste for these three varieties.

In our planting and arrangement we must give due attention, not only to detail but also to general and harmonious effect.

From the lists which I have given, combinations and groupings can be made of infinite variety.

I will close with mention of that wondrous vine, so dear to tourists and so faithful in its efforts to adorn the waste places as well as the gardens. The native flora of Florida would lack its crowning glory in the absence of the Yellow Jessamine.

Report of Committee on Peaches, Plums and Pears.

By Aubrey Frink.

Mr. President, Ladies and Gentlemen:

I have not prepared any paper on peaches, pears and plums, for the reason that I could not get, prior to coming here, just the information that I wanted. I understand that Mr. Shooter is now in Europe, and today I talked to Mr. Klemm and he has no report to make.

This season has been a hard one on peaches as well as oranges. In fact, for a year they have suffered. Last year being wet, was hard; then coming that severe cold at Christmas time which alone would not have done so much damage, but com-

bined with wet weather and succeeding dry weather, together with the April cold, has done a great deal of damage to peaches. From information that I can get, it seems that the crop is very short. Some people claim that their crop will not be more than twenty-five per cent. At some places around Lake Helen and DeLand the per cent is a little better. The trees, also suffered a great many offsets on account of the cold, wet and drought. However, I do not think that they are in any worse shape than the oranges, which suffered by drought and cold.

Now, as far as varieties are concerned, there are four or five varieties that do well and are a good market kind. Perhaps the one entitled to first place is the Jewel. That is planted more largely, perhaps, than all others combined. Following that is the Waldo. Those two peaches are very similar; in fact I doubt if you could tell much, if any, difference either in size, quality or appearance, except that the Jewel is a trifle larger and is also from ten days to two weeks earlier. This is one of the earliest varieties we have, making it on that account a desirable market variety. It is also a free stone.

Then come the varieties of the Bidwell-Peento type; Bidwell Early, Maggie, Subber and Yum Yum, which are very similar in appearance, character and tree growth and time of ripening, being right along with the Jewel. These are cling stones. The Peento and Honey types are far preferable, in fact, the only ones that give us our market peaches. Those of mixed strain like the Jewel and Waldo, also seem to be preferable. The Peento seems to be a more vigorous grower, making a longer lived tree than the honey. They are on a par with our native seedling trees in vigor.

As far as pears go, I do not think that I have anything new to say. Pear growing is all right if you can keep out the blight, but I do not know of any remedy or any preventive. About the best thing seems to be non-cultivation. The two varieties grown most generally are the LeConte and the Keiffer.

As far as plums are concerned, there is a general opinion that they do not do well in Florida; but this is a mistake for there are several varieties of plums that do well. The Excelsior was the original one intro-

duced some twelve years ago. This is a cross between some variety of the Japanese type and the Southern Chicksaw type and bears very well. There is also the Terrell plum. This is very similar to the Excelsior; a trifle larger and I think of a little better flavor. Then there is a yellow variety, the Queen; also the Howe, very similar to Excelsior; and a new variety called Miller, which is later than any of the others, but which is one that I think will succeed very well in Florida. The Excelsior has been tried and proven very satisfactory. The others are comparatively new, but being similar in tree growth and of the same type, I think they will do well throughout the whole state.

Mr. Hampton—What about the Rival peach?

Mr. Frink—I am not so well acquainted with that. I understand it is very similar to the Hall's Yellow. Hall's Yellow has not been a success commercially. It was planted a good deal a few years ago, but for some reason or other it has not made a demand. The demand for that class of peaches has fallen off very considerably. At one time we could not furnish near enough trees to supply the demand, but now we have to be careful not to overstock ourselves.

Mr. Gibbs—What is the matter with the Dorothy, or the Angel?

Mr. Frink—The Dorothy is good, but for market purposes I think it is a little too late. The Angel peach is a good peach, and a pretty one—a little acid for some tastes, and perhaps a little late for the best market. It comes a little too near the season of the Georgia peach.

Mr. Gibbs—What time would you think an early peach would begin to ripen?

Mr. Frink—That is a little hard to

answer. The different seasons makes them ripen at different times.

Mr. Gibbs—When I left home on Saturday, the Angel peach was almost in full, brilliant coloring. I think that is a little early.

Mr. Hart—The Suber, how about that?

Mr. Frink—That is one of the best and should have been included in the list of the Bidwell varieties.

Mr. Penny—I would like to ask about what time would be the best to plant the Excelsior plum.

Mr. Frink—That question might cover a good many different kinds of trees—generally, the late fall or early winter. I consider December the best month.

Member—I have an Excelsior plum tree in my yard which has borne well for four successive years, but for the last two years it has been rather shy. I have excused this, though, on account of the extreme weather conditions. I have some other trees of different varieties of plums that have not given me a quart of plums in twenty years. The Excelsior is the one that has always given the best satisfaction, in my experience.

Mr. Longwood—Do you know anything about the Satsuma plum?

Mr. Frink—It is very erratic. Some report great satisfaction while with others the results are unfavorable. Around Tampa, I understand they do fairly well. It is something like the Kelsey. I would not advise planting it generally.

Mr. Penny—I would like to ask the gentleman who said his Excelsior plum did well, what kind of land he has.

Member—It runs about four feet of

yellow sand. After that, clay phosphate below, and water on an average of fifteen feet.

Mr. Penny—Do you think they would do well on low land?

Member—I have tried all kinds of land, but I don't know that I can tell you exactly what the solution is for the plum problem. It seems to be a very erratic kind of a tree, and they sometimes do well or ill for no apparent reason at all. Some graft pears on the wild haw and say they do well.

Mr. Neil—A man in my county told me to spray with the Bordeaux mixture and I would always have a good crop.

Mr. Waite—I have succeeded in holding the fruit better this year than before, and I sprayed with the Bordeaux.

Mr. Frink—Now, if you take a peach, for instance, that is a native of a different country and bring it down here, it is almost impossible to make it bear. Occasionally you can get a few fruit, but as a general proposition, it never is very successful. I think the Kelsey plum is out of its proper environment.

Mr. Hudson—How can you get a peach that will mature later in the season, say in August?

Mr. Frink—There are varieties that will do that, largely of the native Spanish type. There are several of those peaches; just now I do not recall any of the names. It is hard to get them to bear so well when budded as when they are seedlings; that is, speaking of the Spanish type. Probably one of the best here is the Estella, which is very late and, under favorable conditions, bears well.

Strawberry Culture.

By J. M. Brownlee.

Mr. President, Ladies and Gentlemen:

The soil furnishes anchorage for the roots of the plants, and a reservoir for food and moisture. It makes almost no difference to the plant whether the soil be light or heavy, sandy or clay, so long as these objects are accomplished. The plant lives on the food it finds in the soil and not on the soil itself. It is true that the strawberry—like any other crop—must generally thrive best on rich sandy loam. But is this not the ideal soil for any crop? It holds fertilizer and moisture, but is not easily puddled. It becomes sufficiently compact without getting hard or lumpy and it admits air. These qualities are essential and they can usually be had with less labor and care in sandy loam than in any other soil. Here in Bradford county you may see all kinds of soils planted to strawberries, from low stiff, to high sandy loam, and with little difference in the yield. I don't believe there is any crop grown that is less particular than the strawberry about the kind of soil on which it is grown, not even grass.

KIND OF BERRIES GROWN.

There is very little discussion to be had on the berry most grown here, as the Klondyke is grown almost exclusively throughout Florida. There may be a few Lady Thompsons grown here, but very few indeed. The Klondyke was originated in Louisiana some years ago. It has a very vigorous bush, free from rust or blight, and a very dark green foliage. The fruit is simply perfection, being large

and exceedingly high colored, and very firm, which makes it a good shipper.

This berry was introduced here about six years ago, and has held its own better than any other variety ever planted here. The Klondyke is a very prolific berry. When we have anything like a good season you may expect anywhere from ninety to one hundred and ten bushels per acre.

PREPARATION OF LAND AND METHOD OF CULTIVATION.

In preparing land for strawberries, it is very essential to have your ground free from grass and well pulverized, for when you make your ground up you do not want any cavities underneath the plant. It makes it difficult in getting plants to live, and even if they should live over a cavity, the plant will be a shy bearer. I usually plant berries after oats; plow in the oat stubbles before the grass comes through and then keep it thoroughly disked until ready to bed, which may be from July 15th to September 1st, just as you may choose. In bedding my ground, I use eight and one-half feet for bed, and put four rows of berries to the bed, make the two center rows 18 inches apart and outside rows 22 inches from center rows.

The cultivating is done with a hoe and hand cultivator. Run the hand cultivator about once a week if the ground is wet. This keeps the ground loose and prevents grass from coming through. I use a horse cultivator to plow out my water furrows.

It is very essential to keep the ground well pulverised to prevent it from forming a crust on top and thus drying out too easily.

BEST METHOD OF MARKETING.

Marketing the berry crop is a very difficult matter. Almost anyone can grow them, but when it comes to marketing them it takes one who has studied the conditions for several years. My method is to select one good reliable commission house in each city that I expect to ship to (I use New York, Philadelphia and Boston for my markets) and ship to him regularly. It is well to have berries on the market every day if you possibly can. Put up your berries in good honest packages and mark your name on the crate and it will not take your commission man long to secure a good trade on your fruit; one that the trade will call for. Or, if you expect to sell to buyers at your own town, it is best to put up honest packages and you will never have any trouble in selling. The buyers soon learn who puts up good berries and are always ready to buy that kind.

GROWTH AND EXTENT OF INDUSTRY IN THE STATE.

The strawberry industry has grown wonderfully in this state in the last few years. Ten or twelve years ago the shipments from this county on the heaviest days were no more than from three to four hundred bushels, while last year its heaviest day would reach five or six thousand bushels. Last year there were

\$9,000.00 worth of berries sold at Starke on the wharf in a single day, besides several hundred bushels shipped on consignment. The net sales to the growers of this county last season were between \$350,000 and \$400,000, and there seems to be no limit to the industry. Several years ago, I thought that the market would be glutted if we grew too many berries, but last season, with our large supply of berries, there was a continued cry for more berries.

DIFFICULTIES AND DRAWBACKS OF STRAWBERRY INDUSTRY.

The principal difficulty in the strawberry industry is the drought in the summer in the setting season. The plant is very delicate, and unless we have plenty of rain during the setting season it is very difficult to get a stand, and in order to get a good yield we must have a good stand of nice large bushes, as a small bush can never produce the fruit a large one will. We sometimes have a drought during the picking season that also hurts us very much as it makes the fruit small and of an inferior quality. The blight generally strikes us during the dry season. An insect (commonly known as the thrip) often sucks the bloom and kills it and then they work on the small berries. I have seen them destroy an entire fruit crop.

We sometimes have a late freeze that destroys a great quantity of fruit, but we can't call this a drawback as it is most generally to our advantage as it keeps berries back north of here.

Report From Pinellas Fruit Growers' Association.

By Mr. J. G. Julian, President.

Mr. President, Ladies and Gentlemen:

This association started here among the pineapple and then the orange growers took it up here, forming the Orange Growers' Association some four or five years ago. We have the meetings quarterly the first Saturday of each month of March, June, September and December, which have proved very interesting to some sixty or eighty. Every now and then we say we must take all the orange growers in, but all of them can't get in at the same time. I think we are on a permanent basis and at least 50 or 75 of the orange growers would say positively that we are. We find our quarterly meetings very interesting. We generally have two sessions on the days we meet; one in the forenoon and one in the afternoon. Then, if there is any special point that we want to know more about, we call on the Experiment Station for that specific point and one of Prof. Rolf's assistants comes

down. I believe the Prof. himself was down here once and started to give us a 30 minute talk, but we were all so interested that when he finally did look at his watch, he found he had barely time to catch his train. We meet at different points, Largo, Ozona, Clearwater, St. Petersburg, so that if it is impossible for some of the members to leave their homes, the meetings are brought to them, and it does not work a hardship on anybody. We think it is a good organization for the betterment and general diffusion of ideas. New members are coming in all the time, and I think it is now on a firmer footing than it has been for the last four or five years. We hope to make it a great good and benefit.

Prof. Rolfs—I can assure the meeting that this Association is a wide-awake body and as intelligent a lot of people as anyone would want to see.

Report From Pasadena Farmers' Club.

By B. W. McLain.

Mr. President, Ladies and Gentlemen:

In response to the courteous notice from your president that the Programme Committee had reserved a date for a report from the *Pasadena Farmers' Club*, I now have the honor to introduce the Pasco County Fledgling.

This 3-year-old Agricultural Society

was born September 24th, 1904, at the residence of Mr. C. F. Gardner, on the shores of Lake Pasadena.

Actuated by a common impulse of co-operation and an earnest desire to master the problems involved in agricultural pursuits, twelve gentlemen and nine ladies organized the Pasadena Farmers'

Club and elected Mr. A. Roberts, President, Mrs. C. F. Gardner, Secretary, and Mr. Stephen Soar, Treasurer.

Monthly meetings have been held and the officers proven so satisfactory that they have been annually re-elected; while the membership has increased from 21 to 68, with an average attendance of 30.

The distinguishing feature of this club is its combination of home and social influences with the practical and scientific discussion of the problems incident to agricultural life.

The ladies and children contribute most effectively to the general entertainment as evidenced by Master Butts, a sturdy 3-year-old, who at our last meeting made a happy hit of "My Country 'Tis of Thee" and "I belong to the Band, boom! boom!"

The social relations are further promoted by meeting in turn at the homes of members, each family bringing a basket of lunch, which is assembled by the hostess and spread in a home brewed dinner, which is thoroughly discussed before the purely practical and scientific subjects are introduced.

"Well", I hear you ask, "What has been accomplished?" I answer,—First, a method has been found to bind together in a coherent group those interested in the products of the soil so that their individual development reacts one upon the other, and the experience of the unit member becomes the property and knowledge of all.

Second, the animated discussions and interchanges of practical experience have already developed a strength and confidence which will be efficient in originating and shaping the new projects of irrigation and culture, which must be perfected before general and liberal results can be obtained by Florida farmers.

Third, a power has been organized and a spirit developed which enables the farmer to get into closer touch with other organized workers and thinkers; and the practical and personal assistance already accorded us by members of the Agricultural Station has had a marked influence in awakening the interest and encouraging perseverance in the work. I believe that the ensuing three years will witness an unprecedented development in Pasco county.

It is eminently proper, in this connection, to note the intelligent, unwearying and genial spirit of its President, Mr. A. Roberts, who from its inception to the present moment has studied its interests and presided over its deliberations.

This brief sketch of the origin and policy of the club does not contemplate details of the practical work done or a view of the scientific and technical grounds covered.

I assume that the office of presenting it has come to me because of my very earnest interest in all such matters rather than any practical knowledge or experience of the subjects involved; and therefore, in bringing to you this greeting from the *Pasadena Farmers' Club* I have at once the honor and pleasure of introducing to you my associate delegates,—gentlemen who are not unknown to you and who, by long residence and practical experience, are eminently qualified to inform you upon every point of interest concerning agricultural and horticultural matters in Pasco county:

Dr. J. F. Corrigan, St. Leo; W. J. Ellsworth, Jessamine; J. C. Carter, Dade City; J. W. Hudson, Dade City.

I regret my inability to be present in person.

Legislative Help.

Prof. Bartlett—I had not expected to bring this matter up at the present time. It is a matter of so much importance that several of our people have desired me to bring it before you, possibly through a committee. I have spoken to some of the older members in regard to this, and have also spoken to some of the younger members. There are three things I wish you to consider. One of the things is in regard to the experiment station. We have an experiment station here, but we get very little benefit from it, compared with what we ought to get. We would like help along the line of irrigation, especially the truck men and fruit growers, better than what we are getting now. We have to go up to the experiment station and bring the men down, paying their expenses, and then when they have just opened a little vista to our eyes, they are gone. The people in the experiment station are doing all they can, but they have a limited amount of money to do it with. \$15,000 is all that they get. Florida has never given them a dollar. Every state in the Union is allowed \$15,000 through the Hatch Bill for an experiment station. I suppose our state gets \$15,000 because every state is entitled to that. All through the west they are giving many dollars. In Illinois, in Wisconsin, in Nebraska, and in Kansas, they are doing great things for their agricultural experiment stations. Where they put out thousands of dollars, they have been taking in millions. We are doing very little, and I think a sentiment should be stirred up in the state so that the matter would

be taken up by our Legislature and that it would give us for this purpose at least as much as the Government gives.

I understand there is a bill before the Legislature now to give \$5,000 for the Farmers' Institute and \$30,000 for buildings needed by the Experiment Station, and I think it is the duty of every agriculturist to see that it does not fail. Our State has great prospects in agricultural and horticultural lines, and I think we should use every means in our power to realize these prospects.

The Interstate Commerce Commission is doing a great deal for the whole country. California has done a great deal for itself because of its compact organization. We want to do the same. We want to go before the Interstate Commission and get them to co-operate with us. We should have a committee appointed to go before them and see that we get what we want. We ought to have half the shipping rate we are getting now.

We had an appropriation from Congress for \$5,000 last year with which to fight the white fly, and \$10,000 this year. The State has not been doing enough. Congressman Sibley has done all that one man could do and our Congressmen Mr. Sparkman and Mr. Clark, have co-operated with him and they have been able to get this \$10,000. The United States Government comes in and helps us, and we do nothing. Now, our Legislature should do something to eradicate this curse of orange culture. Let us show that we are interested ourselves and give

our legislators no peace until we get some help from them:

These are the three things, and I ask that you have a committee of five appointed to look into these several propositions and report on them and the advisability of presenting and handling them. I put it in the form of a motion.

Motion seconded.

Mr. Painter—A good many members will probably remember that Mr. Hart at two different meetings put in a resolution somewhat to the effect that we wanted to get aid from the Government to help fight the blight. I went to Washington and presented it to Secretary Wilson myself. He said he wanted to do all he could, but just then the appropriation was all taken up and he said "What are you doing yourselves?" You can count on his helping you and meeting you more than half way on anything you will undertake that will be of benefit. He also said, "If you will get your people together and show that you mean something, then we will help you."

Dr. Richardson—There are some things that nobody can find out. Mr. Painter knows that. You know that this Society has gone to the trouble time and again of preparing bills to be presented to the Legislature. Have they ever gone through? No. I do not know what became of them. Nobody else, it seems, can find out. We simply have apathetic members, an apathetic society and an apathetic political party. By that I mean the men who are in control of the Legislature of our state. I know of no better way to wake them up than to wake up ourselves. I think every member of this organization should take it upon himself to see that the legislature is fixed. I don't mean

fixed in the political sense, because I do not think that the horticulturists of this state are in a position, financially, to fix anybody. I do not think we should fix them as it is ordinarily understood, in the underhanded way, but in a way that will serve our purpose perhaps, better. I mean by that in a way that will make them think they are going to be fixed definitely and permanently and finally. Let us fix them in their political graves if they do not do something for us.

I do not think we should be discouraged by our failures in the past but that we should try again. I know of no better time than right now, and I am heartily in sympathy with the motion offered by Mr. Bartlett, and hope that you will appoint a committee that will do something. Let us get at the Legislature of the State so that we may be able to report, if we desire more help from the Government, that Florida has at least done something for herself. Let us ever bear in mind the old adage that "the Lord helps those who help themselves." Let us help ourselves first and then apply to the Government.

Prof. Bartlett—I think Dr. Richardson's remarks are well put, and I think we should get help from our own Legislature before applying to the Government. I was at a banquet where Mr. Sparkman was present, and he said, "What are you doing to help yourselves?" Of course, there was nothing that could be said.

Prof. Rolfs—I would like to say a word in explanation. We have slightly more funds than Mr. Bartlett spoke of, on account of the creation of the Adams Fund, but these are so circumscribed by law that we must use this fund for origin-

al investigation only, and the work that Mr. Bartlett wants done and that we all want to do, is classified as Farmers' Institute work and demonstration work; in other words, putting into practice well known principles, and where principles are well known, the money received from Congress cannot properly be used. However, the experiment station staff once in a while, if it is possible to slip out to some of these farmers' gatherings, are very glad to do so. When a body of local agriculturists get together and say that they will pay our expenses, we are very willing to go out and give them our time. But we cannot justly charge expenses for work of this kind to the funds mentioned. The Federal Government is this year expending something like \$60,000 for agricultural work in the State of Florida; that is, investigation work. You are perhaps surprised at the amount. There is the Hatch Fund, the Adams Fund, a Subtropical Laboratory Fund and the white fly appropriation, in addition to the local demonstrations and experiments.

You will see where Mr. Tenny and Mr. Powell and men of this stamp are costing

the Federal Government a great deal, and you will see how much the Federal Government does and how little the State does. Consequently, the federal officers have the right to feel a little discouraged. The people at Tallahassee are contemplating an appropriation to give to the experiment station a home. I suppose there is nothing more important than a home. We have had none up to the present time. This bill proposes about \$30,000 to be expended for the buildings and \$5,000 annually for Farmers' Institutes.

Mr. Skinner—I was at Tallahassee several years ago when one of the bills came up that the Society recommended. The difficulty seems to be that the Horticultural Society seems to be identified with the orange industry. The state of Florida is much larger than the orange industry. If you make the people in each part of the State think that they are to be benefited by the passing of a bill, it is pretty likely to go through. They are willing to pass any bill that does not call for money. Let them all see that it is a benefit to the state, and I think there will be no trouble.

Japanese Matting Industry for America.

Prof. Rolfs—I understand that the office of the Seed and Plant Introduction is now looking for a place to plant the Japanese matting rush, and we have their agent with us this morning. Probably you will be as interested as I am in this matter, and I will be glad if Mr. Tull will give us a few remarks.

Mr. Tull—The matting industry in America so far is very young; it is still

in its infancy. This is an entirely new thing in America and the office of Seed and Plant Introduction under the Bureau of Plant Industry has recently taken it up. The growing of this grass was tried by private individuals but they made a failure. They succeeded in getting machinery, but could not get raw material. They went to China and Japan and finally secured a number of plants and sent them

over here to be grown. Japan sent a representative over here and found we were trying to compete with them so they immediately stopped our supply of straw. The American Company sent a man to Japan again and got a small supply of the Chinese straw and they are now making a very fine grade of matting but the supply of raw material is very limited. At this point, the Department of Agriculture took up the work of introducing these two grasses from China and Japan.

Some experiments have been tried with our native grasses on the coast of South Carolina, principally in the abandoned rice lands. The rice industry along the Atlantic Coast, which at one time was so thriving, has within the last ten years, entirely died out on account of the rice in Louisiana and Texas being grown by the use of machinery. The Department thought that by introducing the matting grass into North and South Carolina, they might bring back into cultivation the abandoned rice fields, but so far have proved unsuccessful with the native grasses.

Last year we got a special appropriation through to send a man to Japan to get the roots, as the plant is propagated in this way. I went to Japan last fall and finally succeeded in getting a great many roots of the two different kinds of Japanese and Chinese roots. These roots were finally landed at California but in very bad condition, so to save them we left them at Chico, Cal., to grow for the summer. The plants are now doing very nicely. We are now planning to distribute those roots next fall, beginning at Texas and running along the Gulf into Florida and up into South Carolina. The plant requires almost the same conditions that are re-

quired in rice culture. It is planted in the winter and then water put on. The water, with plenty of fertilizer, forces the plant into a very long, slender growth. We have arranged now for an experiment with some Japanese in Texas who have put out about one and one-half acres of it. We wish to distribute the plants now at Chico in two or three different places in Florida as well as Texas. There is now a ready market for the straw at \$80.00 per ton. In Japan, the grass yields from four to six tons per acre.

The way the Chinese and Japanese grow it is much cheaper than the methods we would have to employ. The labor conditions there are nothing compared to what they are here. The plant is perennial and you can put it in the ground and leave it; with the aid of water and the proper use of fertilizer you can continue to harvest year after year.

Our object is to first find out if the grass will grow. Then we will have to work it out by practice and find out the best methods of growing it. I will be glad to answer any questions or talk to anyone on the subject.

Mr. Hart—What is the price of growing and preparing for market; putting it in shape?

Mr. Tull—The two kinds of straw are cured entirely different. Two days of hot sunshine will cure it. The process of curing in Japan is very crude and very long compared to the way in which we would have to do it. The grass is cut and spread out in the field, and after two days of hot sunshine, the farmer considers it cured.

Camphor for Florida.

W. O. Reichtmann—I regret that I cannot make quite as explicit report as I would like. Probably the thing that most of you are interested in, is whether camphor can be produced commercially in the United States. The first thing to be ascertained is as to whether the plant can be grown at all successfully or not. The natives of Florida can probably answer that question much better than I can, as they have it here with them, and have undoubtedly noticed the habits of its growth. From the trees which are present, it seems to me that there is but one answer to this question, and that is, that the tree can be grown, and grown successfully.

The second point I would mention, is as to whether the camphor tree as grown in this country is producing camphor. You have already had two reports, one presented in 1896, by Henry Hubbard, stating that he had received as high as one and four-tenths per cent. of camphor from the fresh twig of the camphor tree. The second was from Dr. Walker, last year, in which he presented some of the work of the Department and the results of his own personal experiments.

Our work has been confined to Florida and in California, but at the present time we have not as yet found a single tree but that an appreciable quantity of camphor was contained in the leaves and twigs of the tree. The amount of the camphor does not compare with the amount reported as being found in the trees grown in its native condition. This may be due to several reasons. The chief reason is perhaps that we are working only one side of the matter and the

people of Formosa are working under entirely different conditions. They may be working on the basis of dry material, and we on fresh material, which would give a variation of sixty per cent.

The last point to be mentioned, and perhaps the most important point in connection with the camphor work, is the camphor as produced in the United States of a quality that it can be used commercially. Samples of the camphor that have been produced in Florida have been submitted to the trade for their own demonstration and observation, and the report sent to the Department from the firms who have been testing it, is, that they would have thought it was from Japan or Formosa if they had not known where it came from.

Secondly, does it have all of the qualities, physical and chemical, that the Formosa and Japanese camphor have? It has.

Lastly, I can only state that one firm has taken the matter up, and has started planting a tract of three thousand acres with camphor in your own state.

I regret that I cannot go into the details of the work and give you a more detailed talk. This, I trust, may be done in the immediate future.

Dr. Walker produces samples of camphor.

Dr. Walker—I am not in a position to give you much further information about the matter. Mr. Reichtmann has taken charge of the camphor plant. I am doing my best to cultivate as much camphor as I can. Mr. Wood is now in charge of the work at Huntington. Dr.

Reichtmann has taken charge of the large establishment at Satsuma.

I verified my own statement made last year, and find that camphor can be grown more than successfully. The experiment as far as it has gone, is perfectly satisfactory. I have written and advised people to go into this, and a great many have said that there could not be anything in it, because if it was as good as I said, I would want to keep it all to myself. The sample just displayed was made from trees that I planted myself and had purified in Washington, and is of a most satisfactory nature. I can only say to any of my friends who are interested in camphor—I fancy the best thing they can do is to plant it.

Mr. Sheppard—What degree of cold will a camphor tree stand?

Member—In Marion county, I have

not seen one that showed the slightest degree of being injured by the cold.

Mr. Hart—Does the variety have anything to do with its power to withstand the cold?

Dr. Walker—I think the condition of the tree at the time the frost comes has more to do with it than anything else. The leaves will stand a considerable amount of cold and when they fall, retain a considerable portion of their camphor. From the very small amount of opportunity we have had, we discovered that the camphor makes its growth as a rule pretty regularly. I have noticed a few that have made a very irregular growth. A peculiar advantage is that they will stand more cold than an average orange tree, and when cut down you can get your camphor from the dead wood.

Necrology.

Report Submitted by G. L. Taber, W. S. Hart and Wm. C. Richardson.

Mr. President, Ladies and Gentlemen:

There are times in the lives of societies, as of individuals, when we are called upon to cope, as best we may, with the feelings that overwhelm us, and to give expression, in some form, however inadequate, to the esteem and love and honor in which we hold our departed dead.

This is one of those sad occasions and our lips falter and the words we grope for come haltingly and broken and seemingly powerless to convey the thoughts we would utter. We stand apalled at the calamity that has overtaken us. Since last we met our honored and beloved President, Charles Tobin McCarty and five others of our highly esteemed number, have passed into the Great Beyond. The sad record in chronological order is as follows:

L. J. Sawyer of Tibballs, Saint Lucie county, died at Oswego, N. J., July 20th, 1906, aged sixty-eight years.

George Rainsford Fairbanks of Fernandina, Nassau County, died at Suwannee, Tennessee, August 3rd, 1906, aged eighty-six years.

Denis Redmond of Saint Nicholas, Duval County, died at Jacksonville, September 24th, 1906, aged eighty-two years.

Abner Atwood of Pawtucket, R. I., died at his home in Pawtucket, November 23rd, 1906, aged eighty-two years.

Charles Tobin McCarty of Eldred,

Saint Lucie County, died at Fort Pierce, January 30th, 1907, aged fifty years.

Henry George Sartorius of Seminole, Hillsboro County, died at Las Vegas, New Mexico, March 30th, 1907, aged thirty-two years.

Your committee on Necrology, to whom the sad duty was assigned, beg to report the following resolutions:

Whereas, during the past year, death has removed our beloved chief executive officer and several of our most worthy members, and

Whereas, it is due their honored memory that fitting tribute be paid them and expression given to our deep sense of loss, therefore,

Resolved, that in the death of Charles Tobin McCarty, our society has lost a President whom we loved, an executive officer of high ability, a man, a brother and a friend who was in every sense one of "God's noblemen;" that in the death of George R. Fairbanks we have lost a zealous worker for the interests of our society, a historian of note and an honored Christian gentleman; that in the death of Denis Redmond we have lost one of our esteemed honorary members, who for many years was noted in literary work and zealous in horticultural pursuits; that in the death of Abner Atwood, L. J. Sawyer and H. G. Sartorius, we have lost three of our worthy and esteemed members.

Resolved that we extend our sym-

pathies to relatives and friends of these deceased members.

Resolved that these resolutions be spread upon our minutes; that suitable memorial notices be printed in the forthcoming Report of the Society; that the same report shall be dedicated to the memory of our deceased President, Charles Tobin McCarty, and that this dedication so appear on the title page.

CHARLES TOBIN McCARTY.

"Our self-made men are the glory of our institutions."

Charles Tobin McCarty was born at Green Bay, Wisconsin, on February 24th, in the year 1857.

He came of blood which had proved its staunchness amid the dangers and hardships of a new land; he owed his being to parents noted for energy of brain and brawn, in a community where each person must of necessity, have possessed something of the heroic; he sprang from a race which could not be moulded into unchangeable austerity even by the exigencies of pioneer life. He was the son of a frontiersman and he early took upon his young shoulders his share of that father's burdens. Here it was that his inheritance from his Celtic ancestry stood him in good stead. It made him cheerful in the midst of difficulties; it gave him the power to see poetical beauty as well as practical opportunity in the pine forests about him; it fired him with ambition, and whispered to him continuously of great things to be done in the world, even though that

world seemed an unconquerable wilderness.

He was a boy in whose sturdy manliness his father felt a just pride, upon whose gentleness his mother relied; whose courage won the respect of his brothers and whose courtesy made glad the hearts of his sisters.

He gave of himself freely, of his warm sympathy, of his mental activity, and by this very generosity created for himself a little higher plane; opened up for himself the way along which he resolutely trod toward loftier ideals.

He was, from his earliest years, consumed with a thirst for knowledge, for education, apparently realizing from the first that without this he could not reach the heights on which he had fixed his eyes. Only those who are acquainted with the limited educational advantages of the West in those days, can appreciate the difficulties in his way. Whatever they were he surmounted them, and in 1878 entered Tilford Collegiate Academy at Vinton, Iowa, with so many credits that he graduated from that institution a year later.

In the class with him was Miss Elizabeth Matter, whose record in school work was equal to his own. As he had been one marked and set apart, so had she been a leader, a forceful, independent spirit. Upon the stage from which these two delivered their addresses, they were made man and wife, on the day of their graduation. Life as they could see it ahead of them, was not a path of roses, but they entered upon it confidently, secure in the knowledge of their tried powers, animated by kindred ambitions, and sure that the depth of their affections would

not only help them overcome all possible difficulties, but would make the struggle together, a real happiness. Their faith was justified. The dark days came, but they were not cast down, for they had each other and that to them, always meant more than anything else.

The happiness of their home life, the remarkable harmony of their union, deeply impressed all who were allowed the privilege of intimate association, and the desolation of such happiness weighs heavily on the hearts of their friends.

In 1882 Mr. McCarty entered the Law Department of the Iowa State University, graduating with honor at the close of his course. After devoting a year to the practice of his profession he was induced to accept a professorship at Tilford, where he remained until 1888.

His work as a teacher was of a high order, adding markedly to the strength of the school and leaving an imperishable impression upon the minds and hearts of the hundreds of young people who came under his influence. His power was felt outside as well as inside the class-room. He was friend as well as instructor. He not only drilled his students in the acquisition of knowledge, but he interwove facts with a broad philosophy, which gave them warmth and vital significance.

On February 19th of this year the alumni of Tilford held a memorial service in honor of their beloved teacher. Hundreds attended and their sincere sorrow showed that the years had not lessened their regard for Mr. McCarty, nor their appreciation of his worth. Thus it is that fellow students

and pupils after an interval of twenty years, declare that Mr. McCarty, "enriched and inspired their lives and generously helped to lead them out to broader and better fields."

In the year 1888, driven by ill health, he severed his connection with Tilford, left a state where friends were legion, and with his brave wife and three small sons, began his struggle with the wilderness of Southern Florida. In a tiny clearing at what was then Ankona, but is now Eldred, he built his humble dwelling. On its site there now stands a handsome residence, and the wilderness has given place to broad, highly improved acres. The mighty change stands as a monument to his unusual keenness of foresight, to his tireless industry and his inflexible determination.

He entered into the cultivation of his pineapples, not only with the shrewd practicality of the business man, but with the eagerness of the earnest student entering a new field of knowledge. As it was with pineapples, so it was with the citrus fruits, or in fact, with anything which gave promise of becoming a valuable resource of his newly adopted state. He was always student and scientist as well as cultivator.

In 1895 the English Government was looking for a person competent to judge of the possibilities of the Bahama Islands and instruct the people living there, in the art of turning such possibilities into valuable facts. At that time Mr. McCarty had become so widely acknowledged as an authority on semi-tropical industries, that he was chosen to fill this important and honorable position.

As a result of his labors in the islands, he published at Nassau in 1896, "The Farmer and Fruit Grower's Almanac for the Bahamas Colony."

This almanac had nothing to do with the calendar, but was a clear, concise and thoroughly valuable treatise on citrus fruits, vegetables and pineapples, by C. T. McCarty, Agricultural Instructor. It met with the hearty approval of His Excellency Sir Wm. F. Haynes Smith, K. C. M. G., Governor of the Bahamas, and proved of incalculable value to the people of the islands.

His numerous addresses on subjects interesting and helpful to Floridians, have been widely copied and quoted.

At the time of his death, January 30th, 1907, he owned and operated the largest pineapple plantation in the world. He had however, of late years, placed the active management of this vast acreage in the hands of his capable eldest son, Daniel T. McCarty.

As the East Coast country developed, Mr. McCarty's abilities as a lawyer and as a well informed and intellectual citizen were in great demand, and he gave his entire time to affairs in the conducting of which he was eminently qualified to shine. He had as a lawyer a large and ever-increasing practice, serving at the same time on the legal force of the F. E. C. Ry Co. In partnership with A. C. Dittmar, of Ft. Pierce, he was engaged in an extensive real estate business.

He was a heavy stockholder in the bank of Ft. Pierce, and a member of its Board of Directors, president of the Florida State Horticultural Society, president of the Ft. Pierce Board of

Trade, the animating spirit of the county good roads association and a Mason of highest rank.

To quote the words of a fellow-townsman: "He was always found in the front ranks of those working for the improvement of Ft. Pierce, St. Lucie county, the East Coast and the State of Florida.

Mr. McCarty was shot on the streets of Ft. Pierce, the morning of January 30th of the present year, and died the afternoon of the same day, leaving the entire community shocked at "the cruel cutting off of a noble life," in deep gloom over the loss of such a friend and citizen, and with the firm belief that his place could never be filled.

He was a quiet man, with quiet tastes, and he lived a quiet life, yet when he died there came expressions of sorrow and affection from hosts of friends scattered over sixteen states of this great union, and from almost every county of this beautiful state he loved so well. Some of these friends occupy posts of honor among their fellowmen; others are from the humbler walks of life; all are alike bereft and grieving.

Comfort and sympathy, without stint, has been given to the heart-broken wife and her three grief stricken, but manly sons. Words are feeble; all we can do is to say: "Thy will be done."

"God calls our loved ones, but we lose
not wholly
What He has given;
They live on earth in thought and deed,
as truly
As in His heaven."

GEORGE RAINSFORD FAIRBANKS.

To mention the name of George Rainsford Fairbanks is to bring to mind one of the leading characters in the history of this and adjoining states for the past sixty-four years, and one whose literary ability has contributed much to perpetuate that history.

Major Fairbanks was born in Watertown, in northern New York, July 5th, 1820, and died at his summer home at the University of the South, Suwannee, Tennessee, August 3rd, 1906, in the eighty-seventh year of his age.

Entering the Sophomore class of Union College, Schenectady, New York, at the age of sixteen, he graduated with the class of 1839, at nineteen. He received the degree of M.A., both from his alma mata and from Trinity College, Hartford, Connecticut.

In 1842, he was admitted to the bar in New York State. In the same year he came south. This was three years before Florida was admitted to the Union, and he remained a citizen of the Territory and State for the next sixty-four years.

He first settled in historic St. Augustine, but later made his home in Fernandina.

For four years (1842-46), during the territorial days, he was clerk of the United States Superior and District Court for the northern district of Florida; and the year after Florida's admission to the Union in 1845 he was a member of the State Senate (1846-48). He became Vice-President of the Florida Historical Society, honorary member of the New York Historical Society, and held other positions of trust and honor, but was best known

to many of us as a fellow-horticulturist and the efficient President of the Florida Fruit Exchange, from its first real business meeting up to 1895 when the big freeze put the Exchange out of business.

Throughout most of the period of its existence, he has been a valued member of this association, and records of the part he has taken in its discussions, and the papers contributed by him, form some of the most valuable portions of the Society's annual reports.

Over the inscription, "George R. Fairbanks, Historian of Florida," his likeness will be found in the report of 1901.

"History and Antiquities of the City of St. Augustine, Florida;" "Fairbank's History of Florida," "Florida Freezes" (the latter a short sketch contributed to this society in 1895 and to be found in its annual report of that year), and the many other products of his fertile pen will be found helpful, instructive and entertaining, but the work nearest his heart was the establishment and fostering of The University of the South, Suwannee, Tennessee, of which institution he published a history in his eighty-fifth year.

At a convention of the Episcopal church, of which he was an ardent member, held on Lookout Mountain, July 4th, 1857, the plan of the institution had been promulgated and formal organization effected at a notable meeting of representatives of ten Southern states.

At this meeting he was appointed delegate and trustee for Florida.

From that time it became the leading

interest and aim of his life to which he devoted unceasing energy.

Its re-founding and re-organization, and hence the actual existence of this noble seat of learning, after the war, was primarily due to his labors and those of Bishop Quintard, of Tennessee, and it was a point of honor that he had been present in session at every meeting of its Board for forty-nine years, including the one in 1906 before his death.

A pamphlet issued from the press of the University of the South, in October last, plainly shows the high esteem in which he was held by the trustees and faculty of that institution, the last few sentences of which are copied and read as follows:

"As of everything that meets our eyes on this mountain, he was more than all the rest of us put together, the layer out and maker and keeper of it.

"There is nothing here that did not know and own him in it.

"There is nothing here that does not and will not feel and mourn his loss."

DENIS REDMOND.

Mr. Denis Redmond, was born in the County of Wicklow, Ireland, Feb. 3, 1824—the distinguished members of the Irish Party, in the English Parliament, John E. and William Redmond, are of the same family. In his youth Mr. Redmond lived for a time in Baltimore, Md. Later, he went to Augusta, Ga. There he was at first connected with the leading paper, "The Augusta Chronicle," afterwards with the "Southern Cultivator," of which he became owner and editor, and which he

conducted successfully for over twenty years.

He founded the Fruitland Nurseries, now owned by P. J. Berckmans & Sons, and built many beautiful homes in the neighborhood of Augusta, that are still monuments to his good taste and love of trees and flowers.

He was a lover of books, owning a very rare and extensive library, and was considered an able literary critic and an authority on English poetry. He traveled widely in this country, and his love of nature was his religion.

After the war he went further south, living at different times in New Orleans, Pass Christian and Pascagoula, then to Florida, where he made his home for thirty years and was connected with fruit growing and journalism. He was twice married. He had two children by the first marriage, who survive him, Mrs. Locke, of New York City, and Mrs. Mel Redmond Colquit, of Washington, D. C.

Summed up, Mr. Redmond's life was one of great usefulness and devotion to the good and beautiful. He was endeared to many by reason of his loving, magnanimous nature and his beautiful mental gifts and attainments. He was one of the three honorary members of this society.

He died on the 24th of September, 1906, after a brief illness, in Jacksonville, Fla. His wife followed him to the grave in three days.

REV L. J. SAWYER.

Rev. L. J. Sawyer, born at New Haven, Conn., Dec. 19th, 1837, died at Oswego, N. Y., July 20th, 1906.

Leicester J. Sawyer was graduated from Hamilton College, Clinton, N. Y., class of 1859, graduated from Union Theological Seminary, New York City, 1862. October 8th, 1862 he enlisted in Co. H. 27th Conn. Vol. At the battle of Fredericksburg was wounded three times in active service, and twice while lying on the battlefield waiting for removal.

In 1864, he was ordained to the ministry at Menasha, Wis., and for twelve years remained in the West preaching at Sheboygan, Wis., and Burlingame, Kansas. In 1876 he returned East, became pastor of the Presbyterian church at Oriskany, N. Y., and in 1877 took charge of the Presbyterian church at Whitesboro, N. Y. On March 1st, 1889 he accepted a call from Emmanuel church, Amsterdam, N. Y., which position he resigned in 1898 to remove to Tibbals, Fla., and began regular services at Eden and Jensen in 1900. Later he accepted the pastorate of a Union church at Ankona and Eldred, which charges he held until ill health caused him to resign in April, 1906.

Rev. Mr. Sawyer was a man of brilliant intellect and one whose brain force seemed never to grow weary, a speaker who could hold an audience at will, a scholar of great attainments, speaking eight languages fluently; always ready to respond when called upon, and using no manuscript, he made his services valuable at all times and places. He was a genial companion and earnest friend. Mr. Sawyer had been a member of this Society for several years, but much to our regret, his health did not permit him to attend our annual gatherings.

ABNER ATWOOD.

Mr. Abner Atwood was born at Carver, Mass., in a house that had sheltered three successive generations of his family. He came from good old New England stock, John Atwood, the common ancestor of the family in America, having settled at Plymouth, Mass., in 1633.

The youth of Abner Atwood was passed in school and helping his father on the farm until he attained his nineteenth year. He then went to Taunton and entered the employ of William Mason & Company, then one of the largest cotton machinery builders in the country, to learn the trade of machinist. After an experience of five years, he took charge of a section in the works of the Taunton Locomotive Company, remaining until 1858, when he formed a partnership with J. O. Draper in Bedford, Mass., for the manufacture of soap. In 1862 the firm of Draper & Atwood removed to Pawtucket, R. I., and in 1866, upon the death of the junior partner of the firm of R. & G. Cushman, spool manufacturers, Mr. Atwood was invited by the surviving partner to an interest in the firm and business. Until 1875 the style of the firm was Cushman, Phillips & Company. Mr. Cushman then withdrew, and the firm of Atwood, Crawford & Company was formed. The product of the firm is spools and fancy wood turning. In 1890 this company was incorporated under the name of the Atwood Crawford Company, and Mr. Atwood was elected president, which position he held to the time of his death.

He was a prominent member of the Central Falls Congregational church,

and for the past 22 years one of its deacons. He was also a member of the board of directors of the Young Mens' Christian Association, and a member of the building committee.

As a member of the latter body, he manifested a deep interest in the building of the association's new home.

Mr. Atwood purchased his place at Thonotosassa, Fla., a little over twenty years ago, and he and his wife had spent their winters there, with one or two exceptions, for over fifteen years. He took much interest in his Florida place and in all things pertaining to orange growing and the welfare of this society.

He died at his home at Pawtucket, R. I., after a short illness, on November 23rd, 1906. His wife had preceded him to the grave but a few weeks. He left no children. He was a man of sterling worth and character, and one that any community could ill afford to lose.

HENRY GEORGE SARTORIOUS.

Henry George Sartorious was born in Grundy County, Iowa, April 23rd, 1875, and came to Seminole, Fla., with his parents in the fall of 1890. His

early education was obtained in the public schools; his close application and wide reading gave him a fund of knowledge on a wide range of subjects.

On August 6th, 1896, he married Miss Lenora Whittle. Mrs. Sartorious died a year later, leaving him with a little ten-day-old daughter, who very shortly afterward followed her mother to the grave.

After this, Mr. Sartorious taught the public school at Seminole for three terms, then took a course in the Tampa Business College, following which he worked as an express messenger on the A. C. L., running between Tampa and Jacksonville.

Feeling that his aged parents needed him at home, he gave up his position and returned to Seminole, taking direct charge of his father's grove properties. In March, 1906, he was married to Mrs. Eva Drew Lewis. During the spring of 1906 his health began to fail, tuberculosis having developed. He went to New Mexico hoping to regain his health, but died at Las Vegas, March 30th, 1907. Mr. Sartorious was a noble, upright Christian, a member of the Methodist Episcopal church, an earnest worker in the Christian Endeavor Society, and active in temperance reform.

Secretary's Report.

Mr. President, Ladies and Gentlemen:

At the beginning of the year, the prospects for a large membership were not at all flattering, and when the report of our president's death was confirmed, it seemed at the time that the shock to the Society would tend to dwarf it. But this calamity which has befallen us, seems to have awakened the interest of every one in the Society and to draw the members closer together and efforts were made to increase our membership, so that at the beginning of our meeting we had nearly twice as many members as a year ago. At the beginning of the last meeting, only 285 members enrolled, while at the beginning of this meeting 515, and during the meeting over 50 names have been added.

Since the last meeting I have received for the Horticultural Society as follows:

| | |
|----------------------------------------------------------------------------------------------------------------------------|----------|
| Life members, 10, at \$10.00 .. | \$100.00 |
| Reports for 1905 sold 8 | 8.00 |
| Reports for 1906 sold 58 | 58.00 |
| Membership for 1908, 5 | 5.00 |
| Membership for 1907, 515 | 515.00 |
| For registering reports | .40 |
| Received as donations from— | |
| A. D. Makepeace \$1.00 | |
| B. F. Blount .25 | |
| H. S. Pennock 1.00 | 2.25 |
| Cash donations received from members towards making the 1907 report a memorial num- ber in honor of C. T. McCarty | 85.00 |
| | \$773.65 |

I have paid out for the Society since the last meeting as follows:

| | |
|--------------------------------|----------|
| Envelopes | \$ 2.50 |
| Telegrams | .96 |
| Express | .75 |
| Freight on reports | 2.84 |
| Postage | 29.26 |
| To W. S. Hart, on account | 400.00 |
| To W. S. Hart, on account | 252.34 |
| To W. S. Hart, cash | 85.00 |
| | \$773.65 |

We now have enrolled 76 life members
2 honorary members
515 members for 1907
—
593 in all

The Society has received from Mr. S. H. Gaitskill, of McIntosh, fourteen copies of the Horticultural Reports for past years, which now gives us a complete file from 1892 to the present year.

We have also received a copy of the proceedings of 1906 from the Georgia Horticultural Association.

The above is respectfully submitted.

E. O. PAINTER,
Secretary.

Supplementary Report:

Sixty-four 1907 and three 1908 annual memberships have been received since the beginning of this meeting. The amount received from special collection on account of McCarty Memorial Edition amounted to \$85.00.

Treasurer's Report.

Debits.

| | |
|-----------------------------------------------|------------|
| 1906. | |
| May 4th, To Balance on hand | \$274.49 |
| 1907. | |
| May 11th, Sec. E. O. Painter's check | 400.00 |
| May 16th, Sec. E. O. Painter's check | 252.34 |
| May 17, Sec. E. O. Painter's cash | 85.00 |
| | \$1,011.83 |

Credits.

| | |
|---------------------------------------------------------|------------------------|
| 1906 | |
| May 10th, by E. O. Painter, stenographer's fee | \$ 50.00 |
| Dec. 25th, by E. O. Painter Co., on report | 349.15 |
| May 17th, Bal in treasury | 612.68 |
| | \$1,011.83 |
| | W. S. Hart, Treasurer. |

Report of the Executive Committee.

Mr. President, Ladies and Gentlemen:

The Executive Committee met in Jacksonville on July 29, 1906, to consider the publishing of the report, and the appointment of the Standing Committee. This Committee instructed the Secretary to have the report published following the form of previous years. Owing to the lack of funds in the treasury, however, all half tones and the catalogue of fruits were omitted so as to bring the expense of publication as low as possible. The Committee then adjourned.

On March 4th, the Executive Committee met in the office of the secretary in Jacksonville, with the following members present: Prof. P. H. Rolfs, Gainesville; G. L. Taber, Glen St. Mary; E. S. Hubbard, Federal Point; O. W. Connor, Tangerine and E. O. Painter, Jacksonville. It was moved and seconded that the date of the next meeting be placed at May 14th, 15th, 16th and 17th, commencing on the evening of the 14th.

It was also moved and seconded that Mr. J. D. Bell, of St. Petersburg, be appointed Chairman of the Local Committee with power to choose his associates and report the names and rates of the different hotels there.

It was moved and seconded that the secretary write to Mr. Jos. Richardson and secure the best rates possible for the Association.

The following committee on Necrology was appointed: G. L. Taber, Glen St. Mary, chairman; W. S. Hart, Hawks Park, and Dr. W. C. Richardson, Tampa.

The secretary was authorized to get out advertising matter for business houses to send out.

The meeting was adjourned.

In St. Petersburg, May 16th, the Executive Committee met with the following members present: Mr. E. S. Hubbard, chairman; G. L. Taber, P. H. Rolfs, E. O. Painter, and W. S. Hart. The minutes of the previous meeting were read and approved. It was moved by Mr. Taber that the report and bills of the secretary be approved. It was moved by Mr. Taber that the report of the Treasurer, W. S. Hart, be accepted, as same was examined and found correct. Bills presented by the secretary were audited and ordered paid.

E. S. HUBBARD, *Chairman,*
G. L. TABER,
O. W. CONNER.

Report of Committee on Nursery Inspection.

Mr. President, Ladies and Gentlemen:

Your committee to whom was referred the matter of nursery inspection find that the question is a very annoying one and that the only report we can make, much

as we deplore it, is a rather negative one.

We have had the subject under careful consideration for two days and beg leave to report as follows:

We find the inspection as now conduct-

ed is done by the entomologist attached to the State Experiment Station and is purely a voluntary matter on his part, made at the request of, and to accommodate the nurserymen, and is not required as a regular duty or in any way provided for by statute or other law.

The present Experiment Station Entomologist states that he has only made eleven inspections during the past year, and that his methods and practice, including form of certificate, are and have been in accordance with the customs and rules established by his predecessors in office.

The fee charged for an inspection is \$5.00, which is turned into the Experiment Station treasury. In addition to his fee the Entomologist is paid his traveling expenses by the parties requesting the inspection, thus making him substantially their agent. It seems that the certificate of inspection is desired by the nurserymen to enable them to market their pro-

ducts in other states and foreign countries which require inspection, and is, therefore, unfortunately so far as home purchasers are concerned, more in the interest of the nurserymen than the planter.

We feel that this is all wrong and that this society should take such action as may lead to a more extended, legally authorized, well regulated and beneficial system which will properly safeguard the purchaser rather than the seller, and at the same time be reliable and equitable for all.

We therefore recommend that the Legislative and Executive Committees be and are hereby instructed to do all that may be in their power to secure the adoption by the legislature of requisite and specific laws for a proper, reliable and systematic method of inspection.

Respectfully submitted,

W.M. C. RICHARDSON,
F. G. SAMPSON,
H. B. STEVENS.

Statistics of Orange and Grapefruit Crops.

Mr. President, Ladies and Gentlemen:

We, the undersigned committee, recommend that the State Horticultural Society take in hand the plan suggested by Dr. P. Phillips, of Orlando, to obtain statistics from all the orange growing counties of the state, the approximate number of boxes of oranges and grapefruit that will be raised during the year. This we feel will be a benefit to the grower as well as packer, and the country at large in order that the railroad companies, packing houses and box factories may make due preparations for the coming crop to han-

dle it properly. It will also give the grower an additional advantage that he might know what price to put upon his fruit, and not be governed by haphazard and unreliable estimates that are being made, which mean considerable loss to the State of Florida annually. We, therefore, recommend the following plan: let the society appoint in each County not less than three members of this Society, or more, according to size of county. These members should be carefully selected as being conservative and responsible growers, and each one shall report to the

Association direct, how much fruit there will be in his own section and also in the county. These reports shall be carefully considered and published; only those that are considered the most conservative estimates, or prorated by the Secretary from each county as he may think will be the best. The beginning of the estimates shall not be earlier than the latter part of July, and the publication of same shall not be later than the latter part of August, unless conditions of the growing crop may be required to do otherwise, and said reports shall be published in all the leading papers of our State and all the leading fruit journals of the country, giving the returns by counties.

We further recommend that the Society shall request of the railroad companies

carrying such fruit in the state, to furnish the Society tabulated report from each shipping point at the end of each season, that we may compare with the statistics and estimate made by the Society. By doing so, we will readily see at the end of each season whether or not the Society is doing efficient work.

We further recommend that should such Railroad Companies refuse the Society the above reports, that the Society should apply to the Railroad Commission of the State of Florida and compel them to do so.

(Signed)

P. PHILLIPS, *Chairman.*
A. H. BROWN,
Wm. C. RICHARDSON,

Report of Committee on Legislation.

Mr. President, Ladies and Gentlemen:

Your Committee on Legislation recommends that our state legislation now in session be urged to adopt the bill now before it providing for the erection of a building for the experiment station, and the appropriation of funds for institute work.

They also recommend that active steps be taken to bring our transportation facilities and rates for fruits and vegetables to the attention of the Interstate Commerce Commission, with a view to their equitable and speedy adjustment, and that this society, individually and collectively,

co-operate with any and all other organizations in the State in their efforts to secure these results.

To carry out above recommendations, we suggest that a permanent committee on legislation be appointed who shall be authorized to raise funds and use all proper means in their power to accomplish these ends.

A. F. BARTLETT, *Chairman,*
Wm. C. RICHARDSON,
H. B. STEVENS,
G. M. WAKELIN,
H. HAROLD HUME.

Resolution of Thanks.

WHEREAS: The Florida State Horticultural Society during its regular annual meeting, has been so royally entertained by the citizens and Board of Trade, it is fit and proper that we give some expression of our appreciation of the courtesies extended; therefore, be it

Resolved, That we wish to thank the Tampa Bay Transportation Company for the use of their beautiful steamer, "*The Favorite*," for a free trip up the Manatee River, the ladies of the Town Improvement Association for the elegant lunch

so generously served, and the citizens of St. Petersburg as a whole, for their uniform courtesy and hospitality during our stay, and also we wish to thank all of the transportation companies for the special rate given us.

W. N. WILSON,
GEO. KERR,
J. F. FARLEY,
P. J. WESTER,
J. B. CURTIS,
Committee.

Question Box.

No. 1—What is the best method to defoliate?

Member—It is to take your thumb and finger and pull the leaves off.

Mr. Hart—I would like to ask if you think it is practicable to defoliate, say, four square miles of trees in this way?

Mr. Painter—A large per cent. of trees or shrubs can be defoliated by spraying with a strong solution of Bordeaux mixture. By a strong solution I mean one in which the copper has not all been neutralized by the lime. Thrip juice in the proportion of 1 to 500 will also defoliate trees and shrubbery.

No. 2—Which is the best time to plant cabbage palms; can they be transplanted any time in the year?

Prof. Rolfs—I have seen them live when transplanted during any one of the

twelve months. The best time to transplant is after a long dry spell and before that dry spell has been broken.

Mr. Sperry—I contemplated setting out a large quantity of palms. Before doing so I talked with a man who had a large experience in planting palms, and he stated the best time is during the wet season in the summer.

Mr. Chilton—From my experience, I would say February or March. We have our wet times during those months. I have been informed that in digging them up it is well to trim off the small roots and plant them deeper than when they came out of the ground. Trim them close to the ground and plant them one foot deeper than they were originally.

No. 3—I understand that this society frowns down any attempt made by ad-

vertisers to call attention to their goods at its annual meetings. Would it not be well to let them exhibit in the hall, inasmuch as some of the improved machinery would, if shown by salesmen who understand it, prove interesting to us and we would have a chance to compare the various styles in such a way as is not often our privilege. They might even grant a discount to us in return for the advertising privilege.

Mr. Hart—I think our constitution bars out anything of this kind. I do not see how we could grant the room to anyone to exhibit their goods even though it would be of benefit to us. They are at perfect liberty to exhibit their goods outside the place of meeting. I do not think it would be policy to grant anyone this privilege because it would unavoidably disturb our meetings.

Mr. McCarty—I met two or three men yesterday who are interested in irrigation. It seems to me that with as much space as we have here, it would be a good idea to allow them to exhibit where we could all get the benefit of it. This space could all be filled up with goods of the fertilizer men, machinery men, nursery men, etc., without detriment to the meeting. It seems to me it would be a great addition.

Mr. Painter—I think the gentleman has a wrong idea of the proposition. He thinks that the society does not want an exhibit of fruit trees, machinery, etc. We do want it, but we don't want it on the floor where the meeting is held. By the floor, I do not mean literally speaking. I mean any particular wares should not be advertised during our sessions. Any person or firm can bring or send anything they wish to display or advertise to the

place where the meeting is held and make any arrangements they choose outside the place of meeting. The society itself cannot take the position of endorsing or advertising any commodities.

No. 4—Do hard wood ashes actually destroy or check the mildew on the tomato?

Prof. Rolfs—It is not likely that they would have any effect.

No. 5—Is the white fungus of the tomato transmitted through the tomato seed? Is it continued from year to year through the same soil?

Prof. Rolfs—It is transmitted from plant to plant.

No. 6—at what stage of the tomato growth should the Bordeaux be applied to check or destroy the white fungus or mildew?

Prof. Rolfs—Three of these questions appear to be asked by the same person. The tomato in Florida is rarely attacked by mildew and it is probable that the author of these questions had in mind the condition that is produced by a small spider mite. They should be fought by dry sulphur, sulphur spray or sulphur compound. They are easily killed and usually disappear by the use of potassium sulphite or soda sulphite.

No. 7—Orange and grapefruit trees to plant; which are the best and most profitable for planting with normal conditions, large, small or medium size trees, all presumably healthy?

Mr. Taber—Medium are the best.

Mr. Hubbard—Conditions make a dif-

ference. I think the more vigorous growing the tree is, the better it is.

No. 8—What is the best month in the year to plant an orange tree?

Mr. Waite—November.

Mr. McLain—I should say, December.

Mr. Hart—May, if wet, is a pretty good month.

Member—You would not approve of May unless the rainy season had started in, would you?

Mr. Hart—in my part of the country, it is sure to start about that time.

No. 9—I would like to know if the Society approves of cutting the trees back at the time of setting out?

Mr. Hampton—Cut them back every time. And about that planting of trees; I would prefer to plant them in the month of December to any other month in the year. Some say November. Don't you think that is a little too soon? They are likely to start to grow and the January or February cold snap will take them in. If you plant them in December they are not so apt to start to grow.

No. 10—I would like to ask whether it is best to use the Stringfellow method for planting on low ground?

Mr. Hart—I have not had experience in that, but if the ground is low, you cannot push the roots down far. They have to grow on the surface. If there is not room above permanent water line for the tap root, little can be made in that direction. I would prefer fairly high land for planting orange trees.

Mr. Taber—in relation to that Stringfellow method, I want to say that I don't think that the Stringfellow method is a

good habit to get into unless one qualifies every assertion that he makes. If you take a great big tree like Mr. Hubbard would recommend planting, you can't successfully treat it that way. I have set out thousands of little nursery trees and taken off all the fibrous roots. It is the proper way to plant them. Line up a row, open it with a spade and stick in nothing but little sticks. But you can't do that with a five or six year old tree.

Member—I think the success of a newly set tree depends as much on the weather following the time of setting, as the method of setting. As to the Stringfellow method, I would say do not prune the roots quite so close.

Mr. Hume—I have seen a few attempts at setting trees by the Stringfellow method which were entirely successful. I have seen some that were a dismal failure. It requires careful study of the conditions of the soil, of the weather and of the kind of tree you are planting before you determine whether you are going to plant by the Stringfellow method. He makes absolutely no exception to the kind, character, or size of the tree, and I think anyone who follows him implicitly is going to get into pretty deep water.

Mr. Hoard—Three years ago, I moved 600 bearing trees without losing a single tree. Some of them had had a box of oranges the year before, and I saved all the roots I could get.

Mr. Hart—I am not advocating the Stringfellow method in all cases, or anything of the kind. I brought the subject up to see what experience others had had. I am interested in it. All my early experience was much in that line in the planting of trees. When I came to the east coast all of our groves were set out

from big, wild trees that we got from the hammocks. Some of them had no tap root and where they did, we dug down and cut them off short. We cut the large trunks off not over a foot high and cut the roots off close up so that a tree with a six inch trunk would go in a hole eighteen inches to two feet across, and those trees made strong, healthy and rapid growth and were in profitable bearing in three years. The nursery trees were budded when set, but these were allowed to sprout and then buds were inserted in these sprouts after the trees were set in grove form.

I would tell you that it is best to set out big trees. "Big" may mean six or sixty years old. You can get a fine bearing tree very quickly if you put such out when the conditions are favorable, while small trees suffer seriously from every adverse condition and it may take several years to get them to a fair, bearing condition.

Mr. Skinner—During the discussion, Mr. Mason sat alongside of me, and he says there is no question but that cutting off the roots will make them grow deeper.

Mr. Taber—I do not think you can apply the same ruling to trees of all sizes. Mr. Hart mentions citrus trees as being transplanted at any size, but there are few other trees that can be treated like a citrus tree, and live. I claim that a citrus root is one of the hardest things in the world to kill. Take a peach or pecan tree, for instance. Regardless of the age or size of the tree, regardless of the season it is put out—Stringfellow just makes the sweeping assertion that it should be closely root pruned, which I do not believe is always proper or advantageous; and that is the reason why I say that one should

be careful to designate what he is talking about. If you put out trees at the beginning of the dormant season, you can successfully transplant a larger tree and you can prune the roots harder than you can at the time when growth should commence. He makes no exceptions at all.

Mr. Hollingsworth—Mr. Hart, were not those trees you spoke of transplanted on very damp soil?

Mr. Hart—They were transplanted in any kind of soil. In some places it was eleven feet to water, and in others the ground was covered with water a good deal of the time.

No. 11—Can anyone advise concerning the soap tree, how it is planted and what distance apart? Why does not the California Pepper tree fruit here?

Mr. Stevens—I have seen a soap tree growing wild around Orange Lake. That is the only place I have ever seen one in Florida.

Mr. Painter—The soap berry tree has been grown near Tallahassee for years.

No. 12—I would like to ask why the olive tree grows finely here, but does not bear any crop?

Prof. Rolfs—That is a question that is as yet unsolved.

Mr. Wakelin—We have an olive tree on our place. It bloomed very heavily and when I left home for the North it had small green olives. When I came back they had all fallen off, except a few dried up specimens. This year it has had no bloom.

Mr. Hampton—The olive tree has been talked over a long while, and some seem to think they won't bear, and some con-

tend that they will. I have more or less olives every year. I believe I could raise plenty of olives, but whether I could raise enough to pay commercially or not I do not know, but I have plenty for my home consumption.

Prof. Rolfs—There is a place near Sanford and one just east of Malabar and Drayton Island, I think, where they fruit quite heavily. I think that the probability of making it a commercial success is a small one.

Member—Does Mr. Hampton use anything special in the way of fertilizer?

Mr. Hampton—No, I don't use anything special.

Member—Last year I gave my olives slacked lime, and I think I am on the right track to getting enough olives for ourselves.

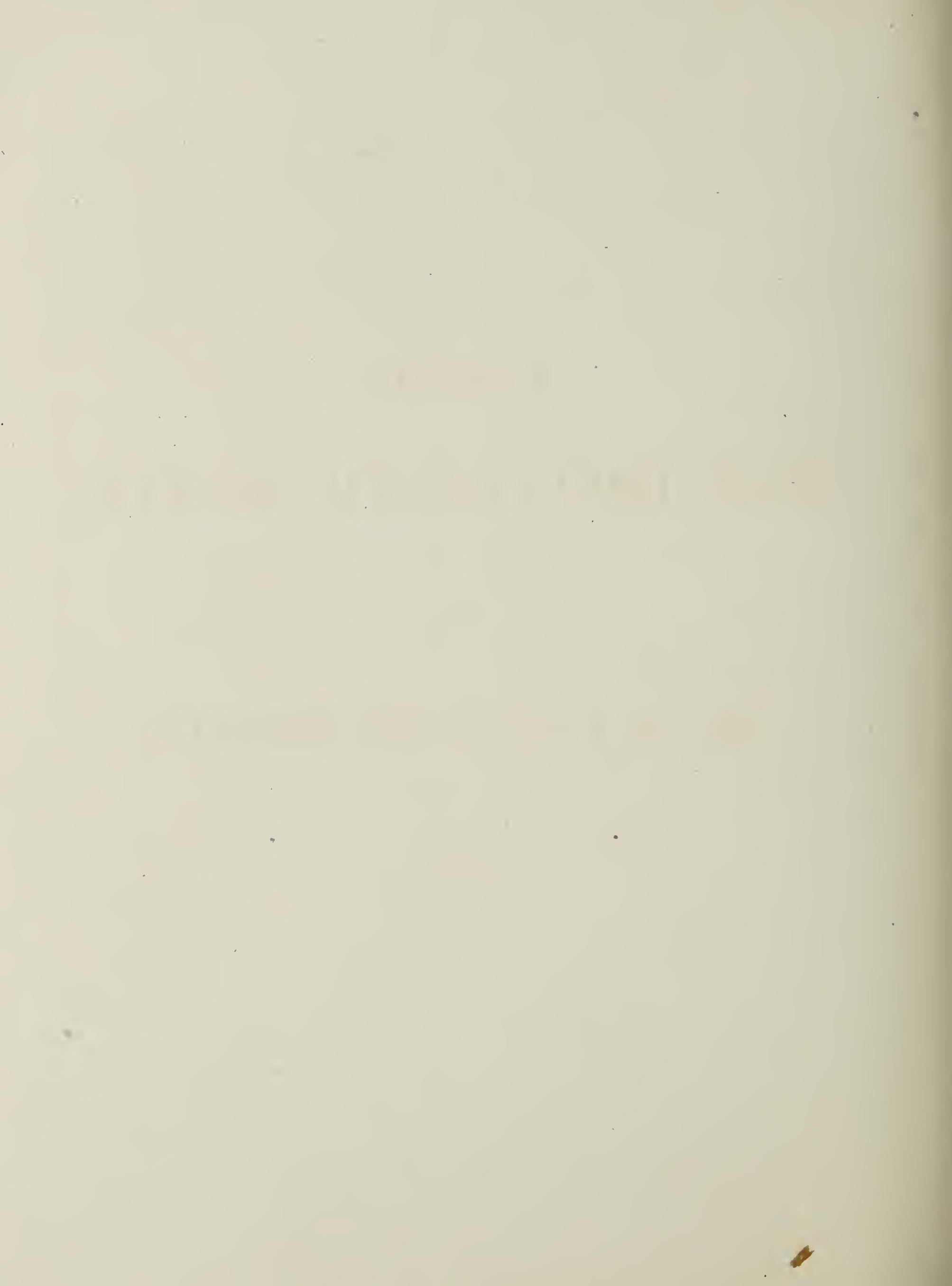
Mr. Hart—This matter has been pretty carefully gone over by Mr. Rooks, one of our members, who is much interested in

anything of the kind. I think the general opinion is that there is but one variety of olives that fruit well in Florida. I have seen some with trunks nearly two feet through, but they never bore what you might call a full crop. I think there is one variety that will produce a fairly good crop, but do not remember what it is.

Member—I live close to Mr. Rooks and see his olives, but I have never seen anything like a full crop.

Mr. Taber—I have fruited some four or five different varieties of olives, including which are the Queen, and they do not even get to maturity, but drop before they mature. I have gotten olives from several different varieties, but would not recommend them for anything more than home use.

Mr. Hampton—I never had any trouble with the fruit dropping. They stayed pretty well to maturity.



**FLORIDA
STATE HORTICULTURAL SOCIETY.**



CATALOGUE OF FRUITS.

1907.

CATALOGUE OF FRUITS.

ADOPTED BY THE SOCIETY AT THE EIGHTEENTH ANNUAL
MEETING.

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 this purpose better, than any that could be made without further subdivisions, 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.

H. HAROLD HUME,
E. N. REASONER,
W. S. HART,
Committee.

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., Originated in Florida.
- O., Oriental.
- S. A., South America.
- W. I., West Indies.

ORIGIN—(Referring to sweet 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.

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 cheeks 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.

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.

SWEET 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 has been deemed advisable to omit the names of many varieties which have disappeared from cultivation. The list, however, is still large.

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 Abbreviations on page iii.)

| NAMES | Origin. | DESCRIPTION. | | | | | | | Adaptability. | | | |
|------------------------------------------------------|---------|--------------|-------|-------|--------|----------|---------|--------|--------------------|--------------------|------------------|-------------------|
| | | Fruit. | | | | Plant. | | | Western North Fla. | Eastern North Fla. | Central Florida. | Southern Florida. |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | | | | |
| Sweet Oranges—Citrus autantium dulcis. | | | | | | | | | | | | |
| 1 Bessie | St M | d s | | r | o | g | 1 | | | | | ** |
| 2 Boone (Boone's Early) | Mal | d s | | rr | lo | v g | v e | | | | | * |
| 3 Brazilian | St M | d s | m | rr | o | b | 1 | gg | | | | * |
| 4 Centennial | St M | d s | m | rr | o | e m | v v | p | | | | * |
| 5 Drake Star | St M | d s | l | rr | o | g | m | v v | | | | * |
| 6 Du Roi | St M | d s | m | r | o | g | 1 m | v | p | | | * |
| 7 Early Oblong (St. Michael Egg) | Sev | d s | m | e | o | f | v e | g g | p | | | * |
| 8 Enterprise Seedless (Starke Seedless) | Sev | d s | m | r | o | v g | e | g g | vg | p | | ** |
| 9 Foster | St M | d s | m | r | o | g | vl | v | p | | | ** |
| 10 Hart (Tardiff, Brown, Excel-sior) | St M | d s | m | e | o | g g | 1 | v | p | | | ** |
| 11 Higley Late | St M | d s | m | rr | o | g g | m | v v | p | | | * |
| 12 Homosassa | Sev | d s | m | rr | o | v b | m | g v | p | | | ** |
| 13 Jaffa | al | d s | m | rr | o | b | m | v v | p | | | * |
| 14 Lamb Summer | St M | d s | m | rr | o | b | vl | v | p | | | * |
| 15 Madam Vinous | St M | d s | m | rr | o | v g | m | v | g | | | ** |
| 16 Magnum Bonum | St M | d s | l | rr | o | b | 1 m | v | p | | | * |
| 17 Majorca | Mal | d s | m | rr | or | b | m | g | p | | | ** |
| 18 Maltese Blood | Mal | d s | s | e | o | v g | l | g | p | | | * |
| 19 Maltese Oval (Garey Med. Sweet) | Mal | d s | l | e | o | v g | m | g | g | | | ** |
| 20 Mays | St M | d s | m | rr | o | v g | l | m | p | | | * |
| 21 Mediterranean Sweet (Sanford's) | St M | d s | l | e | o | b | em | v | p | | | * |
| 22 Nonpareil | Sev | d s | l | rr | o | v g | m | v | p | | | ** |
| 23 Old Vini (Beach No. 2) | Sev | d s | m | rr | lo | g | 1 m | g | vp | | | * |
| 24 Paper Rind | St M | d s | s | e | o | g | e | v | p | | | * |
| 25 Parson Brown | St M | d s | m | e | o | v g | m | v | p | | | * |
| 26 Pineapple | St M | d s | | | | | | | p | | | * |
| 27 Ruby (Sanguinea, Du Rio Blood) | Mal | d s | m | r | or | v g | em | g | p | | | * |
| 28 St. Michael Blood | Mal | d s | m | r | o | b | m | g | p | | | * |
| 29 Star Calyx | St M | d s | l | r | o | g | m | g | g | | | * |
| 30 Sweet Seville (Sanford's Sweet Seville) | Sev | d s | s | r | o | g | ve | v | p | | | * |
| 31 Tephi | Mal | d s | m | r | o | v g | m | vp | p | | | ** |
| 32 Valencia Late | Mal | d s | l | e | lo | g | l | g | p | | | * |
| 33 Washington Navel | Sev | d s | l | re | o | b | em | g | s | | | * |

Remarks—On varieties as numbered above: Nos. 8 and 25, desirable early sorts; 5, 23 and 28, distinct; 6, distinctly corrugated, desirable; 1 and 10, very desirable late sorts; 11, 12, 13, 17, 21 and 26 desirable; 6, 7 and 18 came from Thomas Rivers, of England, the well-known nurseryman.

Of Sweet 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.

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, Maltese Oval; Very Late, Hart.

Varieties distinctly marked in their exterior appearance, like the Navels, Bloods, Du Roi, etc., are, other things being equal, most desirable for market.

MANDARIN ORANGES—*Citrus nobilis*.

(See Explanation of Abbreviations on page iii.)

| NAMES | Origin. | DESCRIPTION. | | | | | | | | Adaptability. | | | |
|---------------------------|---------|--------------|-------|-------|--------|----------|---------|--------|---------------|---------------|------------|--------------------|------------------|
| | | Fruit. | | | | Tree. | | | | Western Fla. | North Fla. | Eastern North Fla. | Central Florida. |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Prolificness. | | | | |
| 1 Cha (Mandarin)..... | For | ds | m | f | lo | g | e | qq qq | f | — | — | * | * |
| 2 Dancy (Tangierine).... | N | ds | ml | f | r | b | em | qq qq | vp | — | — | ** | * |
| 3 King (King of Siam).... | For | ds | l | f | o | vg | vl | qq qq | vp | — | — | * | * |
| 4 Oneco | N | ds | ml | f | o | vg | m | qq qq | f | — | | * | ** |
| 5 Satsuma (Oonshiu) | For | as | m | f | o | vg | ve | qq | vp | — | * | ** | * |

Remarks—No. 1, a favorite in the New Orleans market; No. 2. the favorite of the group. The Satsuma is valued on account of its hardiness, which is increased by being budded on the entirely hardy C. trifoliata. It is much planted in sections north of the usual range of oranges.

BIGARADE ORANGES—*Citrus vulgaris*.

(See Explanation of Abbreviations on page iii.)

| NAMES | Origin. | DESCRIPTION. | | | | | | | | | Adaptability. |
|-------------------------------|---------|--------------|-------|-------|--------|----------|---------|--------|---------------|----|--------------------|
| | | Fruit. | | | | | Tree. | | | | |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Prolificness. | | |
| 1 Bitter Sweet | N | dc | 1 | rf | do | | vl | v | p | | Western North Fla. |
| 2 Phillips Bitter Sweet | NN | dc | 1 | rf | do | | vl | v | p | | Eastern North Fla. |
| 3 Sour | N | c | 1 | rf | do | | vl | v | p | ** | Central Florida. |

Remarks—Nos. 1 and 2, very refreshing in summer; 3, refreshing in summer and much used in making marmalades.

POMELOS—(Grape Fruit) *Citrus decumana*.

(See Explanation of Abbreviations on page iii.)

| NAMES | Origin. | DESCRIPTION. | | | | | | | | | Adaptability. |
|---------------------------------|---------|--------------|-------|-------|--------|----------|---------|--------|---------------|--|--------------------|
| | | Fruit. | | | | | Tree. | | | | |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Prolificness. | | |
| 1 Aurantium | N | ds | m | r | ly | g | lm | v | vp | | Western North Fla. |
| 2 Duncan | NN | ds | 1 | rf | ly | vg | 1 | v | vp | | Eastern North Fla. |
| 3 Hall | NN | ds | 1 | r | ly | gg | 1 | v | vp | | Central Florida. |
| 4 Indian River (Standard) | NN | ds | 1 | rf | ly | vg | vl | v | vp | | Southern Florida. |
| 5 Josselyn | NN | ds | m | r | lo | g | lm | v | vp | | ** |
| 6 Marsh | NN | ds | 1 | f | ly | vg | lm | v | vp | | ** |
| 7 Mays | NN | ds | 1 | rf | ly | vg | lm | v | vp | | ** |
| 8 Pernambuco | F | ds | 1 | rf | ly | vg | vl | v | vp | | ** |
| 9 Royal | N | ds | ml | rf | lo | g | m | v | vp | | ** |

The Pomelo.—Growing the Pomelo for market is a development of the past fifteen or twenty years; but large quantities of this fruit are now shipped from the State and its culture is rapidly extending. It has proved popular in the general market and its culture is very profitable. Its range of adaptability is about the same as that of the orange. Most of the older trees were planted before named varieties were introduced. The above list comprises the leading varieties now generally planted.

SHADDOCKS—*Citrus decumana*.

(See Explanation of Abbreviations on page iii.)

| NAMES | Origin. | Use. | Size. | DESCRIPTION. | | | | Adaptability | | | |
|------------------------------------|---------|------|-------|--------------|-------|--------|---------------|-------------------|-------------------|------------------|-------------------|
| | | | | Plant. | Tree. | Vigor. | Prolificness. | Western North Fla | Eastern North Fla | Central Florida. | Southern Florida. |
| 1 Blood Shaddock | F | | l | r | lo | f | v | | | ** | * |
| 3 Mammoth or Orange Shaddock | F | | l | r | lo | f | v | | | ** | * |

Remarks—The Shaddocks are of no commercial importance in Florida, nor are they desirable except as ornamental fruits, remarkable for their size and beauty.

LEMONS—*Citrus limonum*.

(See Explanation of Abbreviations on page iii.)

| NAMES (Varieties.) | Origin. | Use. | Size. | DESCRIPTION. | | | | Adaptability. | | | |
|---------------------------------|---------|------|-------|--------------|-------|--------|---------------|-------------------|--------------------|------------------|-------------------|
| | | | | Fruit. | Tree. | Vigor. | Prolificness. | Western North Fla | Eastern North Fla. | Central Florida. | Southern Florida. |
| 1 Belair | F | cs | m | bl | ly | b | f | v | vp | * | ** |
| 2 Genoa (Eureka) | F | cs | m | l | ly | b | f | v | vp | * | ** |
| 3 Imperial (Messina) | F | cs | m | l | y | g | f | v | vp | * | ** |
| 4 Sicily (Sanford's Thornless). | F | cs | m | l | ly | b | f | v | vp | * | ** |
| 5 Villafranca | F | cs | m | l | ly | b | f | v | vp | * | ** |

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 | | Western Fla. | North Fla. | Eastern North Fla. | Central Florida. | Southern Florida. | |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Prolificness. | | | |
| Kumquats-Kin Kans (Citrus Japonica) | | | | | | | | | | | | |
| 1 Marumi | F | dcs | s | r | o | | | m | p | * | ** | * |
| 2 Nagami | F | dcs | s | o | o | | | m | p | * | ** | * |
| Limes (Citrus Limetta.)* | | | | | | | | | | | | |
| 3 Rangpur | F | cs | m | f | r | vg | fw | v | p | * | ** | |
| 4 Tahiti | F | cs | l | l | y | vg | f | v | p | * | ** | |
| Citrons (Citrus Medica.) | | | | | | | | | | | | |
| 5 Corsican | F | | | | | | | | | | | |
| 6 Bergamonts (Citrus bergamium) | | | | | | | | | | | * | |
| 7 Otaheites (Citrus sinensis) .. | | | | | | | | | | | * | |
| 8 Trifoliatas (Citrus trifoliata) | | | | | | | | | | * | * | * |

Remarks.—On varieties and species as numbered above: No. 6, grown as an ornamental, yields an essential oil; 7, grown as an ornamental, and as a stock for dwarfing—fruit valueless; 8, a hardy species, grown as ornamental, extensively used as stock and for hedges—fruit valueless.

*Most of the limes grown in the State are designated as Mexican limes. They are seedlings and should be referred to as the Mexican group. Lime culture is of considerable importance.

DECIDUOUS FRUITS.

PEACHES—*Persica vulgaris*.

Note.—The time of ripening of any particular variety varies considerably, in Florida, as elsewhere, according to the 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 iii.)

| NAMES | Origin. | DESCRIPTION. | | | | | | | Adaptability. | | | | |
|--------------------------------|---------|--------------|--------|--------|----------|---------|---|----|---------------|---------------|--------------------|--------------------|----|
| | | Fruit. | | | Tree. | | | | Vigor. | Prolificness. | Western North Fla. | Eastern North Fla. | |
| | | Size. | Class. | Color. | Quality. | Season. | | | | | | | |
| 1 Angel | P-to | ds | 1 | f | w | b | v | vp | * | ** | ** | ** | ** |
| 2 Belle of Georgia | NC | ds | 1 | f | w | m | p | p | * | * | * | * | ** |
| 3 Bidwells Early | P-to | ds | m | c | w | v e | p | * | ** | * | * | ** | ** |
| 4 Bidwells Late..... | P-to | ds | 1 | c | w | e | v | vp | * | ** | * | ** | ** |
| 5 Cablers Indian | S | dcn | 1 | r | g g g | m | f | * | ** | * | * | * | ** |
| 6 Carman | N C | ds | 1 | w | g g g | e | | | † | + | * | * | ** |
| 7 Chinese Cling | N C | dn | 1 | w | g g g | m | | | * | * | * | * | ** |
| 8 Climax | H | ds | m | w r | g g g | e | | p | * | * | * | * | ** |
| 9 Colon | H | ds | m | w | g g g | m | | p | * | * | * | * | ** |
| 10 Countess | S | dn | 1 | w | g g g | m | | p | * | * | * | * | ** |
| 11 Crawfords Early | Per | dn | 1 | y | g b | e | | f | * | * | * | * | ** |
| 12 Dorothy (Dorothy N.)..... | P-to | ds | m l | y | g b | m | | p | * | * | * | * | ** |
| 13 Elberta | N C | a | vl | y | g b | m | | p | * | * | * | * | ** |
| 14 Estella | S | ds | 1 | y | g b | l | | f | * | * | * | * | ** |
| 15 Florida Crawford | S | dcn | 1 | y | g b | m | | f | * | * | * | * | ** |
| 16 Florida Gem.. | H | a | m | w r | g g | e | | p | * | * | * | * | ** |
| 17 General Lee | N C | a | 1 | c | g g | m | | f | * | * | * | * | ** |
| 18 Gibbons October | S | d n | m | w | g g | vl | | f | * | * | * | * | ** |
| 19 Greenboro | Per | ds | m | w | g g | g | | | † | † | * | * | ** |
| 20 Hall (Hall's Yellow) Early. | H | a | m l | y | g g | g | | vp | * | * | * | * | ** |
| 21 Honey | H | a | m | w | g g | g | | p | * | * | * | * | ** |
| 22 Imperial | H | a | 1 | w | g g | g | | f | * | * | * | * | ** |
| 23 Japan Dwarf Blood..... | NOB | ds | m | r | g f | ve | | g | * | * | * | * | ** |
| 24 Jewel..... | P-to | ds | m | w | g g | g | | g | * | * | * | * | ** |
| 25 La Magnifique | S | dcn | 1 | c | g g | g | | g | * | * | * | * | ** |
| 26 La Reine | S | dcn | 1 | c | g g | g | | g | * | * | * | * | ** |
| 27 Maggie | P-to | ds | m | c | g g | g | | g | * | * | * | * | ** |
| 28 Mamie Ross | N C | ds | l | c | g g | g | | g | * | * | * | * | ** |
| 29 Onderdonk | S | dcn | m | f | g g | g | | g | * | * | * | * | ** |
| 30 Oviedo | H | a | m | f | g g | g | | g | * | * | * | * | ** |
| 31 Pallas | H | ds | m | f | g g | g | | g | * | * | * | * | ** |
| 32 Peen-to | P-to | a | m | c | g g | g | | vp | * | * | * | * | ** |
| 33 Powers September | S | dn | m | f | g g | g | | f | * | * | * | * | ** |
| 34 Red Ceylon | NOB | c | m | r | f f | ve | | p | * | * | * | * | ** |
| 35 Sneed | N C | ds | m | c | g g | g | | g | * | * | * | * | ** |
| 36 Stanley | H | ds | m | c | g g | e | | g | * | * | * | * | ** |

PEACHES—Continued.

(See Explanation of Abbreviations on page iii)

| NAMES | Origin. | DESCRIPTION. | | | | | | | | | Adaptability. | | |
|-------------------|---------|--------------|-------|--------|--------|----------|---------|--------|---------------|-------------------|-------------------|--------------------|------------------|
| | | Fruit. | | | | | | Tree. | | | Western North Fla | Eastern North Fla. | Central Florida. |
| | | Use. | Size. | Class. | Color. | Quality. | Season. | Vigor. | Prolificness. | Southern Florida. | | | |
| 37 Suber | P-to | ds | m | c | w | g | ve | v | p | * | * | * | ** |
| 38 Taber | H | ds | m | c | wr | b | e | gg | pp | ** | ** | * | * |
| Triana | H | ds | m | f | wr | g | e | gg | pp | * | * | * | * |
| 40 Victor | | | ml | c | w | g | ve | pp | pp | * | * | * | * |
| 41 Victoria | S | d c n | l | f | y | g | l | g | gg | * | * | * | * |
| 42 Waldo | P-to | ds | m | f | w | g | ve | vp | gg | ** | ** | ** | ** |
| 43 Yum Yum | P-to | ds | m | c | w | g | ve | g | gg | — | — | * | ** |

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. 21 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 South 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 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 triflora* and hybrids.

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 iii.)

| NAMES | Origin. | DESCRIPTION. | | | | | | | | Adaptability |
|-------------------|---------|--------------|-------|-------|--------|--------|----------|---------|--------|--------------------|
| | | | | | | | | | | |
| | | Use. | Size. | Form. | Color. | Class. | Quality. | Season. | Vigor. | Prolificness. |
| 1 Abundance | J | a | lm | | yr | c | em | v | f | |
| 2 Burbank | J | a | lm | | py | c | em | v | gg | |
| 3 Chabot | J | a | lm | | rp | c | m | v | * | Western North Fla |
| 4 Excelsior | J H | a | m | | rp | c | b | vp | * | Eastern North Fla. |
| 5 Howe | J H | a | lm | rb | r | f | g | v | * | Central Florida. |
| 6 Kelsey | J | a | vl | | gy | c | g | v | * | |
| 7 Red June | J | a | m | | r | c | b | e | * | Southern Florida. |
| 8 Satsuma | J | a | l | | p | c | b | ml | * | |
| 9 Wickson | J | a | l | | br | b | b | m | v | |

PEARS—*Pyrus communis*.

(See Explanation of Abbreviations on page iii.)

| NAMES | Class. | DESCRIPTION. | | | | | | | | Adaptability. |
|------------------|--------|--------------|-------|-------|--------|----------|---------|--------|---------------|---------------|
| | | | | | | | | | | |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Prolificness. | |
| 1 Keiffer | OO | a | l | rbp | y&r | gg | vl | v | f | ** |
| 2 Le Conte | O | a | l | olbp | y g | gg | e | v | vp | ** |
| 3 Smith | O | a | l | ep | y g | gg | e | v | p | ** |

GRAPES—*Vitis—Labrusca, Aestivalis, Vulpina.*

(See Explanation of Abbreviations on page iii.)

| NAMES (Varieties) | Origin. | DESCRIPTION. | | | | | | | | | | Adaptability. | | | | |
|-------------------|---------|--------------|-------|--------|-----|-------|-------|-------|-------|--------|----------|---------------|--------|---------------|-------------------|-------------------|
| | | Fruit. | | | | | | | | | | Vine. | | | | |
| | | Bunch. | | Berry. | | Size. | Form. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Prolificness. | Western North Fla | |
| | | Use. | Size. | Form. | | | | | | | | | | | | Eastern North Fla |
| 1 Concord | L | d nw | l | sh | l | r | b | g | m | g | f | * | * | * | * | |
| 2 Cynthiana | A | dw | m | sh cp | s | r | b | vg | l | v | f | ** | ** | ** | ** | |
| 3 Delaware | H? | a | s | sh cp | s | r | r | w | m | g | p | * | * | * | * | |
| 4 Diamond | L | d s | m | sh cp | m | r | w | g | v e | v | p | * | * | * | * | |
| 5 Elvira | RH | w | s | cp | m | r | w | g | m | g | p | * | * | * | * | |
| 6 Goethe | H | d n | m | | v l | e | w | vg | l | v | p | * | * | * | * | |
| 7 Herbemont | A | dw | m | sh cp | s | r | b | vg | l | v | p | * | * | * | * | |
| 8 Ives | L | sw | m | cp | m | re | b | f | v e | v | p | ** | * | * | * | * |
| 9 Key | | | | | | | | | | | | | | | | * |
| 10 Niagara | L | d s | l | cp | m | r | w | g | v e | v | p | ** | ** | ** | * | * |
| 11 Norton | A | dw | m | sh cp | s | r | b | g | l | v | f | ** | ** | ** | | |
| 12 Salem | H | d n | m | sh cp | l | r | r | vg | m | v | f | * | * | * | | |
| 13 Lindley | H | d s | l | sh cp | l | v | v | vg | e | v | vp | ** | ** | ** | | |
| 14 Wilder | H | d n | l | br | vl | r | b | vg | m | v | f | * | * | * | | |

Remarks.—2, 9, 11, almost free from fungous diseases; 1, 3, 4, 5, 10, 13, subject to fungous diseases in wet seasons; 7, 12, 14, subject to fungous diseases; 7, stars apply especially to the East Coast.

Grapes.—In many locations throughout the State varieties (as indicated by the starting 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.

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.

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 Luttichau. They are all grafted on V. *riparia* and V. *rupestris*, are now in their fifth 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.

MUSCADINE GRAPES.—*Vitis rotundifolia*.

(See Explanation of Abbreviations on page iii.)

| NAMES (Varieties.) | Origin. | DESCRIPTION. | | | | | | | | | | Adaptability |
|--------------------|---------|--------------|--------|-------|-------|-------|--------|--------|----------|---------|--------|---------------|
| | | Fruit. | | | | | Vines. | | | | | |
| | | Bunch. | Berry. | Size. | Form. | Size. | Form | Color. | Quality. | Season. | Vigor. | Prolificness. |
| 1 Eden | v | d nw | s | r | vl | r | b | g | vl | v | vp | ** ** ** ** |
| 2 Flowers | v | d nw | s | r | vl | r | b | f | vl | v | p | ** ** ** * |
| 3 James | v | d nw | s | r | vl | r | b | vg | vl | v | vp | ** ** ** ** |
| 4 Meisch | v | d nw | s | r | vl | r | p | g | vl | v | p | ** ** ** ** |
| 5 Scuppernong ... | v | d nw | s | r | vl | r | v z y | vg | vl | v | vp | ** ** ** ** |
| 6 Thomas | v | d nw | s | r | vl | r | b | vg | vl | v | vp | ** ** ** ** |

Remarks.—The Muscadine Grapes are prodigious growers and bear heavy crops of fruit. They are very popular in the South, where they are used for dessert and for making wine and jelly, but they are not grown for Northern market.

KAKI—Japanese Persimmon—*Diospyros Kaki*.

| NAMES. | Origin. | DESCRIPTION. | | | | | | | | Adaptability | | | |
|------------------------|---------|--------------|-------|-------|--------|----------|---------|--------|----|---------------|--------------|------------|--------------|
| | | Fruit. | | | | Tree. | | | | Prolificness. | Western Fla. | North Fla. | Eastern Fla. |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | | | | | |
| 1 Costata | J | ds | m | rcpt | s r | g | l | v | p | ** | ** | ** | * |
| 2 Hachiya | J | ds | v1 | obpt | b r | vg | e | g | s | * | * | * | * |
| 3 Hyakume | J | ds | 1 | rfov | o r | gg | m | v | p | ** | ** | | * |
| 4 Okame | J | ds | 1 | rgf | bcr | g | & m e | v | vp | ** | ** | ** | * |
| 5 Tabers No. 129 | J | ds | m | rpt | o r | rfob | ve | v | p | ** | ** | ** | * |
| 6 Tanenashi | J | ds | 1 | rcpt | lr | b | m | g | g | ** | ** | ** | * |
| 7 Triumph | | | | | | | | | | | | | |
| 8 Tsuru | J | ds | 1 | olpt | b r | g | v1 | v | vp | ** | ** | ** | * |
| 9 Yeddoichi | J | ds | m | rf | d r | vg | m | g | g | ** | ** | ** | * |
| 10 Yemon | J | ds | 1 | rgf | o & r | vg | m | v | p | ** | ** | ** | * |
| 11 Zengi | J | ds | s | rf | d r | g | ve | v | vp | ** | * | * | * |

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 fruit; 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 Yeddoichi; others are best when still hard, like Zengi and Tabers No. 129. As they 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 Tanenashi; 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 kinds 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.—Tanenashi, Okame, Yemon and Yeddoichi 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 Hachiya 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 Tabers 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. Tanenashi is, perhaps, most highly esteemed in the market.

Stock.—The Kaki should be grafted on the native persimmon, on which it is much more satisfactory than upon its own imported stocks.

MINOR DECIDUOUS FRUITS.

(See Explanation of Abbreviations on page iii.)

| NAMES | Origin. | DESCRIPTION. | | | | | | | Adaptability. | | | |
|--------------------------------------------|---------|--------------|-------|-------|--------|----------|---------|----------------|---------------|-------------|--------------------|--------------------|
| | | Fruit. | | | | | | Tree or Plant. | | Prolifness. | Western North Fla. | Eastern North Fla. |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | | | | | |
| Apples—<i>Pyrus malus</i> | | | | | | | | | | | | |
| 1 Jennings | N? | d n | l | f | g | gg | e | v | p | * | * | † |
| 2 Red Astrachan | F | d n | l | r | r | gg | e | | | * | | |
| Figs—<i>Ficus carica</i>. | | | | | | | | | | | | |
| 3 Black Ischia | F | den | m | b l | g g | s | m | | | * | * | * |
| 4 Blue Genoa | F | den | m | b r | g g | s s | m | | | * | * | * |
| 5 Brown Turkey | F | den | m | v b r | g g | s s | v | g | vp | * | * | * |
| 6 Brunswick | F | den | l | p v | b | s s | v | vp | | * | * | * |
| 7 Celestial | F | den | s | g | g | s s | v | vp | | * | * | * |
| 8 Green Ischia | F | den | m | y | g | s | v | vp | | * | * | * |
| 9 Lemon | F | den | m | | | | v | | | * | * | * |
| 10 White Adriatic | | | | | | | | | | | | |
| Mulberries—<i>Morus nigra</i> | | | | | | | | | | | | |
| 11 Downing | A | m | o l | b | g | E | v | s | | * | * | * |
| 12 Hicks | A | m | o l | b | f | E & L | v | vp | | * | * | * |
| 13 Stubbs | A | l | o l | b | g | M | v | p | | * | * | * |
| Pomegranates—<i>Punica granatum</i> | | | | | | | | | | | | |
| 14 Acid | d | l | r | ry | b | F | v | p | | * | * | * |
| 15 Purple | d | l | r | ry | b | F | v | p | | * | * | * |
| 16 Sweet | d | l | r | ry | g | F | v | p | | * | * | * |

Remarks.—Nos. 1 and 2, home use; 12, unsatisfactory bearer; 13, enormously productive; 14 and 15, superior quality acid; 16, 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, except when canned or preserved, in which form it finds a ready market at high prices, 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 generally grown for market, but most plantations have a few trees. There are several new choice varieties being tried.

MINOR MISCELLANEOUS FRUITS.

(See Explanation of Abbreviations on page iii.)

| NAMES. | Origin. | DESCRIPTION. | | | | | | | | Adaptability. | |
|----------------------------------------|---------|--------------|-------|--------|---------|----------|---------|--------|---------------|---------------|--|
| | | Fruit. | | | | Plant. | | | | | |
| | | Use. | Size. | Class. | Color. | Quality. | Season. | Vigor. | Prolificness. | | |
| Blackberries— <i>Rubus cuneifolius</i> | A | dn | | | | | | | | * | |
| Dewberries— <i>Rubus trivialis</i> ... | A | dn | | | | | | | | * | |
| Loquats— <i>Eriobotrya Japonica</i> . | F | dn | m | e | y rb | vg | Sp | v | p | ** | |
| Olives— <i>Olea Europea</i> | F | cs | s | e | | | F | v | p | * | |

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. The Manatee Dewberry, and the Northey, presumably a hybrid, have proved satisfactory in many localities.

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 largely from seed, and the fruit varies greatly in size and quality. A number of varieties have been introduced from California and are being tested.

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.

TROPICAL FRUITS

PINEAPPLES—*Ananas sativa*.

(See Explanation of Abbreviations on page iii.)

| NAMES | Origin. | DESCRIPTION. | | | | | | | | Adaptability | |
|--------------------|---------|--------------|-------|-------|--------|----------------|---------|--------|---------------|--------------|--|
| | | Fruit. | | | | Tree or Plant. | | | | | |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Prolificness. | | |
| 1 Abachi | F | a | l | ol | oy | b | m | m | r | * | |
| 2 Egyptiana | F | a | m | y | gg | m | e | p | f | ** | |
| 3 Porto Rico | F | a | vl | oy | gg | m | e | gp | vp | ** | |
| 4 Pernambuco | dn | s | dy | v | vs | m | g | p | p | ** | |
| 5 Spanish | F | a | m | rg | g | f | e | g | p | ** | |
| 6 Cayenne | F | a | l | oy | vg | f | m | g | p | ** | |

Remarks.—All varieties of Pineapples are adapted to South Florida with light protec-

tion, 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 Spanish, Porto Rico, and Cayenne are grown most extensively for market. The Egyptian Queen, and Pernambuco are grown for market less extensively. These remarks apply to the East Coast.

In the numerous and extensive shedded pineries of Orange County and the West Coast, which are cultivated on an intensive system, the Cayenne is planted almost exclusively.

BANANAS—*Musa*.

(See Explanation of Abbreviations on page iii.)

| NAMES (Varieties.) | Origin. | DESCRIPTION. | | | | | | | Adaptability. | | | |
|------------------------------|---------|--------------|-------|-------|--------|----------|---------|--------|--------------------|--------------------|------------------|-------------------|
| | | Fruit. | | | | | Tree. | | Western North Fla. | Eastern North Fla. | Central Florida. | Southern Florida. |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | | | | |
| 1 Baracoa (Red Jamaica) | W I | d s | l | | r | g | | v | p | — | — | ** |
| 2 Cavendish | E I | d s | m | | y | b | | v | p | — | — | ** |
| 3 Dacca | | d n | m | | y | g g | | v | p | — | — | ** |
| 4 Golden (Tahiti?) | W I | d n | l | | y | g | | v | p | — | — | ** |
| 5 Harts Choice | W I | d n | s | | y | b | | v | p | — | * | ** |
| 7 Orinoco ("Horse Banana"). | S A | d c n | l | | y | f | | v | p | — | * | ** |

Remarks—On varieties as numbered above. Nos. 1, 2 and 4, general market; 3, 5 and 7, 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." 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. paradisica 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 iii.)

| NAMES | Origin. | DESCRIPTION. | | | | | | | Adaptability. | |
|-------------------------------------------------------------------|---------|--------------|-------|-------|--------|----------|---------|--------|---------------|--------------------|
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Tree. | |
| 1 Group of Common Guava (P. Guaiava) many unnamed varieties | W I | d c n | | | | s & f | v | v p | — | Western North Fla. |
| 2 Cattley (P. Cattleyanum) | A | c n | s | r | r | s & f | v | p | * | Eastern North Fla. |
| 3 Chinese (P. Lucidum) | | c n | s | r | y | s & f | v | p | * | Central Florida. |
| 4 Guinea (P. Guineense) | | d c n | l | p | y | s & f | v | p | ** | Southern Florida. |
| 5 Guisaro (P. Molle) | | c n | m | r | y | s & f | v | p | ** | |

Remarks.—On varieties as numbered above. 2 and 3 hardy; No. 5 quite acid.

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 Indica*.

(See Explanation of Abbreviations on page iii.)

| NAMES. | Origin. | DESCRIPTION. | | | | | | | Adaptability. | |
|-----------------|---------|--------------|-------|-------|--------|----------|---------|--------|---------------|--------------------|
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Plant. | | |
| 1 Mulgoba | E I | d c n | | k | y & r | b | s | v | v p | Western North Fla. |

Remarks.—A large number of seedling mangoes are grown. Many of these are referred to as No. 11, and, while they have a group resemblance to one another, still they are distinct in varietal characteristics. A considerable number of named varieties are now being tested. Among these may be mentioned, Alfonse, Soondershaw, and Gordon.

MINOR TROPICAL FRUITS.

| NAMES. | Origin. | DESCRIPTION. | | | | | | | | | Adaptability. | | | |
|-----------------------------------------------------------|---------|--------------|-------|-------|--------|----------|---------|--------|---------------|-------------------|---------------|------------|--------------------|------------------|
| | | Fruit. | | | | | Tree. | | | | Western Fla. | North Fla. | Eastern North Fla. | Central Florida. |
| | | Use. | Size. | Form. | Color. | Quality. | Season. | Vigor. | Prolificness. | Southern Florida. | | | | |
| 1 Akee (<i>Cupania sapida</i>) | Af | c | l | r | r | g | s | v | p | - | - | - | - | * |
| 2 Avocado (<i>Persea gratissima</i>) | W I | dcs | l | p | ygp | g | s & f | v | p | - | - | - | - | ** |
| 3 Barbadoes Cherry (<i>Malpighia glaba</i>) | Bar | dc | s | r | y | g | s | v | p | - | - | - | - | * |
| 4 Carissa arduina | Natal | d c | m | ob | r | g | s | v | p | - | - | - | - | ** |
| 5 Cashew (<i>Anacardium occidentale</i>) | S A | c | m | ob | y & r | g | s | v | p | - | - | - | - | ** |
| 6 Ceriman (<i>Monstera deliciosa</i>) | J A | d | l | ob | y g | vg | s | v | p | - | - | - | - | ** |
| 7 Cherimoya (<i>Anon cherimolia</i>) | S A | dn | l | e | bry | g | s | v | p | - | - | - | - | ** |
| 8 Custard Apple (<i>Anona reticulata</i>) | W I | dn | l | c | g | g | s | v | p | - | - | - | - | * |
| 9 Downy myrtle (<i>Myrtus tomentosus</i>) | I | - | s | ob | pr | gg | s | v | p | - | - | - | - | ** |
| 10 Egg-fruit (<i>Lucuma rivicoa</i>) | C | d | m | cg | y | f | s | v | p | - | - | - | - | ** |
| 11 Granadilla (<i>Passiflora edulis</i>) | V I | dc | m | r | g | g | s | v | p | - | - | - | - | * |
| 12 Granadilla (<i>Passiflora quadrangularis</i>) | C A | d c | l | ov | g | g | s | v | p | - | - | * | - | * |
| 13 Indian Fig Cactus (<i>Opuntia ficus-Indica</i>) | I | c | l | ov | r | g | s | v | p | - | - | * | - | * |
| 14 Jamaica Sorrel (<i>Hibiscus sabdipiffa</i>) | M | c | l | ov | r | | s | v | p | - | - | * | - | * |
| 15 Kei Apple (<i>Aberia Caffa</i>) ... | A | c | s | ov | r | f | | v | p | - | - | - | - | * |
| 16 Limeberry (<i>Triphrasia aurantiola</i>) | P | c | s | ov | r | | | v | p | - | - | - | - | ** |
| 17 Mamme Apple (<i>Mammea Americana</i>) | W I | ds | l | r | pr | g | s | v | p | - | - | - | - | * |
| 18 Mamme Sapota (<i>Lucuma mammosa</i>) | W I | ds | l | e | y | g | s | | | - | - | - | - | * |
| 19 Otaheite Gooseberry (<i>Cicca disticha</i>) | W I | c | s | r | w | g | ev | v | p | - | - | - | - | ** |
| 20 Pawpaw (<i>Carica papaya</i>) ... | E & WI | dcn | l | e | y | f | sp&s | v | p | - | - | - | - | * |
| 21 Rose Apple (<i>Eugenia Jam-bos</i>) | E I | dc | m | r | ly | f | ev | v | p | - | - | - | - | ** |
| 22 Sapodilla (<i>Achras sapota</i>)... | W I | ds | m | r | br | g | | v | p | - | - | - | - | ** |
| 23 Sapota blanco (<i>Casimiroa edulis</i>) | M | ds | m | c | g | g | s | v | p | - | - | - | - | * |
| 24 Sour Sop (<i>Anon muricata</i>).. | W I | c | l | c | g | g | s | v | p | - | - | - | - | * |
| 25 Spanish Lime (<i>Melicocca biguga</i>) | W I | d | s | r | g | g | s | v | p | - | - | - | - | * |
| 26 Star Apple (<i>Chrysophyllum cainito</i>) | W I | dc | m | r | g | g | sp | v | p | - | - | - | - | ** |
| 27 Sugar Apple (<i>Anona squamosa</i>) | W I | dc | m | c | g | g | s&f | v | p | - | - | - | - | ** |
| 28 Surinam cherry (<i>Eugenia michelia</i>) | E I | dc | s | r | rb | g | s | v | p | - | - | * | - | ** |
| 29 Tamarind (<i>Tamarindus Indicus</i>) | E I | ds | sm | pod | br | f | ev | v | p | - | - | - | - | ** |

NUTS.

(See Explanation of Abbreviations on page iii.)

| NAMES | Origin. | DESCRIPTION. | | | | | Adaptability | | | |
|------------------------------------------------------------------------|---------|--------------|-------|----------|--------|----|---------------|--------------|------------|--------------------|
| | | Fruit. | | | Tree. | | Prolificness. | Western Fla. | North Fla. | Eastern North Fla. |
| | | Use. | Size. | Quality. | Vigor. | | | | | |
| Chestnuts—Castanea | | | | | | | | | | |
| 1 Chinquapin (<i>C. pumila</i>) | A | d n | s | v g | v | p | * | * | * | * |
| 2 Japan Chestnut (<i>G. Japonica</i>) | F | dcs | v l | g | v | gg | * | * | * | * |
| Pecans—Carya olivoformis | | | | | | | | | | |
| 3 Centennial | La | ds | l | b | v | p | ** | ** | ** | * |
| 4 Frotscher | La | ds | l | b | v | p | ** | ** | ** | ** |
| 5 Schley | Miss | ds | l | b | v | p | ** | ** | * | * |
| 6 Stuart | Miss | ds | l | b | v | p | ** | ** | ** | ** |
| 7 Van Deman | La | ds | l | b | v | p | ** | ** | * | |
| Walnuts—Juglans. | | | | | | | | | | |
| 8 Japan Walnut (<i>J. Seiboldiana</i> ; <i>J. cordiformis</i>) | F | d | m | b | v | p | † | † | † | † |
| Cocoanuts. | | | | | | | | | | |
| 9 Seedlings | F | dcs | 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 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.

MISCELLANEOUS FRUITS.

STRAWBERRIES—(*Fragaria*.)

(See Explanation of Abbreviations on page iii.)

| NAMES (Varieties.) | Origin. | DESCRIPTION. | | | | | | | | | | Adaptability. | | | |
|--------------------|---------|--------------|------|-------|-------|--------|----------|--------|---------|--------|----------------|---------------|------------|--------------|------------------|
| | | Fruit. | | | | | | | | Plant. | | | | | |
| | | Sex. | Use. | Size. | Form. | Color. | Quality. | Flesh. | Season. | Vigor | Productiveness | Western Fla. | North Fla. | Eastern Fla. | Central Florida. |
| 1 Brandywine | A | B | d n | l | c | c | f | f | l | m | f | ** | ** | * | |
| 2 Cloud | A | P | a | l | bo | dc | f | m | el | v | p | ** | ** | | |
| 3 Clyde | A | B | a | l | c | c | b | f | el | v | p | ** | ** | * | |
| 4 Excelsior | A | B | a | m | ol | dc | fg | m | ve | m | p | * | * | ** | ** |
| 5 Hoffman | A | B | s | m | c | dc | ff | f | ve | m | f | * | * | ** | ** |
| 6 Klondike | A | a | l | dc | g | f | e | v | v | p | * | * | * | * | |
| 7 Michel | A | B | d n | l | bc | yr | v | s | ve | v | p | * | * | * | * |
| 8 Murray | A | P | a | o | dc | m | f | ve | v | vp | ** | ** | * | | |
| 9 Newnan | A | B | a | m | o | c | g | f | e l | v | f | ** | ** | ** | ** |
| 10 Nick Ohmer | A | P | n | l | c | dc | b | m | l | v | p | ** | * | | ** |
| 11 Phenomenal | F | B | a | l | c | dc | b | f | el | v | p | * | | | ** |
| 12 Rising | A | P | a | m | ol | dc | m | f | ve | v | vp | ** | | | |
| 13 Thompson | A | B | s | l | o | sc | f | f | e | m | 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. Rising 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, Early, Splendid, Pride of Cumberland and Gandy have been tested and condemned. Klondike is a recent introduction of great promise, and has been given a place in the list of desirable varieties.

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